

Systematic Changes in Families Following Prevention Trials

Gerald R. Patterson,^{1,2} David DeGarmo,¹ and Marion S. Forgatch¹

Received

A selective prevention design was applied to 238 recently separated families. Of these, 153 mothers randomly assigned to the experimental (E) group participated in 14 group sessions focused on Parent Management Treatment (PMT). Prior analyses showed that, over time, the group of families in the untreated group deteriorated in both parenting practices and in child outcomes. In keeping with the classic prevention pattern, families in the E group showed modest improvements in parenting and in child outcomes. Improvements in parenting were associated with significant reductions in problem behavior. The data showed that those mothers who improved their parenting skills during the first 12 months also showed significant reductions in maternal depression during that same interval. A cross-lagged panel analysis showed that a reduction in maternal depression during the first year of the study was a significant predictor of maintenance or improvements over the next 18 months. The findings are consistent with the concept of the family as a system.

KEY WORDS: change; depression; family system; feed forward loop; treatment process.

This report explores the possibility that Parent Management Training (PMT) as applied in prevention trials, may set in motion changes in family process that have largely been ignored. The issue is explored in the context of data generated by randomized prevention trials for recently separated families (Forgatch & DeGarmo, 1999).

Several decades of highly successful findings from both clinical and prevention trials have raised some extremely interesting questions. PMT procedures were developed in the late 1960s. They were tailored especially for oppositional and antisocial children. A substantial number of randomized trial studies demonstrated that training in parenting practices can be employed successfully across settings for a wide range of samples (Bien & Bry, 1980; Eisenstadt, Eyberg, McNeil, Newcomb, & Funderbunk, 1993; Kazdin, 1997). These clinical trials were narrowly designed to answer questions about the significance and persistence of changes in child outcomes. None of the findings addressed the issue of why, when the intervention was terminated, did the parenting practices and child outcomes

not return to their baseline state? The studies also showed that the effects are maintained (DeGarmo, Patterson, & Forgatch, in press; Forehand & Long, 1988; Patterson & Fleishman, 1979; Webster-Stratton, Hollingsworth, & Kolpacoff, 1989). The results from these follow-up studies raise the related question of why the treatment effects are maintained during follow-up.

Finally, there is yet a third and even more puzzling phenomenon posed by some modern PMT-based prevention trials. In two prevention-intervention studies, PMT procedures were applied to moderate-risk samples (Forgatch & DeGarmo, 2002; Vitaro, Brendgen, & Tremblay, 2001). Both studies used repeated measures collected over the course of 3–7-year follow-up. The follow-up data posed an extremely interesting problem. In both studies, effect sizes comparing experimental (E) and control (C) group values for parenting measures and child outcomes actually increased during follow-up. The data showed that families in the comparison group continued to worsen, whereas families in the E groups showed modest improvements.

To begin understanding this complex outcome, we first examined what is being prevented, and why some families worsen and others improve. Macrolevel studies carried out at the national level suggest that being reared

¹Oregon Social Learning Center, Eugene, Oregon.

²Address all correspondence to Gerald R. Patterson, PhD, Oregon Social Learning Center, 160 East Fourth Avenue, Eugene, Oregon; e-mail: carleenr@oslc.org.

by single mothers increased the risk of incarceration as an adult (McLoyd, 1998). Furthermore, parental divorce had long-term negative implications for adult mental health (Chase-Lansdale, 1995). Hetherington (1989) found that in the years immediately following the separation, there was a significant increase in risk for boys' aggression, noncompliance, and underachieving. These findings were replicated in a longitudinal analysis by Martinez and Forgatch (2001).

It is important to note, however, that there is good reason to believe that some of the adjustment difficulties for children of divorced families may be linked with parenting problems that existed prior to the divorce (Block, Block, & Gjerde, 1986; Shaw, Emery, & Tuer, 1993). In this sense, for some families, the divorce process may amplify existing deviancy processes whereas in other families it creates deviancy processes that did not exist beforehand. Cherlin et al. (1991) examined findings from two national longitudinal surveys. After controlling for the predivorce adjustment as two-parent families, the data showed that from 11 to 20% of the boys in the now divorced samples were having adjustment problems. Data from passive longitudinal studies at both Virginia and Oregon showed that in these divorced families negative child outcomes were associated with disrupted parenting skills (Forgatch, Patterson, & Ray, 1996; Hetherington, 1989).

As noted earlier, in longitudinal randomized prevention trials with recently separated mothers, it was hypothesized that families in the untreated comparison group would show increasing disruptions in measures of parenting practices and in deviant child outcome. However, families receiving PMT would be expected to show modest gains or at least maintain an effective level of parenting practices. This group would also be expected to show modest reductions in levels of child deviancy. For example, in Fig. 1, findings from the Oregon Divorce Study (ODS) families in the untreated group showed systematic deterioration in parenting practices for both positive parenting (a composite of monitoring, problem solving, involvement, and encouragement) and coercive discipline (a composite of inept discipline, negative reinforcement, and negative reciprocity; see Martinez & Forgatch, 2001). Incidentally, the brief increase in coercive discipline confrontations at 6 months for families in the E group is a replication of prior findings from a clinical study by Stoolmiller, Duncan, Bank, and Patterson (1993). As the parent confronts the child on discipline issues the parent child interactions actually become more aversive for a short time. But the "struggle work through" pattern is also a predictor for future successful adjustment.

The data showed that by Month 12, there were already significant differences between the two groups. For

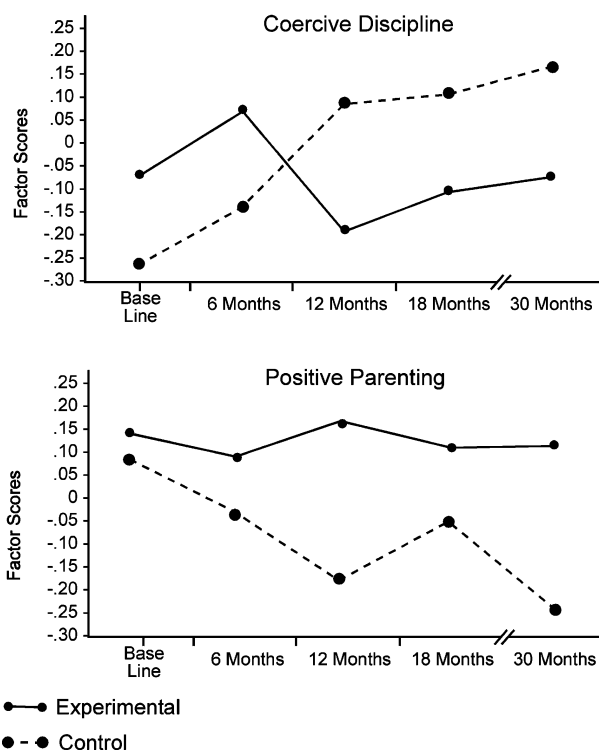


Fig. 1. The prevention effect for effective parenting practices (Martinez & Forgatch, 2001).

families in the untreated group, as parenting practices deteriorated, child outcomes worsened. In keeping with expectations, a comparison of the E and C groups showed that boys in the E group were significantly better adjusted on measures of compliance (Martinez & Forgatch, 2001), school achievement (Forgatch & DeGarmo, 1999), deviant peer relations, delinquency, and antisocial behavior (Forgatch & DeGarmo, 2002).

