Moderators of Outcome in a Brief Family-Centered Intervention for Preventing Early Problem Behavior

FRANCES GARDNER, CHRISTOPHER TRENTACOSTA, DANIEL SHAW, THOMAS J. DISHION, MELVIN WILSON

ABSTRACT

This study investigates moderators of change in early conduct problems, in a brief family-centered intervention for low-income families, already found to be effective for improving conduct problems, positive parenting and maternal depression. 731 high-risk 2-3 year-olds were randomized to the Family Check Up parenting intervention, or to a no-intervention control group. Moderator analyses examined socio-demographic, parent psychosocial and child risk factors as predictors of change in conduct problems from age 2-4. Results showed that presence of two parental risk factors (teen parent / low educational attainment) predicted greater improvement in conduct problems following intervention, compared to families with lower risk. Other risk factors showed no predictive effects. Overall, findings suggest that a brief family-centered intervention can be effective in reaching the most distressed and disadvantaged families within a high-risk, low-income sample. The findings present a relatively optimistic picture of outcomes for very hard-to-reach families, compared to some extant literature on parenting interventions. A brief intervention which can reach the most marginalized families is likely to have potential to be taken to scale, and thus to have a public health impact.

Keywords: problem behavior, early prevention, moderators, parenting, conduct problems

There is a substantial body of evidence from randomized trials to show that parenting interventions are effective in preventing child problem behavior (Kazdin, 2002). Many of these studies can be termed ‘efficacy trials’, as they are conducted in relatively specialist settings such as research institutes and university-based clinics. A more recent development in the field has been to develop and test effectiveness of interventions for high-risk families that have the potential for widespread dissemination into real-world, community settings (Dishion & Kavanagh, 2003; Gardner, Burton & Klimes, 2006; Hutchings et al., 2007; Webster-Stratton, 1998). Key ingredients likely to enhance the transportability of interventions ‘to scale’ include developing modified interventions that are brief and low cost (Dishion, Nelson, & Kavanagh, 2003; Shaw, Dishion, Supplee, Gardner & Arnds, 2006; Turner & Sanders, 2006), and ensuring that interventions are adapted for engaging the most marginalized families. It is generally accepted the brief, low cost interventions in community settings that have even small effect sizes could potentially be translated into large public health benefits (Biglan & Taylor, 2000).

A key issue underlying the potential to have a public health impact is whether such brief interventions are effective for the most troubled or hard-to-reach families in society, or whether they work better for more advantaged families, as reported in a recent meta-analysis of parent training interventions (Reyno & McGrath, 2006). This is especially true for interventions to prevent problem behavior in children and adolescents, as the hard-to-reach families are also those most likely to have children showing early onset behavior problems, which can escalate to multiple problem behaviors by adolescents (Moffitt, 1993; Patterson & Yoeger, 1993). Accordingly, this paper investigates through moderator analyses, which families and children benefit from a brief intervention (Dishion et al., 2007; Shaw et al., 2006) for early prevention of problem behavior in low-income toddlers and preschoolers.
The Early Steps trial (Dishion et al., 2007; Gardner, Shaw, Dishion, Burton, & Supplee, in press; Shaw et al., 2006) is a randomized trial of a brief family-centered intervention, Dishion & Kavanagh’s (2003) Family Check-Up (FCU), aimed at the early prevention of conduct problems and risk of later drug use through enhancing parenting skills and addressing domains that compromise parental functioning (e.g., social support, parental well-being, neighborhood resources). It focuses on low-income families with toddlers, screened for risk factors for early-starting problem behavior. It draws extensively on developmental knowledge of risk factors for early-starter conduct problems, and their continuities with later risk behaviors (Moffit & Caspi, 2001; Shaw, Bell, & Gilliom, 2000; Shaw, Gilliom, Ingoldsby, & Nagin, 2003). Engaging high-risk families in preventive interventions poses many challenges, stemming from their multiple problems and from the fact that they have not requested help. Thus an important feature of the FCU is the use of Motivational Interviewing (Miller & Rollnick, 2002) techniques to enhance engagement and motivation for change in parenting. Central to the intervention is the use of individualized feedback from a detailed home-based assessment of the child and family needs, as well as videotaped observation tasks. The shared feedback process is a crucial part of engaging the family, which ensures the intervention is closely tailored to their needs and goals, and that the parents are, as far as possible, motivated and ready for change. These factors also make it more likely that a brief parenting intervention will be effective (Dishion & Kavanagh, 2003; Dishion & Stormshak, 2006).

