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ENVIRONMENTAL STRESS, MATERNAL PSYCHOLOGICAL RESOURCES, AND POSITIVE MATERNAL BEHAVIOR IN AN AT-RISK SAMPLE

By

Timothy L. Goth-Owens

A DISSERTATION

Submitted to
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ABSTRACT

ENVIRONMENTAL STRESS, MATERNAL PSYCHOLOGICAL RESOURCES, AND POSITIVE MATERNAL BEHAVIOR IN AN AT-RISK SAMPLE

By

Timothy L. Goth-Owens

This study was designed to apply a model of the determinants of individual differences in maternal behavior to a sample presumed to be at risk for the development of significant parent-child interactional problems. Path analysis was used to test the hypothesis that maternal psychological characteristics act as a buffer between background environmental stressors and developing mother-infant interaction.

Subjects for this study were participants in one of two child abuse prevention programs. They were referred on the basis of perceived risk for seriously dysfunctional parenting. Measures used for the study were a maternal interview covering selected historical and demograhic information, a psychological distress scale, a maternal attitude scale, and observers' ratings of qualitative dimensions of mother-infant interaction. These measures were taken at four and eight months after intake into the prevention program.

The study involved development of a measurement model for the three primary constructs of the model and path analysis of the

measures developed. The model was tested at two points in time and with three overlapping subsamples of the original pool of 55 subjects.

Zero order correlational data showed a consistent positive relationship between adaptive maternal attitudes and positive maternal behavior. No other correlation was consistent and significant.

The model tested met all test of significance in only one of the five separate tests. These significant results were viewed as chance findings and the conclusion reached was that the data did not support the model under investigation.

Failure to support the hypothesized model was discussed as a potential Type II error attributable to inadequate sample size, measurement problems, and conceptual limitations of the model tested. Suggestions for future research were offered.

To Judy, Amanda, Eliza, and Jacob

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Community Mental Health Board, provided the data set, his time, energy, expertise, and in the long run, did not get much for his trouble. Dr. Wright and Ms. Betty Tableman at the Michigan Department of Mental Health have shown strong leadership in their efforts to maintain prevention programs as a viable component of mental health services locally and throughout the state. I cannot thank them enough for making this dissertation possible.

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INTRODUCTION

The present study addressed two general issues in the study of the ontogeny and maintenance of individual differences in the behavior of mothers of infants. The first of those issues is developed largely from the work of Belsky (1980, 1984). In a review of the area of child maltreatment (1980), he presented a conceptual perspective for organizing the available data on the correlates and determinants of child maltreatment. In a later paper, he proposed that the insights gleaned from the study of seriously dysfunctional parenting provide both a data base and a theoretical framework for the study of the determinants of parenting in general (Belsky, 1984). In keeping with Belsky's proposal, a first goal of the present investigation was to apply insights from the child maltreatment literature to the study of parenting in a sample of parents who have not been identified as abusive or neglectful.

The second general focus of this study, again suggested by Belsky (1980), involved application of causal modeling as an analytic strategy in the study of determinants of individual differences in parenting (Asher, 1976; Hunter & Gerbing, 1982; Reis, 1982; Rogosa, 1979).

The merit of developing models using this general approach lies in the imposition of order on the many variables related to child

maltreatment (Belsky, 1980). The state of research in this area is particularly well suited to hypothesis testing through causal modeling (Belsky, 1980; see Patterson, 1986, for a recent application).

A second general goal of this study was to use causal modeling, specifically path analysis, to test hypotheses generated from the child maltreatment literature concerning influences on the early development of maternal-infant interaction.

The specific hypotheses to be tested concerned developing causal connections* between the classes of variables that have received significant attention in the child maltreatment literature. The first set contains variables pertaining to the social and economic conditions under which mothers are currently living and have lived. The social context variables are called "risk factors," i.e., conditions which increase the probability that some type of dysfunctional parenting will take place (Solnit & Provence, 1979). The second class of variables is "personal psychological resources" of mothers (following Belsky, 1984). This construct is indexed by maternal attitudes toward the experience of being a mother and toward childrearing as well as observers' ratings of maternal

*Throughout this paper, the term "causal" is used in the sense that it is used in the causal modeling literature. Causal models test whether or not a given set of data "fit" a theoretical model of the relationships among variables. Models which "fit" the data are more likely to represent the causal chain in a set of variables; however, causality itself is not demonstrated solely by virtue of specification of a model which fits the data. All other conditions for the demonstration of causality would need to be met in order to make claims concerning causality (Asher, 1976).

psychological distress. The outcome measure used is the quality of observed mother-infant interaction.