The findings are consistent with expectations for prevention trials. However, the findings also raise the key question of why one would expect single-parent families in the comparison group to deteriorate in both parenting practices and child outcomes. As a general case, studies have repeatedly shown that recently separated mothers experience dramatic increases in stressors (Forgatch, Patterson, & Skinner, 1988; Hetherington, 1989). Longitudinal studies have also shown that increased stress is accompanied by disrupted parenting practices (Conger, Patterson, & Gé, 1995; Forgatch, Patterson, & Ray, 1996). Although there are multiple components contributing to single-parent stress, the more interesting one is associated with the repartnering process. For example, Forgatch et al. (1996) modeled data that showed that frequent repartnering was a major contributor to the stress experienced by single mothers. Frequent repartnering was also associated

Systematic Changes in Families

623

with growth in child antisocial (Forgatch et al., 1996). In fact, there was an accumulative effect of prior relationship transitions (DeGarmo & Forgatch, 1999; Martinez & Forgatch, 2002) on child negative outcomes. In a similar vein, there was a linear relation between transition frequency (repartnering) and likelihood of early-onset police arrest (Patterson, 1996). Transition frequency also contributes to increasing risk for disrupted parenting (Capaldi & Patterson, 1994; Forgatch et al., 1996).

In the present context, the hypothesis would be that a subgroup of single mothers engages in frequent repartnering. Presumably, this subgroup contributes significantly to the increasing disruptions in parenting practices and concomitant increases in child deviancy. We suspect there may be several other trajectories that may lead to a similar outcome. For example, divorced mothers who become irritable-depressed are likely to have less confident support over time, which leads to future disruptions in parenting (DeGarmo & Forgatch 1997; Patterson & Forgatch, 1990). Alternatively, one might hypothesize that it is the absence of a father figure that leads to children acting out. However, follow-up findings show that children from widowed families do not tend to be aggressive.

Nor is there homogeneity within the intervention group of a prevention trial for parents or for children. Participating in parent group meetings suggests smorgasbord as a metaphor for thinking about the postseparation intervention process. The sessions provide an array of opportunities where each parent makes her own decision about what to work on and when. In some families, problems with the child are just developing. In other families, the parent may be concerned about the child's sadness or achievement or relationship problems with peers; others may be concerned with noncompliance or oppositional behavior. We hypothesized that at any given point during PMT intervention, there are only a few parents working on the same child problems. This is unlike the case for clinical interventions with families of aggressive children where samples are selected because they share a common set of symptoms. Within the first week or two, most parents in a clinical sample would be focused on some aspect of noncompliance. We believe these differences account for the 6-month delay in treatment effects observed in the ODS prevention trial (Forgatch & DeGarmo, 2002).

Such diversity of trajectories within a group design provides an excellent opportunity for evaluating the variance in systems of change. Even a casual reading of systems theory (Granic 2000; Lewis & Granic, 2000; Sameroff, 1989) would suggest that there may be much more going on during a prevention trial than is evident from simple pre- and postcomparisons of parenting practices and child outcomes. According to Sameroff (1989),

one of the prime characteristics of a system lies in its interconnectedness. At one level, this may simply be a loose way of saying that family process changes over time in an orderly fashion. It could also be interpreted to mean that some changes in a family member could correlate with changes in the behavior of another member during the same time interval. For example, change in the problem child might be accompanied by collateral changes in siblings as shown by Arnold, Levine, and Patterson (1975). Similarly, changes in child behaviors might accompany intervention-induced changes in marital relationships.

Our first attempt to explore the interconnectedness hypothesis focused on the changes that accompanied and followed participation in PMT presented during a series of group sessions (DeGarmo, Patterson, & Forgatch, in press). The analyses were focused on the interplay among measures of parenting practices, measures of child and maternal depression, and a number of child behavior problems. The variables were expressed as growth curves and were assessed at baseline, 6, 12, 18, and 30 months. Two types of collateral change were studied (Fig. 2). The first was a collateral change across members shared across time. Here, changes in the behavior of one member might covary with changes in feeling or behavior on the part of the other. An example of this kind of collateral change was found in a path coefficient of .51 between the changes in boys' antisocial behavior and changes in maternal depression, from baseline through 30 months. The second pattern of collateral changes that was of interest was within-agent changes across time. For example, the individual's feelings might be changing during the same time interval during which the child's behavior is changing. Within individuals, it was possible that changes in feelings (depression) would follow changes in their own behavior. The path coefficient from changes in boys' internalizing symptoms to changes in their antisocial behavior was $-.42$. Incidentally, in either case if the direction of effects was reversed, the model no longer fit.

Neither of these results was particularly surprising. What was surprising was that collateral effects such as these had not been noted before. It makes sense that there is probably some sort of reciprocal relation between changes in what people do and changes in how they feel. DeGarmo et al. (in press) also presented the data from an E by C comparison that suggested that the sequence of change itself might be orderly. It seemed that group differences in parenting and child antisocial behavior emerged first and was followed by later increasing effect sizes for both the boys' behavior and mothers' depression scores.

The current report examines a further derivative of the orderly sequence concept. It is hypothesized that collateral changes in how the mother feels (depression) may be a

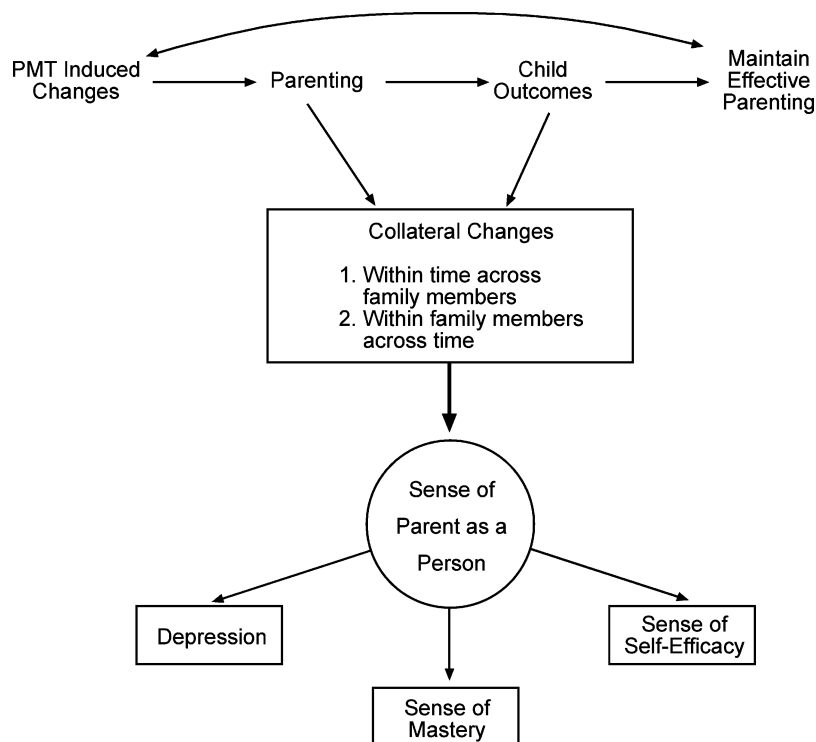


Fig. 2. Theoretical model of collateral changes during PMT.

predictor of later improvements in her parenting practices. This study extends the DeGarmo et al. (in press) analyses in two different ways. Their analysis of collateral change was based on the combined information from changes within the E group with the changes within the C group. The current report is focused only on the changes that occur within the E group. This permits a unilateral focus on PMT induced change per se. We also assumed that early changes in maternal depression might have a special significance for later stages of intervention.