The FCU was originally developed and shown to be effective for high-risk adolescents as a preventive intervention, embedded in the public school system (Dishion et al., 2003). For early childhood prevention, an accessible community service that reaches a high proportion of low-income toddlers throughout the USA is the Women, Infants, and Children program (WIC), a national program for family nutrition supplement and support. Findings from a pilot study (Gardner et al., in press; Shaw et al., 2006), and from a large multi-site trial, involving 731 high-risk toddlers recruited from urban, rural and suburban WIC sites (Dishion et al., 2007) show clear intervention effects at age 3 and 4 on positive parenting skill and child problem behavior. In both trials, change in positive parenting appeared to account for change in the primary outcome, child problem behavior. Furthermore, in the multi-site trial, there were also significant intervention effects on maternal depression (Shaw, Connell, Dishion, Wilson, & Gardner, 2007) and on children’s school readiness (Lunkenheimer et al., 2007), including language development and self-regulation. Analyses of two basic demographic factors, child gender and ethnicity (Dishion et al., 2007), revealed that there were no differences in intervention effects by gender or ethnicity.

Given these preventive intervention effects on child problem behavior, it is important to evaluate whether the FCU intervention has beneficial effects across the whole sample, or whether there are subgroups of the most distressed and disadvantaged families for whom the intervention is less effective. For example, where parents are depressed, unsupported, or have very low educational attainments, is the intervention less effective? Or do children with higher levels of attention problems or internalizing symptoms benefit more or less from the intervention? These questions are investigated through moderator analyses; these are important for informing the next generation of intervention and prevention trials, and for directly informing practice. Identifying those who respond differently to intervention may lead to investigation and understanding of subgroups for whom there may be distinct causal patterns or prognoses (Hinshaw, 2002). Clinically, moderator analyses are helpful in identifying with greater precision types of clients for whom an intervention may be particularly suitable, or conversely, subgroups for whom there might be iatrogenic effects or the need for extra therapeutic effort. Findings may provide evidence to practitioners that interventions can be effective for client groups traditionally thought to be hard-to-treat, or alternatively suggest that specific interventions are less fruitful for families living in the context of high adversity.

In an intervention trial, the relevant question is whether intervention effects are conditional (“moderated”) on characteristics of the target population at baseline. Crucially, moderation is defined as a statistical interaction between the baseline characteristic and the intervention effect (Hinshaw, 2002; Kraemer, Wilson, Fairburn, & Agras, 2002). Thus, moderators are distinct from ‘predictors’ of outcome, which may be associated with outcome equally across treatment and control groups (Beauchaine, Webster-Stratton, & Reid, 2005; Hinshaw, 2002), or may be tested within the treatment group only (e.g. Reyno & McGrath 2006; Dumas & Wahler, 1983).