The model to be tested predicts that risk factors (from the social-economic domain) have a direct effect on the quality of mother-infant interaction, as well as an indirect effect that is mediated by the mothers' psychological resources. To begin presenting the development of this particular model of the determinants of maternal behavior, four theoretical perspectives on child maltreatment are outlined. Then, the Belsky (1980, 1984) and Bronfenbrenner (1979) ecological perspective on child maltreatment is presented in some depth. This model integrates four divergent models that have been influential in the area of child maltreatment. Third, recent research into child maltreatment, particularly studies using multivariate analytic strategies, is reviewed with particular emphasis on their relationship to Belsky's ecological model. Finally, hypotheses derived from the child maltreatment literature, together with support from other lines of research, are presented.

REVIEW OF THE LITERATURE

Theoretical Perspectives

In the 25 years since Kempe and his colleagues (Kempe et al., 1962) drew attention to the "battered child syndrome," there has been considerable effort to isolate etiological factors in the serious maltreatment of children. This effort was furthered at the policy level when the Child Abuse Prevention and Treatment Act of 1974 (P.L. 99-237) mandated funding for research into causal antecedents of child maltreatment (Costa & Nelson, 1978). Since that time, there has been an increased attention to the prediction and prevention of the maltreatment of children and to the host of theoretical, empirical, legal, and policy questions raised by the idea that it might be desirable to have some means of ascertaining and identifying which parents are likely to cause significant harm to their children (Starr, 1982b).

Over time, numerous variables have been identified as causes, correlates, and predictors of child maltreatment. The burgeoning literature has been carefully reviewed several times in recent years with particular attention to systematizing this plethora of presumed etiological factors. There have been spirited discussions concerning the adequacy of different models, the political implications and values associated with them, and the critical assumptions underlying them (Allan, 1978; Belsky, 1980; Parke, 1982; Parke & Collmer, 1975;

Watkins & Bradbard, 1982; Wolfe, 1985; Zigler, 1980). For example, in a definitive review, Parke and Collmer (1975) contrasted four perspectives on the etiology of child abuse. The first, the psychiatric model, looks for personalty traits, dispositions, attitudes, and factors in parents' own development which predispose them to maltreat their children (e.g., Sloan & Meier, 1983; Spinetta, 1978; Spinetta & Rigler, 1972; Steele & Pollock, 1974). A second approach, the social-situational model, draws heavily on Patterson's model of coercive exchange in families (Patterson, 1982, 1986; Patterson & Cobb, 1971). Of particular concern from this perspective is the manner in which caregiving practices, especially the use of corporal punishment, come to escalate to the level of abuse in the context of ongoing family interactions (Burgess, 1978; Burgess & Conger, 1978; Crittenden, 1981).

The third perspective is the "abusive-provoking child" model (deLissovoy, 1979). This model hypothesizes that particular children are at higher risk for abuse because of characteristics that may make them particularly problematic to parents. An irritable, nonconsolable infant would be seen as a high-risk child in this model (Frodi & Lamb, 1980; Gaensbauer & Sands, 1979; Sameroff & Chandler, 1975).

Finally, a fourth perspective, the sociological, concerns itself less with the process of the development of parent-child relationships and more with the conditions under which such development occurs (Powell, 1980). This model looks to cultural factors, social and economic stresses, living conditions, and other

sociodemographic forces that interfere with the ability of parents to adequately care for their children (Garbarino, 1976; Garbarino & Sherman, 1980; Gelles, 1973; Straus, 1980).