Forgatch, Bullock, and Patterson (in press) discussed the different impact on family life between what parents do in terms of parenting practices and how it is that parents think and feel about themselves as a person. Carrying this distinction into the present context, it is assumed that PMT alters not only what the parent does in managing her child but also alters how she thinks and feels about herself as a parent. Furthermore, it is hypothesized that the collateral changes discussed in this study significantly impact the various indicators that define the latent construct for Parent as a Person. Although this study included measures for only the depression indicator, it seems reasonable to encourage other investigators to use a broader specification. In keeping with a broader perspective, Price's SEM

model (Price, 2003) showed that a sense of mastery was significantly related to reduced depression and both made unique contributions to long-term re-employment.

The indicator for maternal depression plays a key role in our model for collateral change. Recent findings in the research literature would lead one to believe that this same variable has also come to play a key role in theories of aggression (Reid, Patterson, & Snyder, 2002). For example, maternal depression seems to have a bidirectional relation with parenting practices. Improving parenting practices produces decreases in depression (Patterson, 1980) and increasing parental depression produces disruptions in parenting (Conger et al., 1995).

Maternal depression also seems to have a bidirectional relation with child antisocial behavior. As noted earlier, separation and divorce were often followed by increases in maternal depression. These increases, in turn, were followed by increases in child antisocial behavior. Data from a divorce sample also showed that child deviancy contributed to increased maternal depression (Forgatch et al., 1996). As already noted, DeGarmo et al. (in press) found that negative growth in child antisocial behavior over a 30-month interval covaried with negative growth in maternal depression.

A2

Systematic Changes in Families

625

Even this cursory view suggests that maternal depression and child aggression are tied together in some interesting ways. In the present context, we hypothesized that those mothers who show an early reduction in depression would be more likely to maintain effective parenting a year later. Presumably, the earlier this shift in the mothers' sense of being an efficacious parent, the sooner it is that the parenting practices would improve. In this sense, it is implied that corollary changes that occur early in prevention trials may have some special properties. We examined the possibility that early changes in maternal depression for families in the E group may relate to their long-term maintenance of effective parenting practices. Incidentally, if such a positive feed-forward loop were shown to exist, it would exemplify what is meant by self-organizing change (Granic, 2000; Sameroff, 1989).

There is no strong theory that says that both within-subject, across-time and across-subject, across-time collateral changes must characterize all PMT prevention trials. We view both the hypotheses themselves and the data in support as exploratory in nature. However, the corollary change hypotheses have the virtue of being reasonable derivatives of systems views of family process, and both views are eminently testable, given the current data set.

Complete data were available for 153 recently separated families who were randomly assigned to the E group. Data were available to examine three sets of variables required to test the hypotheses. A composite measure of parenting effectiveness included observation-based indicators. There was also a composite measure of child antisocial behavior that included an observation-based indicator as well as a self-report measure of maternal depression. The first hypothesis was that during the first 12 months, reductions in maternal depression would be shown to be a collateral change variable that covaried with either changes in child antisocial behavior or changes in parenting. The second hypothesis was that the early reduction in maternal depression would identify those mothers who made further improvements in their parenting during the last 12 months of the study. In effect, early changes in maternal depression function as a feed-forward amplifying loop.

METHODS

Participants at baseline were 238 recently separated single mothers and their sons residing in a medium-sized city in the Pacific Northwest. Families were randomly assigned to intervention ($n = 153$) or control conditions ($n = 85$). At the 30-months follow-up, the participating

sample was 209 families (88% retention) with no differences in attrition between the families randomly assigned to the intervention ($n = 133$) or control conditions ($n = 76$). The baseline families were recruited through media advertisements, flyers distributed throughout the community, and divorce court records. Mothers in eligible families (a) had been separated from their partner within the prior 3–24 months, (b) resided with a biological son in Grades 1 through 3, and (c) did not cohabit with a new partner. The sample was restricted to boys, because they are more likely than girls to exhibit adverse effects of divorce as preadolescents (Hetherington & Clingempeel, 1992; Shaw, Emery, & Tuer, 1993).

At baseline, mothers had been separated for an average of 9.2 months. Families tended to be small, with 2.1 children on average. The mean age of the mothers was 34.8 years ($SD = 5.4$; range 21.4–49.6), and the mean age for the boys was 7.8 years ($SD = .93$; range 6.1–10.4). The racial or ethnic composition of the boys in the sample was 86% White, 1% African American, 2% Latino, 2% Native American, and 9% from a mixture of racial or ethnic groups. This distribution reflected the racial or ethnic makeup of the community in which the study was conducted. The mean annual family income was \$14,900, which was similar to that reported for other female-headed households with children in the county at that time (i.e., \$15,300; US Department of Commerce, Bureau of the Census, 1993). Seventy-six percent of the families were receiving public assistance.

Most mothers (76%) had some academic or vocational training beyond high school, although only 17% had completed a 4-year college degree or higher. Approximately 20% of the women completed their education with high school graduation, and 4% had not completed high school. Most mothers were classified within lower- and working-class ranges in terms of occupation (Hollingshead, 1975): 32% unskilled, 21% semiskilled, 23% clerical or skilled, 22% minor professional to medium business, and 3% major business or major professional.

At baseline, the groups differed in terms of months since separation, $t(236) = -3.21$, $p = .001$, and the boy's age, $t(236) = 2.27$, $p = .02$. On average, mothers in the E group ($M = 9.84$, $SD = 5.79$) had been separated for about 2.4 months longer than those in the control group ($M = 7.48$, $SD = 4.56$). Boys in E group ($M = 7.65$, $SD = .93$) were about .28 years younger than those in the control group ($M = 7.93$, $SD = .92$) on average. Models were tested controlling for these variables. None of these control variables altered the substantive findings of the present analysis, thus they were excluded from the presentation of results.

Study Design

The study employed an E longitudinal design. Families were assigned randomly with approximately two-thirds to the E group ($n = 153$) and one-third to the no-intervention C group ($n = 85$). The unequal assignment to group condition was done to provide sufficient sample size within the E group to examine potential full-implementation effects of the intervention (Vinokur, Price, & Kaplan, 1991). Mothers in the E group were invited to participate in the intervention; and families in the C condition received no intervention. The intervention involved no work with the children. Only mothers participated.

Families in both groups received extensive multiple-method, -setting, and -agent assessment five times on the same timeline: baseline, 6, 12, 18, and 30 months. A minor assessment, including telephone interviews with mothers and ratings from teachers, occurred at 24 months but did not include assessment of the key outcomes analyzed for the present paper. Currently, assessment continues and is now being collected at 48 months. All E families had completed the intervention by the 6-month assessment, although 4–6 weeks may have transpired between termination of the intervention and the 6-month assessment.

Intervention

The intervention consisted of a series of parent group meetings held weekly in the early evening hours at the Oregon Social Learning Center (OSLC). The original intervention curriculum included 16 weekly topics, but two topics were combined with others for parsimony when the intervention was underway. Thirteen parent groups ranged in size from 6–16 ($M = 9.5$). E-group mothers participated in an average of 8.5 sessions ($SD = 5.7$).