In the field of parenting interventions for problem behavior, there are relatively few analyses of moderators, but many studies of predictors of outcome (Kazdin & Wassell, 1999, Dumas & Wahler, 1983, Webster-Stratton, 1985), including a recent meta-analytic review (Reyno & McGrath, 2006). This review suggested that parents under high levels of distress, including those with low income, depression, and children with severe behavior problems do not benefit as much from parenting programs as those fac-
ing lower levels of adversity, showing higher rates of drop out, and lower rates of success if they attend. However, some other recent studies reached rather different conclusions. For example, Beauchaine et al. (2005) pooled data from five clinic-based trials of Webster-Stratton’s Incredible Years program. In predictor analyses, they found that younger parents, those with a history of substance abuse, and children with co-morbid anxiety or depression did better in parent training than families without such risk factors present. Furthermore, in moderator analyses, mothers with poor marriages or higher levels of depression, also fared better in parent training, compared to those who were less distressed. In a pooled sample of 630 low-income parents of children in Head Start nurseries, participating in preventive trials of the same intervention, Baydar, Reid, and Webster-Stratton (2003) found that mothers who were depressed, or who had a history of abuse or substance use were just as likely to benefit from the program, as those without such risk factors. Using the same sample, Reid, Webster-Stratton, and Beauchaine (2001) analyzed multiple measures of child and parent outcome, engagement and attendance by ethnicity, finding that intervention effects and satisfaction were equally strong across four ethnic groups.

In keeping with these recent findings, data from a pilot randomized trial of the FCU suggested that parents experiencing high levels of both parent and child risk were the most likely to engage. Specifically, it was found that parents who were more depressed and children observed to be high on fearlessness at age 2 were most likely to benefit from the FCU, and the interaction between child temperament and intervention outcome was statistically reliable in relation to age 4 conduct problems (Shaw, Dishion et al., 2006). In work with adolescents it was found that parents of young adolescents involved with deviant peers, parents and children with high levels of conflict, and single parents were most likely to engage and benefit from the FCU intervention. However, there were no statistical interactions between these baseline characteristics and intervention outcome (Connell, Dishion, Yasui, & Kavanagh, in press).

Together, these trials and meta-analysis present a somewhat mixed picture of whether parenting interventions in general are successful at engaging the most distressed and disadvantaged families within high-risk or treatment samples. Some appear to be successful at helping very troubled families, including the Webster-Stratton group-based parenting program, which appears to achieve this by careful attention to parent engagement and accessibility of intervention (Hutchings, Bywater & Daley, in press). Using a much briefer intervention, the FCU, which employs a distinct and innovative approach to engagement using Motivational Interviewing strategies in the home, we might also expect to obtain comparable or better results with the most distressed families, as was found in the Early Steps Pilot Study (Shaw et al., 2006). However, the present study, by using a much larger sample than most other parent intervention studies, provides a more precise and reliable test of moderating mechanisms.

The aim of the present paper is to test whether there are differential intervention effects on child problem behavior, by child or family risk factors, in the multi-site Early Steps trial. 731 low-income toddlers were screened as high risk for problem behavior in WIC centers, and randomly allocated to a brief assessment-driven early parenting intervention, the FCU, or to no intervention. Main trial outcomes are reported by Dishion et al. (2007). For the present paper, we followed prior literature on predictors of intervention change (Reyno & McGrath, 2006), and examined two sets of potential moderators of outcome: Family and parent risk factors included the following risk variables assessed at the initial assessment when children were age 2 to 2 years 11 months old: mother a lone parent, teen parent, low maternal educational level, very low family income, maternal drug or alcohol problems, high levels of maternal depression, perceived hassles or partner problems. Child risk factors included high levels of attention problems, externalizing and internalizing symptoms. For all analyses, the dependent variable was the primary outcome of the trial, change in conduct problems from age 2 to 4. We did not have specific hypotheses about whether higher levels of individual family, parent, or child risk factors would be associated with greater improvements in child disruptive behavior. However, based on prior research, in particular findings the ES Pilot study, we postulated that when group differences emerged, they would tend to show better intervention outcomes for families with higher versus lower levels of initial family, parent, and child adversity.