The content of intervention sessions, description of interventionist training, and details regarding program fidelity are provided elsewhere (Forgatch & DeGarmo, 1999). The manualized intervention program is described in *Parenting Through Change* (Forgatch, 1994). The program also included a 30-min videotape, *The Divorce Workout* (Forgatch & Marquez, 1993), which shows three families using effective parenting practices to help their children adjust to the divorce transition.

The intervention was built around five theoretically based effective parenting practices (i.e., appropriate discipline, skill encouragement, monitoring, problem solving, and positive involvement) and other issues relevant to divorcing women (e.g., regulating negative emotions and managing interpersonal conflict). The parenting topics taught mothers strategies for decreasing coercive exchanges with their children by responding early and appro-

priately to child misbehavior with noncorporal discipline (e.g., time out, work chores, and privilege removal). Simultaneously, the intervention focused on the use of contingent positive reinforcement (e.g., praise and incentive charts) to promote prosocial behavior. The topics were presented in an integrated step-by-step approach. Each new topic was introduced to build on previously learned skills. Topics were usually introduced in one or more sessions and then reviewed and revisited throughout the remainder of the program. The program was flexible in that it allowed participants to discuss current relevant issues as part of the regular agenda for each session. These issues were often linked directly to a specific curriculum topic.

Measures and Construct Scores

Multiple-informant and multiple-method assessments were conducted at each assessment. Relevant portions of the assessment battery for this study included structured interviews with mothers and laboratory observations of mother–child interactions during structured interaction tasks. Participants were paid approximately \$10 per hour for their time. Laboratory observation included a set of structured interaction tasks totaling 45 min. The activities included: four 5-min mother–son problem-solving discussions about current hot conflicts (e.g., chores, school problems, behavior), a 10-min teaching task (involving the mother assisting her son with a series of academic problems set one grade level above his current grade), a 10-min unstructured activity (involving directions for the child to not play with certain toys and to put toys away), and a 5-min period for participants to share refreshments. These interactions were videotaped and scored using the Interpersonal Process Code (IPC; Rusby, Estes, & Dishion, 1991) and a global rating system (Forgatch, Knutson, & Mayne, 1992). Approximately 15% of the interactions were scored by randomly selected pairs of coders to assess intercoder agreement. Average Cohen's Kappa for IPC content codes was .78 (range = .77 to .80) and for affect was .70 (range = .67 to .76) across all five waves.

To model change over time, mean construct scores were created for outcomes comprising multiple indicators using methods outlined by Stoolmiller (1995) for modeling growth of construct scores. The focus in this report is on antisocial behaviors of the boy, maternal depression, and effective parenting practices.

Boy Antisocial Behaviors

Child antisocial behavior was a composite construct score of three main indicators, consisting of observational

Systematic Changes in Families

627

measures of noncompliance and aggression and a mother-reported standardized measure of delinquency. The three-indicator construct produced Cronbach's alphas of .59, .68, .63, .64, and .65, respectively.

Noncompliance was a construct score itself developed and validated in Martinez and Forgatch (2001). The noncompliance score included three indicators: a microsocial score, a coder rating scale score, and an interviewer impression score. The indicators were subjected to principal components factor analyses yielding a single factor solution at each wave. The factor loading ranged from .65 to .89 across the five waves of data. The *microsocial score* was computed from IPC codes. The score was the proportion of child noncompliance (relative to all other behaviors) following a mother's directive, that is, the total number of child noncompliance divided by the total number of directives issued by the mother during the observation. This proportion score accounts for differential base rates of maternal directives, which could arbitrarily inflate or deflate child noncompliance rates. The intraclass correlation coefficient (ICC) of intercoder reliability for the microsocial noncompliance score was .71, .80, .84, .64, and .86, respectively. *Coder ratings* was a scale score based on global observations made directly following scoring of the microsocial behaviors. Ten Likert-scale items assessed noncompliance on a scale from 1 to 5. Sample items include: withdrew from interaction in a negative way, was noncompliant, complied with commands from mom, was resistant to doing task. Cronbach's alphas were .90, .89, .87, .90, and .89; ICCs were .77, .87, .87, .66, and .90, respectively. Finally, the *child interviewer impressions* score was based on global ratings of noncompliance. This scale consisted of three items rated from 1–5 including items such as: was cooperative during the interview, was noncompliant with you, and was noncompliant with mother. Cronbach's alphas were .85, .84, .85, .81, and .83, respectively.

Aggression was a microsocial indicator scored as the rate per minute of physical aversive behaviors observed during the structured interaction tasks. Examples of physically aversive behaviors from the IPC included any contact of the child with the mother involving hitting, kicking, pinching, and so on. The aggression indicator was log-transformed before factor analyses, because the indicator was skewed and leptokurtic in its distribution.

Delinquency was measured with the delinquency *T* score from the mothers' report on the Child Behavior Checklist (CBCL; Achenbach, 1992). The *T* score is nationally normed and consists of 13 items describing child behaviors over the previous 2 months. Items were rated on a 3-point scale from 0 (*not true*) to 2 (*very true or often true*). Sample items include the following: steals, uses

drugs or alcohol, or vandalism. Cronbach's alphas were .64, .63, .72, .73, and .75 across waves.

Maternal Depression

A single indicator defined maternal depression. Maternal report of depressed mood was assessed by the scale from the Center for Epidemiological Studies of Depression (CESD; Radloff, 1977). This was a 20-item symptom-oriented report, where each item was measured on a 4-point scale (0–3) indicating the frequency of events during the previous week. The events ranged from *rarely or none* (0–1 day) to *most or all of the time* (5–7 days). Sample items included felt depressed, fearful, lonely, or hopeful about the future. Cronbach's alpha reliabilities ranged from .92 to .94 as assessed from baseline through 30 months.

Effective Parenting

Domains of effective and ineffective parenting were derived from theoretically based research on Patterson's coercion model (Patterson, 1982; Patterson, Reid, & Dishion, 1992). These observationally based measures of effective skills and ineffective coercive strategies have demonstrated sensitivity to change in PMT and have shown convergent and predictive validity in at-risk and divorce samples (Forgatch et al., 1996; Forgatch & DeGarmo, 1999; Patterson, 1982; Patterson et al., 1992). For this analysis, the final construct score was the mean of the seven indicators of parenting skill, four positive measures, and three coercive measures. Positive domains included positive involvement, skill encouragement, problem solving, and monitoring. Negative domains included inept discipline, negative reinforcement, and negative reciprocity. Negative domains were reverse scored, and each indicator was rescaled to range from 0–1 so that a higher score reflected effective parenting. The seven-indicator growth construct produced Cronbach's alphas of .73, .70, .73, .72, and .63, respectively.

Positive involvement was a mean scale score of coder ratings following each of the structured interaction tasks. Five indicators of mother's observed prosocial involvement following the interaction tasks and two overall ratings were averaged for the final scale. The seven indicators included 38 Likert-scale items concerning the mother's interaction with her son (e.g., showed empathy, support, genuine concern; provided encouragement; showed warmth; showed respect; was accepting; and was affectionate). Alphas for the overall scale ranged from .90–.94 across the

assessment waves. ICCs were .83, .90, .82, .79, and .93 from baseline to 30 months.

Skill encouragement was a mean scale score based on global coder ratings following the 10-min teaching task. Eleven scale items assessed the mothers' ability to promote child skill development through contingent encouragement and scaffolding strategies (e.g., breaks task into manageable steps, reinforces success, prompts appropriate behavior, and corrects in a nonaversive way). Cronbach's alphas were .69, .73, .81, .70 and .67; ICCs were .73, .67, .66, .48, and .76, respectively.

Problem solving was a scale score of global coder ratings made following each of the three problem-solving interactions involving a mother-identified issue. Nine Likert-scale items were averaged to compute the scale score (e.g., solution quality, extent of resolution, likelihood of follow through, apparent satisfaction). Cronbach's alphas ranged from .87 to .92 across the three topics and five waves; ICCs were .77, .81, .76, .84, and .79, respectively.

Monitoring was a scale score from two agents' reports of how effective the mother was in supervising her son. Parent interviewers provided global Likert-scale ratings on three items: skillful in supervising during the assessment, keeps close track of youngster outside of laboratory, and skillful at obtaining information from the child. Cronbach's alphas were .82, .76, .73, .74, and .60 from baseline to 30 months. Coders also provided global ratings of monitoring after coding the entire 45 minutes of laboratory interactions. The two Likert-scale items assessed the mothers' apparent knowledge of their sons' day-to-day activities and tolerance of negative behavior. The two items were correlated .22, .13, .38, .59, and .47 from baseline to 30 months and were significant at the $p < .05$ at each wave. The final score was an average of the ratings by the two agents.

Inept discipline was a scale score based on coder global impressions of discipline following their coding the entire 45 minutes of laboratory observation. The scale consisted of 13 items rated from 1 (*untrue/doesn't fit*) to 5 (*true/perfect fit*). Sample items include overly strict, authoritarian, oppressive; erratic, inconsistent, haphazard; threatens unlikely disciplines; and uses nagging or nattering to get compliance. Cronbach's alpha ranged from .91 to .92; ICCs were .70, .85, .78, .77, and .88, respectively.

Negative reinforcement was a microsocial score based on IPC coding of the mother-child interactions observed from the full 45 min of interaction. Our operationalization of negative reinforcement was based on conflict bouts, which involved an exchange of aversive behavior between mother and son. Negative reinforcement was defined as the frequency of conflict bouts initiated by the mother and terminated by the son. In the first step of the

bout, the mother introduced an aversive behavior following a period of at least 12 s of interaction without aversive behavior. In the second step, the son responded with an aversive behavior within 12 s. In the last step, the bout ended following a period of at least 12 seconds without either person's use of aversive behavior. In this sense, the son escaped an aversive situation by employing an aversive behavior and was negatively reinforced. The ICCs were .78, .58, .49, .68, and .60, respectively.

Negative reciprocity was a microsocial score based on the entire 45 minutes of laboratory observation. The derived score was the Haberman binomial z score (Gottman & Roy, 1990) reflecting the conditional probability that the mother reciprocated the son's aversive behavior with an aversive behavior of her own. ICCs were .65, .74, .54, .63, and .67 from baseline to 30 months.

RESULTS

Analytic Strategy

The analysis plan was to begin by examining intervention effects on the separate outcomes first and then examine an interconnected process model of systematic change over time. For the final model, within the families participating in PMT group sessions, we specified a cross-lagged panel model to evaluate the interdependence of change among the variables (see Curran & Bollen, 2001). For the longitudinal participants, we estimated the multivariate models using full information maximum likelihood estimation (FIML). Assuming that data are missing completely at random, FIML is more statistically efficient than listwise deletion methods for longitudinal data (see Wothke, 2000). Little's test for missing data indicated that FIML was appropriate as the data were missing completely at random ($\chi^2 = 78.847$, $df = 76$, $p = .38$).

Given the central role accorded the maternal depression variable, we began by examining changes in this variable during the course of the study. As presented in Fig. 3, the data showed that the situation for the C group families is unstable; whereas mothers in the treated group are showing significant reductions in maternal depression. We evaluated change in the variables of focus using repeated measures analysis of variance (MANOVA) using polynomial contrasts adjusting for the uneven time spacing of assessments. In these particular MANOVAs, t tests compare fitted slope coefficients between groups for each of the transformed time effects. For maternal depression the Linear group \times Time effect was significant using intent-to-treat directional hypotheses for the expected intervention effects ($t = 1.89$, $p = .06$).

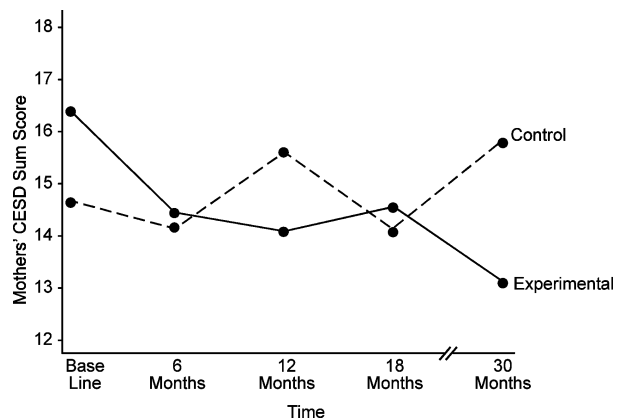


Fig. 3. Changes in maternal depression.

The next step in the analyses was to examine changes in the composite antisocial behavior score. As noted earlier, DeGarmo et al. (in press) based their analyses on the combined E and C group data. They found that over a 30-month interval that reductions in child antisocial covaried with changes in maternal depression.

The findings describing changes in boy antisocial behavior are presented in Fig. 4. On the average across 30 months, there was both a reduction in child antisocial behavior within the E group and at the same time an increase in antisocial behavior for the control group. The Linear group \times Time effect was significant ($t = 2.38, p = .01$). It can be seen that during the first 12 months of the study, there was an appreciable reduction in boy antisocial for members in the E group. During that same time

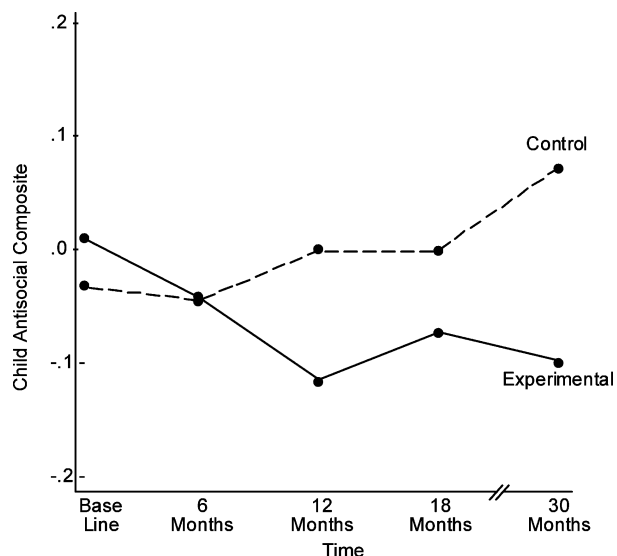


Fig. 4. Changes in boy antisocial behavior.

interval, the boys in the C group seemed to worsen. However, the hypothesized covariation between changes in boy antisocial with changes in maternal depression during the same 12-month interval was found to be nonsignificant ($-.03$).

As noted earlier, the research literature offered strong support for a bidirectional relationship between maternal depression and parenting practices. This implies that changes in either variable could produce changes in the other. In the present context, hypothesizing a feed-forward loop would require that the direction of effects move from changes in parenting to changes in maternal depression. As shown in Fig. 1, there were improvements in coercive discipline practices during the first 12 months. It was hypothesized that during this interval, changes in parenting practices would covary with changes in maternal depression, and the changes in parenting practices would be associated with changes in child antisocial behaviors.