Method

Participants

Ethical approval was granted by the Institutional Review Board at all authors’ institutions. Parental written consent was obtained both for screening and trial stages of the study. 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 as at or above 1 SD above normative averages on one or more 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 educational achievement and low family income using WIC criteria). For inclusion in the sample, high risk status on at least two of the three risk domains was required. In cases where the high risk criterion was not met for child behavior, children were required to have above average scores on either the Eyberg Child Behavior Inventory Intensity or Problem scales (Robinson, Eyberg, & Ross, 1980) to increase the probability that parents would be motivated to change this behavior.

Recruitment. Initially, 1666 families with a 2-year-old child were screened at WIC sites across the three study sites, of which 879 met eligibility requirements, and 731 (83%) agreed to participate. 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% girls), 37% each were recruited in Pittsburgh and Eugene, and 26% in Charlottesville. Across sites, primary caregivers’ self-identified ethnicity was as follows: 28% African American, 50% European American, 13.0% biracial, and 9% other groups. Thirteen percent self-reported as Hispanic American. Over two-thirds of families had an annual income of less than $20,000 (in 2002-3), and the average number of family members per household was 4.5 (SD = 1.63).

Retention. Of the 731 families who initially participated, 659 (90%) participated at the one-year, and 619 (85%) at the two-year (age 4) follow-up. At ages 3 and 4, selective attrition analyses revealed no significant differences by site, race, ethnicity, or gender, levels of maternal depression, or children’s externalizing behavior. Furthermore, no differences were found in the number of participants who were not retained in the control versus intervention groups at ages 3 (n = 40 and n = 32, respectively) and 4 (n = 58 and n = 53).

Measures
All measures were administered at the age 2, 3 and 4 home visits. However, we report on risk factors assessed at baseline (age 2), and problem behavior at age 2 and 4.

Demographics questionnaire. A demographics questionnaire was administered to mothers, including questions about family structure and risk factors, defined as follows: Lone parenthood, as having no partner living in the household; teen parenthood as being <18 years old at the birth of the first child; very low family income as <$10k per year; and low maternal educational level as having completed less than a high-school education.

Parent substance use. Mother’s current drug or alcohol problem was defined, via questionnaire (Dischion & Kavanagh, 2003), to include one or more of the following: (a) argumentative or irritable when drinking; (b) drink every day and drink 3-4+ drinks most days; (c) use marijuana or hard drugs more than once per month; (d) use more than one hard drug once per month.

Maternal depression. We used the Center for Epidemiological Studies on Depression Scale (CES-D; Radloff, 1977), a well-validated, widely used 20-item measure of depressive symptoms. Participants report frequency of experiencing listed depressive symptoms during the past week on a scale ranging from 0 (0–1 day) to 3 (5–7 days). Items are summed to create an overall depressive symptoms score.

Early childhood problem behavior. The Eyberg Child Behavior Inventory (ECBI) was administered, a widely used 36-item measure of childhood problem behavior (Robinson et al., 1980). We used the Problem Scale, the primary outcome for the trial, which asks caregivers to report whether or not the behavior is a problem for the parent. The inventory has been shown to be highly correlated with independent observations of children’s behavior, to differentiate clinic-referred and nonclinic populations, and shows high test–retest reliability (.86) and internal consistency (.98) (Robinson et al., 1980).

For baseline assessment of child problem behaviors, we used the 99-item Child Behavior Checklist for ages 1.5–5 years (CBCL; Achenbach & Rescorla, 2000), including two broad-band factors, Internalizing and Externalizing, and the Attention Problems subscale.

Parenting daily hassles (PDH; Crnic & Greenberg, 1990). The PDH is a measure of typical daily stressors perceived by parents, found to be associated with child behavior outcome to a greater degree than life stresses that are more global in nature (Crnic & Greenberg, 1990). In the present study, the PDH was administered to mothers, and the scale of perceived frequency of daily stressors was used (Cronbach’s alpha = .81).