To understand how induced changes in the family system worked for the intervention group, we examined the interconnectedness of mother's depression, her parenting behaviors, and behaviors of the child by conducting a cross-lagged panel model examining changes from baseline to the first year and then unique changes from the first year to 30 months within the E group. Figure 5 summarizes the findings in the form of a structural equations path model using standardized beta coefficients that examine these hypotheses. Although cross-lagged paths were tested among the three main variables, only significant paths were displayed in the final trimmed model. No substantive differences were found between a trimmed model and those with full cross-lagged paths.

A3

The final process model provided the best fit to the data, $\chi^2(14) = 12.06, p = .60, CFI = 1.00$. Before examining the collateral change hypotheses, it is important to note that the model also includes data that relate to the over-all purpose of the prevention trial. There is a highly significant path ($\beta = -.37, p < .001$) between changes in parenting at 12 months and changes in boys' antisocial during that same time interval. In the same vein, the path for changes in parenting at 30 months to changes in boys' antisocial behavior was $-.26 (p < .01)$. Clear evidence is provided that the interventions were doing what they were designed to do.

In the general model, it was also the case that the baseline measures for parenting effectiveness correlated in the expected fashion with the baseline measure of depression ($r = -.23, p < .01$). What is important in testing the first hypothesis is that changes in parenting during those first 12 months covaried significantly with reductions in maternal depression ($r = -.19, p < .05$). The findings show that within families in the E group, there is low-level

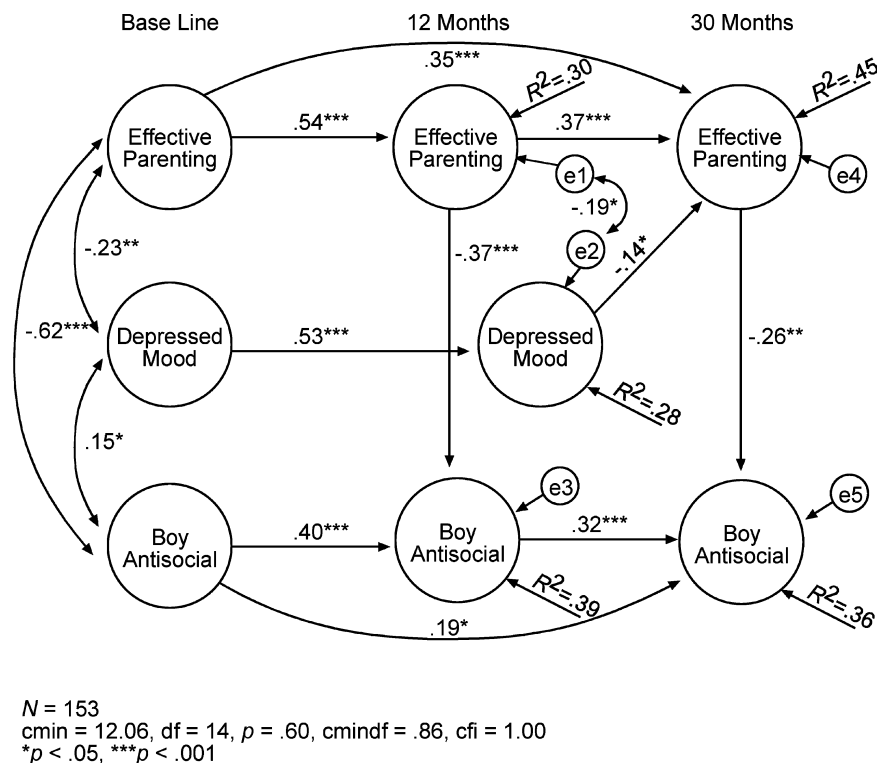


Fig. 5. Process model of PMT-induced changes within the experimental group.

covariation between these two variables even during the first 12 months. Improvements in parenting were associated with collateral reductions in maternal depression for mothers in the E group. The path coefficient does not, of course, prove that the direction of effects moves from changes in parenting to changes in depression or vice versa for correlational effects.

A separate model was used to test for the significance of either bidirectional path between maternal depression and her parenting. This was done by specifying reciprocal effects and removing the prior cross lags. The analyses showed a nonsignificant path from depression to parenting ($\beta = -.03$). There was a borderline path from changes in parenting to changes in depression ($\beta = -.11$). Although the trends are in keeping with the hypothesis, the fact that the path from parenting to depression was only of borderline significance weakened any argument that required a particular direction of effects. For the moment, we can only conclude that there are associations between maternal depression and parenting at baseline and 12 months. However, further tests of process hypotheses using lagged sequence can inform the expectations of how changes in the family system can be associated with future changes in the same system.

Our feed-forward hypothesis requires only that some changes occurring during the first 12 months predict which families continued to improve their parenting during the last 18 months of the study. We hypothesized that a reduction in maternal depression during the first 12 months would serve this function. To provide the most conservative estimate possible, the contribution of maternal depression to future parenting must remain significant after partialling out the prior contribution of parenting. In the model, the path coefficient from baseline measures of parenting to changes in parenting at 30 months was .35. The path from changes in parenting at 12 months to changes in parenting at 30 months was .37. Both of these contributions were partialled out to arrive at a residual estimate of the contribution of earlier changes in maternal depression. The residual contribution of the prior reduction in maternal depression was a small but statistically significant one as indicated by the path coefficient of $-.14$ ($p < .05$). The findings are consistent with the idea of an earlier change in depression contributing to future improvements in parenting. The pattern of findings is also consistent with the status of the maternal depression variable serving as a feed-forward loop providing unique contributions to changes in parenting that occurred postintervention. This

independent contribution of reductions in maternal depression were predictive of unique changes in parenting from 12 to 30 months that, in turn, predicted unique change in child antisocial behavior from 12 to 30 months.

DISCUSSION

The findings make a case for the general assumption that prevention and clinical trials may both be characterized by orderly changes among family members that has been largely overlooked because of our historic preoccupation with changes in symptoms. It was also the case that in many clinical studies, assessments were limited to just two time points, pre- and postintervention—hardly a sufficient basis for estimating collateral changes. However, given repeated assessments, both the publication by DeGarmo et al. (in press) and the current findings suggest that PMT can set complex processes in motion. Changes in one person can alter the feelings and behaviors of other family members. The data also support the idea that there may be collateral changes within individuals across time (i.e., changes in individual behaviors can covary with changes in how the individual feels).

The current data suggest that during the first 12 months, one change that occurs that is fundamentally important is the reduction in maternal depression. The findings are consistent with the idea that some early improvements in parenting practices are responsible for the improvements in maternal depression. However, the findings are such that we cannot make a compelling argument that the direction of effects is from parenting changes to changes in depression. For example, we cannot strongly reject the argument that it was improvements in maternal depression that led to the improvements in parenting. Perhaps for many, simply being enrolled in a structured program is associated with a reduction in depression (i.e., now there is renewed hope).

Whether or not the current findings provide an accurate specification of the model for collateral changes in depression, the findings say that given such changes occur early in the treatment process, they served as a feed-forward loop. The changes in depression that occur early on in intervention are significant predictors for future changes in parenting. Presumably, if measures of mastery, parental efficacy, and depression were all available, the resulting latent construct would provide a more sensitive register of collateral effects. The improved specification of the model would be further enhanced if the study also includes repeated assessment of all family members.

We need to develop a theory about intervention process that details the sequence of variables that change

during prevention trials. Who changes first? Why do they change? For example, observation data could be collected on a monthly basis during and following intervention. Given that each family member was targeted in each observation session, it would be possible to trace the sequence of change. For example, does it move from changes in the problem child to changes in siblings and parents?

Early studies of resistance in clinical samples were limited examples of this kind of process study. Data showed that parent depression, social disadvantage, and antisocial behavior were all associated with increased resistance to change in parenting and less improvement in child outcome (Patterson & Chamberlain, 1988, 1994; Patterson & Forgatch, 1985). Microsocial analyses showed that as the parent attempted to set limits on the problem child, child coercive behavior actually increased on the short run. This effect was also obtained in the Forgatch studies (see Fig. 1, Discipline). Stoolmiller et al. (1993) suggested that successful families followed a different resistance trajectory than did unsuccessful ones.

Our discussions about therapy process have often centered on the idea that processes could be generated by the interventions that serve as feedback loops. Presumably, the function served by these loops could be to enhance (or retard) the process of change. Perhaps these imaginary loops would also determine long-term maintenance. The problem was that the kind of data required was not available in most clinical studies. There was simply no way to study what takes place among family members as treatment and follow-up phases unfold. The ODS design with its repeated measures partially solved that problem. However, several limitations in this study should be noted. One of the biggest handicaps in specifying the model is to be found in the use of a single indicator, maternal depression, to define what a mother thinks and feels about herself as a parent. In current work with an independent divorced sample where multiple indicators were available (see Forgatch et al., 1996), we have since found that indeed maternal depression loaded (.77) on the construct; but so did self-report measures of mastery (.76) and self-esteem/self-worth (.87). A second limitation lies in the restricted number of time points available for a definition of growth or change. We had only three points to assess early and three for late change. The follow-up of the ODS study continues; and data are now available at 48 months.

It is obvious that we are just beginning to understand how PMT functions as an agent of change in the family system over time. Following these leads will require major changes in the timing and in the range of variables assessed both during and following prevention trials. The studies will have to incorporate many features of the Forgatch

A5 studies with a focus on data collected at 6-month intervals and a general sampling of multimethod, multiagent definitions for key constructs. As noted earlier, we expect that future studies will find that shifts in measures of how the family members feel and how they think about themselves, and other members will play significant roles in these yet to be discovered feed-forward loops.

ACKNOWLEDGEMENTS

The authors acknowledge support provided by grants MH 383318 and MH 54703 from the Child and Adolescent Treatment and Preventive Intervention Research Branch, DSIR, NIMH, U.S. PHS; Grant No. DA 16097 from the Prevention Research Branch, NIDA, U.S. PHS; and Grant No. P50 MH 46690 from the Prevention and Behavioral Medicine Research Branch, Division of Epidemiology and Services Research Branch, NIMH, U.S. PHS.

REFERENCES

- Achenbach, T. M. (1992). *Revised Child Behavior Checklist*. Burlington: University of Vermont.
- Arnold, J. E., Levine, A. G., & Patterson, G. R. (1975). Changes in sibling behavior following family intervention. *Journal of Consulting and Clinical Psychology, 43*, 683–688.
- Bien, N. Z., & Bry, N. H. (1980). An experimentally designed comparison of four intensities of school-based prevention programs for adolescents with adjustment problems. *Journal of Community Psychology, 8*, 110–116.
- Block, J. H., Block, J., & Gjerde, P. F. (1986). The personality of children prior to divorce: A prospective study. *Child Development, 57*, 827–840.
- Capaldi, D. M., & Patterson, G. R. (1994). Interrelated influences of contextual factors on antisocial behavior in childhood and adolescence for males. In D. Fowles, P. Sutker, & S. Goodman (Eds.), *Progress in experimental personality and psychopathology research* (pp. 165–198). New York: Springer.
- Chase-Lansdale, P. L. (1995). The long-term effects of parental divorce on the mental health of young adults: A developmental perspective. *Child Development, 66*, 1614–1634.
- Cherlin, A. J., Furstenberg, F. F., Jr., Chase-Lansdale, P. L., Kiernan, K. E., Robins, P. K., Morrison, D. R., et al. (1991). Longitudinal studies of effects of divorce on children in Great Britain and the United States. *Science, 252*, 1386–1389.
- Conger, R. D., Patterson, G. R., & Gé, X. (1995). It takes two to replicate: A mediational model for the impact of parents' stress on adolescent adjustment. *Child Development, 66*, 80–97.
- Curran, P. J., & Bollen, K. A. (2001). The best of both worlds: Combining autoregressive and latent curve models. In L. M. Collins & A. G. Sayer (Eds.), *New methods for the analysis of change: Decade of behavior* (pp. 107–135). Washington DC: American Psychological Association.
- DeGarmo, D. S., & Forgatch, M. S. (1997). Confidant support and maternal distress: Predictors of parenting practices for divorced mothers. *Personal Relationships, 4*, 305–317.
- DeGarmo, D. S., & Forgatch, M. S. (1999). Contexts as predictors of changing maternal parenting practices in diverse family structures: A social interactional perspective to risk and resilience. In E. M. Hetherington (Ed.), *Coping with divorce, single parenting and remarriage: A risk and resiliency perspective* (pp. 227–252). Hillsdale, NJ: Erlbaum.
- DeGarmo, D. S., Patterson, G. R., & Forgatch, M. S. (in press). Why do parent training intervention outcomes maintain or wane over time? *Prevention Science*. A6
- Eisenstadt, T. H., Eyberg, S., McNeil, C. B., Newcomb, K., & Funderburk, B. (1993). Parent-child interaction therapy with behavior problem children: Relative effectiveness of two stages and overall treatment outcome. *Journal of Clinical Child Psychology, 22*, 42–51.
- Forehand, R., & Long, N. (1988). Outpatient treatment of the acting out child: Procedures, long-term follow-up data, and clinical problems. *Advances in Behaviour Research and Therapy, 10*, 129–177.
- Forgatch, M. S. (1994). *Parenting through change: A programmed intervention curriculum for groups of single mothers*. Unpublished manuscript, Oregon Social Learning Center, Eugene.
- Forgatch, M. S., Bullock, B. M., & Patterson, G. R. (in press). From theory to practice: Increasing effective parenting through role-play: The Oregon model of parent management training (PMTO). In H. Steiner, K. Chang, J. Lock, & J. Wilson (Eds.), *Handbook of mental health interventions in children and adolescents: An integrated developmental approach*. San Francisco: Jossey-Bass. A7
- Forgatch, M. S., & DeGarmo, D. S. (1999). Parenting through change: An effective prevention program for single mothers. *Journal of Consulting and Clinical Psychology, 67*, 711–724.
- Forgatch, M. S., & DeGarmo, D. S. (2002). Extending and testing the social interaction learning model with divorce samples. In J. B. Reid, G. R. Patterson, & J. Snyder (Eds.), *Antisocial behavior in children and adolescents: A developmental analysis and model for intervention* (pp. 235–256). Washington, DC: American Psychological Association.
- Forgatch, M. S., Knutson, N., & Mayne, T. (1992). *Coder impressions of ODS lab tasks*. Eugene: Oregon Social Learning Center.
- Forgatch, M. S., & Marquez, B. (1993). *The divorce workout* [Videotape]. Eugene, OR: Oregon Social Learning Center.
- Forgatch, M. S., Patterson, G. R., & Ray, J. A. (1996). Divorce and boys' adjustment problems: Two paths with a single model. In E. M. Hetherington & E. A. Blechman (Eds.), *Stress, coping, and resiliency in children and families* (pp. 67–105). Mahwah, NJ: Erlbaum.
- Forgatch, M. S., Patterson, G. R., & Skinner, M. L. (1988). A mediational model for the effect of divorce on antisocial behavior in boys. In E. M. Hetherington & J. D. Arasteh (Eds.), *Impact of divorce, single parenting, and step-parenting on children* (pp. 135–154). Hillsdale, NJ: Erlbaum.
- Gottman, J. M., & Roy, A. K. (1990). *Sequential analyses: A guide for behavioral researchers*. New York: Cambridge University Press.
- Granic, I. (2000). The self-organization of parent-child relations: Beyond bidirectional models. In M. D. Lewis & I. Granic (Eds.), *Emotion, development and self-organization: Dynamic systems approaches to emotional development* (pp. 267–297). New York: Cambridge University Press.
- Hetherington, E. M. (1989). Coping with family transitions: Winners, losers, and survivors. *Child Development, 60*, 1–14.
- Hetherington, E. M., & Clingempeel, W. G. (1992). Coping with marital transitions: A family systems perspective. *Monographs of the Society for Research in Child Development, 57*(2/3, Serial No. 227), 1–242.
- Hetherington, E. M., Cox, M., & Cox, R. (1981). Effects of divorce on parents and children. In M. Lamb (Ed.), *Nontraditional families* (pp. 233–287). Hillsdale, NJ: Erlbaum. A8
- Hollingshead, A. B. (1975). *Four factor index of social status*. Unpublished manuscript, Department of Sociology, Yale University, New Haven, CT.
- Kazdin, A. E. (1997). Parent management training: Evidence, outcomes, and issues. *Journal of American Academy of Child and Adolescent Psychiatry, 36*, 1349–1356.