Partner relationship quality. Maternal perception of the level of satisfaction in her significant-other relationship was assessed using the short form of the Marital Adjustment Test (MAT; Locke & Wallace, 1959). On this scale, high scores represent higher satisfaction. Prior research shows that this measure
differentiates between harmonious and disturbed marriages (Locke & Wallace, 1959; Rosenbaum & O’Leary, 1981) and also predicts child behavior problems (Emery & O’Leary, 1982). Where mothers were recently separated, they were asked to report on that period of the past year when they were still living with their partner. Where mothers were not married, they were instructed to complete the scale on their most intimate adult relationship, including their live-in, or current dating partner. The word or “close relationship” was substituted for “marriage.” This strategy is sensitive to the fact that 40% of the mothers in the study were single, and allowed for the inclusion of important information on a close relationship considered by the mothers to have primacy.

Procedures

Assessment protocol. Parents and children who agreed to participate in the study were scheduled for a 2.5-hour home visit. Each assessment began with a series of observational tasks including free play, clean-up, teaching tasks, meal preparation and lunch; these parent-child interaction data were used for investigating outcomes and mediators, and for parent feedback, and are not further reported here. Parents also completed questionnaires during the home visit. The home visit and observation protocol was repeated at age 3 and 4 for control and intervention groups. Families received $100 for age 2, and $140 for participating in the age 4 assessment.

The randomization sequence was computer-generated by a staff member who was not involved with recruitment, and was stratified by gender. To ensure allocation concealment, 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 for follow-up assessments were not informed of families’ allocation.

Relevant to this study, we present outcomes in terms of change in child problem behavior from age 2 to 4 (parent-reported ECBI Problem Scale score), and baseline data on demographic and psychosocial risk factors from the age 2 assessment.

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 (Dishion & Kavanagh, 2003; Dishion & Stormshak, 2006) and modeled after the Drinker’s Check-Up (Miller & Rollnick, 2002), consisting for this trial of an assessment (baseline), randomization, an initial interview, a feedback session, and dependent on family preference, possible follow-up sessions. Families were given a $25 gift certificate for completing the FCU at the end of the feedback session.

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 was a detailed 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., co-parenting), and contextual issues (e.g., daycare, partner relationship, housing).

All parent consultants had Ph.D- and master’s-level qualifications and experience in family interventions, but, at the study’s outset, no experience in using the FCU. They 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 families, parent consultants were certified by lead consultants at each site who had been certified by the intervention developer. 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, and was repeated yearly. Weekly cross-site video-conferences also helped to enhance fidelity. Finally, annual parent consultant meetings were held to update training, and address issues related to 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 age 2 and 65.4% at age 3. Of those families who met with a parent consultant, the average number of sessions per family was 3.3 (SD = 2.8) at age 2 and 2.8 (SD = 2.7) at age 3, including the initial interview and feedback as two of those sessions. We used an intention-to-treat design, including in all analyses the 22% of families assigned to the intervention group who did not participate in the FCU.
Descriptive statistics for all variables analyzed in the present study at baseline by treatment allocation are shown in Table 1. The families showed high levels of disadvantage, including nearly 80% being below the poverty line (or 29% below $10k), and 40% of mothers being lone parents. Furthermore, 45% of mothers were above the clinical cut-off for depression (16 on the CES-D), and 44% of children at age 2 were above the clinical cut-off on the ECBI Intensity scale (132 in the re-standardization sample; Colvin, Eyberg, & Adams, 1999). Consistent with random assignment, there were no differences between the groups on baseline demographic or behavioral characteristics.

Analysis Strategy
The dependent variable for all analyses was the ECBI Problem scale score. Change scores represented positive improvement; thus change was calculated as the child age 2 minus age 4 ECBI Problem score. All predictor variables were measured at baseline, and included five binary variables: lone parent, very low income, teen parent, parent less than high school education, parent substance use problem; three continuous parental risk variables: parent depression, daily hassles, and partner relationship problems; and three continuous child risk factors: the CBCL Internalizing Factor score, CBCL Externalizing Factor score, and the CBCL Attention Problems scale score. In order to show clearly the building blocks of the multivariate analysis, we first present predictors of change in the intervention group by comparing, for each binary variable, pre-post intervention change (ECBI) by ‘risk’ group (Table 2). For each continuous predictor, we present predictors as correlations between baseline scores and intervention change (Tables 3, 4). For comparison, we also show predictors of change over the same time period in the control group (Tables 2, 3, 4). Secondly, using the whole sample we examined moderators of intervention effects using linear multiple regression, carrying out a separate regression for each risk variable. In step 1, intervention status and risk factor were entered, followed by in step 2, the interaction term (risk factor x intervention status). Tables 5, 6, 7 show each regression analysis; for ease of reference, we also summarize the moderator regression findings in Tables 2, 3 and 4.

### Results

Descriptive statistics for all variables analyzed in the present study at baseline by treatment allocation are shown in Table 1. The families showed high levels of disadvantage, including nearly 80% being below the poverty line (or 29% below $10k), and 40% of mothers being lone parents. Furthermore, 45% of mothers were above the clinical cut-off for depression (16 on the CES-D), and 44% of children at age 2 were above the clinical cut-off on the ECBI Intensity scale (132 in the re-standardization sample; Colvin, Eyberg, & Adams, 1999). Consistent with random assignment, there were no differences between the groups on baseline demographic or behavioral characteristics.

### Analysis Strategy

The dependent variable for all analyses was the ECBI Problem scale score. Change scores represented positive improvement; thus change was calculated as the child age 2 minus age 4 ECBI Problem score. All predictor variables were measured at baseline, and included five binary variables: lone parent, very low income, teen parent, parent less than high school education, parent substance use problem; three continuous parental risk variables: parent depression, daily hassles, and partner relationship problems; and three continuous child risk factors: the CBCL Internalizing Factor score, CBCL Externalizing Factor score, and the CBCL Attention Problems scale score. In order to show clearly the building blocks of the multivariate analysis, we first present predictors of change in the intervention group by comparing, for each binary variable, pre-post intervention change (ECBI) by ‘risk’ group (Table 2). For each continuous predictor, we present predictors as correlations between baseline scores and intervention change (Tables 3, 4). For comparison, we also show predictors of change over the same time period in the control group (Tables 2, 3, 4). Secondly, using the whole sample we examined moderators of intervention effects using linear multiple regression, carrying out a separate regression for each risk variable. In step 1, intervention status and risk factor were entered, followed by in step 2, the interaction term (risk factor x intervention status). Tables 5, 6, 7 show each regression analysis; for ease of reference, we also summarize the moderator regression findings in Tables 2, 3 and 4.
are equally likely to improve whether mother is more depressed (or hassled) or not, in both groups.

**Partner relationship quality.** Across both randomized groups, for the subsample (n = 412) with a regular or live-in partner, there was a marginal moderation effect (β = .10, p = .055) of partner relationship quality on intervention outcome, such that children whose parents report high satisfaction, show more improvement with intervention.

**Continuous Child Risk Variables as Moderators of Intervention Change (Tables 4 & 7)**

There were no moderator effects of child internalizing, externalizing or attention problem scores at baseline, suggesting that children with higher levels of these problems are just as likely to benefit from the intervention as others.