Systematic Changes in Families

633

- Lewis, M. D., & Granic, I. (Eds.) (2000). *Emotion, development and self-organization: Dynamic systems approaches to emotional development*. New York: Cambridge University Press.
- Martinez, C. R., Jr., & Forgatch, M. S. (2001). Preventing problems with boys' noncompliance: Effects of a parent training intervention for divorcing mothers. *Journal of Consulting and Clinical Psychology, 69*, 416–428.
- Martinez, C. R., Jr., & Forgatch, M. S. (2002). Adjusting to change: Linking family structure transitions with parenting and child adjustment. *Journal of Family Psychology, 16*(2), 107–117.
- McLoyd, V. C. (1998). Children in poverty: Development, public policy, and practice. In W. Damon, I. E. Sigel & K. A. Renninger (Eds.), *Handbook of child psychology* (5th ed., Vol. 4). New York: Wiley.
- Patterson, G. R. (1980). Mothers: The unacknowledged victims. *Monographs of the Society for Research in Child Development, 45*(5, Serial No. 186).
- Patterson, G. R. (1982). *A social learning approach: Vol. 3: Coercive family process*. Eugene, OR: Castalia.
- Patterson, G. R. (1996). Some characteristics of a developmental theory for early onset delinquency. In M. F. Lenzenweger, & J. J. Haugaard (Eds.), *Frontiers of developmental psychopathology* (pp. 81–124). New York: Oxford University Press.
- Patterson, G. R., & Chamberlain, P. (1988). Treatment process: A problem at three levels. In L. C. Wynne (Ed.), *State of the art in family therapy research: Controversies and recommendations* (pp. 189–223). New York: Family Process Press.
- Patterson, G. R., & Chamberlain, P. (1994). A functional analysis of resistance during parent training therapy. *Clinical Psychology: Science and Practice, 1*(1), 53–70.
- Patterson, G. R., & Fleischman, M. J. (1979). Maintenance of treatment effects: Some considerations concerning family systems and follow-up data. *Behavior Therapy, 10*, 168–185.
- Patterson, G. R., & Forgatch, M. S. (1985). Therapist behavior as a determinant for client resistance: A paradox for the behavior modified. *Journal of Consulting and Clinical Psychology, 5*, 237–262.
- Patterson, G. R., & Forgatch, M. S. (1990). Initiation and maintenance of process disrupting single-mother families. In G. R. Patterson (Ed.), *Depression and aggression in family interaction* (pp. 209–245). Hillsdale, NJ: Erlbaum.
- Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *A social interactional approach: Vol. 4: Antisocial boys*. Eugene, OR: Castalia.
- Price, R. H. (2003, June). *Intervention as hypothesis: Learning from field experimental in the 'Winning New Jobs' program*. Paper presented at Family Consortium III, "Prevention and Dissemination," Santa Anna Pueblo, NM.
- Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385–401.
- Reid, J. B., Patterson, G. R., & Snyder, J. (2002). *Antisocial behavior in children and adolescents: A developmental analysis and model for intervention*. Washington, DC: American Psychological Association.
- Rusby, J. C., Estes, A., & Dishion, T. (1991). *The Interpersonal Process Code (IPC)*. Unpublished manuscript, Oregon Social Learning Center, Eugene, OR.
- Sameroff, A. J. (1989). Commentary: General systems and the regulation of development. In M. R. Gunnar & E. Thelen (Eds.), *Systems and development: The Minnesota Symposia on Child Psychology* (Vol. 22, pp. 219–235). Hillsdale, NJ: Erlbaum.
- Shaw, D. S., Emery, R. E., & Tuer, M. D. (1993). Parental functioning and children's adjustment in families of divorce: A prospective study. *Journal of Abnormal Child Psychology, 21*, 119–134.
- Stoolmiller, M. S. (1995). Using latent growth curve models to study developmental processes. In J. M. Gottman (Ed.), *The analysis of change* (pp. 105–138). Mahwah, NJ: Erlbaum.
- Stoolmiller, M., Duncan, T., Bank, L., & Patterson, G. R. (1993). Some problems and solutions in the study of change: Significant patterns in client resistance. *Journal of Consulting and Clinical Psychology, 61*, 920–928.
- U.S. Department of Commerce, Bureau of the Census. (1993). *1990 Census of population and housing: Population and housing characteristics for census tracts and block numbering areas* (1990 CPH-3-144). Washington, DC: U. S. Government Printing Office.
- Vinokur, A. D., Price, R. H., & Caplan, R. D. (1991). From field experiments to program implementation: Assessing the potential outcomes of an experimental intervention program for unemployed persons. *American Journal of Community Psychology, 19*, 543–562.
- Vitaro, F., Brendgen, M., & Tremblay, R. E. (2001). Preventive intervention: Assessing its effects on the trajectories of delinquency and testing for mediational processes. *Applied Developmental Science, 5*, 201–213.
- Webster-Stratton, C., Hollinsworth, T., & Kolpacoff, M. (1989). The long-term effectiveness and clinical significance of three cost-effective training programs for families with conduct-problem children. *Journal of Consulting and Clinical Psychology, 57*, 550–553.
- Wothke, W. (2000). Longitudinal and multigroup modeling with missing data. In T. D. Little, K. U. Schnabel, & J. Baumert (Eds.), *Longitudinal and multilevel data: Practical issues, applied approaches, and specific examples* (pp. 269–281). Mahwah, NJ: Erlbaum.