**Discussion**

These findings suggest a very brief family-centered intervention is successful in improving early child problem behavior, even among the most distressed and disadvantaged families within an already high risk, low income sample. Specifically, the moderator analyses found that two family risk factors predicted greater improvement in child conduct problems in response to a brief parenting intervention; thus parents with low educational level, and those who were teenaged when they had their first child, responded better to intervention than those who were more advantaged. On the other hand, there were no moderator effects for other variables; parents who were single, who were very depressed or hassled, who reported current drug or alcohol problems, or who had very low income, were equally likely to be helped by the intervention, compared to those with lower levels of risk on these variables. One risk factor marginally moderated outcome, in the direction of higher risk predicting smaller magnitude of change, namely poor partner relationship quality. Child problem behavior, including high levels of internalizing, externalizing and attentional problem symptoms at baseline, did not moderate outcome; thus children were equally likely to do well, irrespective of high or low levels of problem behavior symptoms at the outset. The present paper complements the findings of Dishion et al. (2007) and Shaw et al. (2007), which demonstrate effectiveness of the FCU for preventing problem behavior, and for addressing key risk factors, including parenting skill and maternal depression. They also show that the FCU is equally likely to reduce problem behavior for boys and girls, and for families of different ethnic groups (Dishion et al., 2007). The present paper extends these findings considerably, by showing that the intervention effects are not diminished in families with very high levels of distress and disadvantage, and indeed effects are stronger in the presence of some family risk factors.
program has a very strong evidence base, but is not particularly brief (12 group sessions), which may potentially limit its ability to be taken to scale. Furthermore, a group-based format may not suit all families. Potentially, the FCU provides an effective but brief route to engaging marginal families; however, to resolve questions of real-world effectiveness, such programs will need to be taken to scale and further tested for cost-effectiveness, as some community trials have begun to do (Tudor-Edwards, Ceilleachair, Bywater, Hughes, & Hutchings, 2007).

It is worth considering why it might be that teen mothers and those with very low educational attainment responded better to the intervention. It might be these risk factors are linked to more limited awareness of child development and parenting issues, and the structured feedback provided by FCU is particularly accessible and easy to understand, and therefore more useful for these parents. It is harder to interpret the data suggesting that parents with better partner relationships had somewhat better child outcomes. Since these analyses were based on a selected subsample of mothers (n = 412) with a partner to report on, consequently the most unsupported mothers were excluded from these findings.

Strengths of the present study include its very large and diverse sample, and, to our knowledge, this is the largest study to date of moderating mechanisms in a family or parenting intervention. The intervention is noteworthy for its careful attention to selection of participants and assessment-driven intervention, based on longitudinal predictive studies of youth problem behavior (Shaw et al., 2003), and novel techniques based on motivational interviewing, allowing a brief intervention to be effective. Limitations of the study include that the findings may not be generalizable to higher income, lower risk populations. Also, while the sample included reasonably high percentages of AA and EA families, we had proportionately fewer Hispanic families, and AA families were primarily concentrated in urban rather than rural or suburban neighborhoods. It is also worth noting that in the case of some risk variables, mothers were the informants for both the predictor and outcome variable. However, many of the risk variables were relatively objective demographic data, such as maternal age or education attainment, or tended to have little method overlap.

It is noteworthy that this study fails to replicate a more traditional pattern of findings, whereby family risk factors predict poor outcome, as found by Dumas and Wahler (1983), and by Reyno and McGrath’s (2006) meta-analysis. The more optimistic findings of the Early Steps trial are consistent with some other recent preschool parenting intervention trials, which also found as good or better results with more distressed and disadvantaged families (Baydar et al., 2003; Beauchaine et al., 2005, Gardner, Hutchings & Bywater, 2007). It is worth considering whether there are common factors that contribute to some interventions being more effective than others with very troubled or impoverished families. Crucial factors are likely to be accessibility and careful attention to client engagement and motivation (Hutchings et al., 2007). These factors are central to the FCU, with its use of shared assessment results to design an intervention led by client-needs, and its use of MI strategies. Furthermore, home-visiting can provide a more ecologically valid assessment of current family functioning and needs. The other trials showing evidence of stronger effects with the most distressed families used the Webster-Stratton (1998) program, which, like the FCU, has a strong focus on collaborative engagement with parents. However, in the Webster-Stratton program this was achieved through the use of a group-based program with an emphasis on non-didactic shared parent discussion and problem-solving. Accessibility is addressed in the FCU by locating assessment and intervention in the home, and in the Webster-Stratton group-based program by providing food, childcare and sometimes transport. The latter

<table>
<thead>
<tr>
<th>Drug problem</th>
<th>Depression</th>
<th>Hassles</th>
<th>Partner relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>β</td>
<td>Δ R²</td>
<td>β</td>
<td>Δ R²</td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk factor</td>
<td>-0.04</td>
<td>0.04*</td>
<td>-0.07</td>
</tr>
<tr>
<td>Intervention</td>
<td>0.11**</td>
<td>0.11**</td>
<td>0.10**</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk factor</td>
<td>-0.04</td>
<td>0.00</td>
<td>-0.06</td>
</tr>
<tr>
<td>Intervention</td>
<td>0.10</td>
<td>0.11**</td>
<td>0.11**</td>
</tr>
<tr>
<td>Interaction term</td>
<td>0.01</td>
<td>0.10</td>
<td>0.04</td>
</tr>
</tbody>
</table>

It is noteworthy that this study fails to replicate a more traditional pattern of findings, whereby family risk factors predict poor outcome, as found by Dumas and Wahler (1983), and by Reyno and McGrath’s (2006) meta-analysis. The more optimistic findings of the Early Steps trial are consistent with some other recent preschool parenting intervention trials, which also found as good or better results with more distressed and disadvantaged families (Baydar et al., 2003; Beauchaine et al., 2005, Gardner, Hutchings & Bywater, 2007). It is worth considering whether there are common factors that contribute to some interventions being more effective than others with very troubled or impoverished families. Crucial factors are likely to be accessibility and careful attention to client engagement and motivation (Hutchings et al., 2007). These factors are central to the FCU, with its use of shared assessment results to design an intervention led by client-needs, and its use of MI strategies. Furthermore, home-visiting can provide a more ecologically valid assessment of current family functioning and needs. The other trials showing evidence of stronger effects with the most distressed families used the Webster-Stratton (1998) program, which, like the FCU, has a strong focus on collaborative engagement with parents. However, in the Webster-Stratton program this was achieved through the use of a group-based program with an emphasis on non-didactic shared parent discussion and problem-solving. Accessibility is addressed in the FCU by locating assessment and intervention in the home, and in the Webster-Stratton group-based program by providing food, childcare and sometimes transport. The latter

<table>
<thead>
<tr>
<th>Attention problems</th>
<th>Externalizing</th>
<th>Internalizing</th>
</tr>
</thead>
<tbody>
<tr>
<td>β</td>
<td>Δ R²</td>
<td>β</td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk factor</td>
<td>-0.06</td>
<td>0.01*</td>
</tr>
<tr>
<td>Intervention</td>
<td>0.11**</td>
<td>0.11**</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk factor</td>
<td>-0.05</td>
<td>0.00</td>
</tr>
<tr>
<td>Intervention</td>
<td>0.11**</td>
<td>0.11**</td>
</tr>
<tr>
<td>Interaction term</td>
<td>0.01</td>
<td>0.00</td>
</tr>
</tbody>
</table>

* p < .10  ** p < .05 *** p < .01
with the outcome variable, child problem behavior. Even though we have randomization and an experimental design, measurement could have included the use of multiple methods and informants.

In conclusion, the Family Check-Up intervention holds much promise. When an intervention aims to be effective for very hard-to-reach families, then it is critical to test whether this is indeed the case, using moderator analyses. These findings suggest that the FCU is as effective, or more so, with the most distressed and disadvantaged families within an already low income sample, selected for having multiple risk factors for later problem behavior and drug use. Furthermore, because the FCU intervention is brief, and has the possibility for embedding within a widespread and accessible service system such as WIC, it means that, taken to scale, the FCU could have considerable public health impact.

References
Dishion, T., Shaw, D., Connell, A., Gardner, F., Weaver, C., & Wilson, M. (2007). The Family Check Up with high-risk families with toddlers: Outcomes on positive parent-
GARDNER, TRENTACOSTA, SHAW, DISHION, WILSON

Ford Press.