The Ecological Model of Child Maltreatment

While some authors have either implicitly or explicitly claimed primacy for one etiological perspective over others, the general trend in the current literature is toward integrative, multivariate approaches which recognize influences at all four levels of analysis. This trend is typified by Belsky's (1980) adaptation of Bronfenbrenner's (1979) ecological model of human development to the problem of child maltreatment. This model is concerned not only with identifying particular variables that are correlates or predictors of child maltreatment, but also with identifying classes of variables and the relationships among such classes. There is a strong emphasis on the relationships that exist between such classes of variables.

Belsky's model begins with the area he terms "ontogenetic development," i.e., the manner in which the development of parents over the course of their own life could predispose them to provide severely suboptimal care for their own children. In addition, Belsky proposes simultaneous consideration of (2) relationships and living conditions in the immediate household (microsystem); (3) characteristics of larger social systems in which the family is involved, e.g., neighborhood, schools, community, work (exosystem); and (4) the values and beliefs characteristic of the culture which influences

families and those social systems directly affecting families (macrosystem). These four levels (which contain all elements of the four models described above) are viewed as being nested from individual to family, to community to societal levels with variables at each level interacting with variables at other levels.

As a general statement of the etiology of child maltreatment, Belsky's model suggests that parents bring a particular set of experiences, attitudes, beliefs, and other historically determined predispositions with them to the task of parenthood. Dysfunctional predispositions increase the risk of maltreatment. When stressors within the immediate family (e.g., marital conflict, overcrowding, unemployment, an irritable infant) combine with stressors at the community level (e.g., crime, impoverishment, high unemployment), the likelihood of parent-child conflict increases. The values and child-rearing practices predominant in the larger context in which individual, family, and community are embedded can influence the form that a parent-child conflict takes.

The most immediate contribution of Belsky's model lies in its ability to organize the diverse perspectives guiding research in the area of child maltreatment into a unified framework. In addition, it raises a number of questions which are of importance theoretically, empirically, and clinically. If one is interested in predicting the occurrence of child maltreatment, Belsky's model will not specify a priori a set of necessary and sufficient conditions for the occurrence of maltreatment. Deleterious conditions at all four levels (individual to societal) in the model would undoubtedly

suggest a very high probability that seriously dysfunctional parenting would occur. Short of that situation, the picture is less clear. The model does not make specific predictions regarding the primacy of deficits in one area over deficits in others. Nor is it clear to what extent deficits in one system (and which system) can override advantageous conditions in other systems. Conversely, advantageous conditions in one system might insulate parents from the effects of deleterious conditions in other systems. Child maltreatment may not turn out to be predicted by a simple additive model, such that overall risk increases as a function of increases in specific areas or systems. Where these risks are "located" could be critical.

Belsky's Model of the Determinants of Parenting

More recently, Belsky (1984) has addressed questions such as those raised above. In a model of the determinants of parenting, he has distinguished among three classes of variables. These classes represent a slight departure from the ecological model described above, but cover the same general domains. The first area of influence is that of ontogenetic origins of parents (as described above) and "personal psychological resources" (the cognitive, affective, and psychological assets of parents). Second is the child's individual characteristics, and third is contextual sources of stress and support. Belsky has hypothesized that personal psychological resources is the most influential determinant because

parents are buffered from threats to parenting from other sources (child characteristics and stresses) through their personal resources. In addition, the kinds of social support that might further protect the parenting system are a function of the parents' ability to recruit such support. In other words, reasonably psychologically intact individuals are less likely to maltreat their children in the face of adversity because they will have resources available for coping with that adversity.

Belsky's model poses empirically testable questions. However, the complexity of these questions means that complex methodological and analytic strategies are needed to address them.

Previous Research Findings

Correlates of Child Maltreatment

The extant literature on the etiology of child maltreatment has been reviewed several times (Allan, 1978; Belsky, 1980, Burgess, 1978; Chibucos, 1980; Parke, 1982; Parke & Collmer, 1975; Wolfe, 1985; Zigler, 1980). In general, these reviewers have noted that research has tended to be guided by one of the four models described above, outlined by Parke and Collmer (1975), with little effort to integrate these perspectives. As a result, the literature suggests numerous etiological factors. Table 1 provides a list of correlates of child maltreatment that have been reported in the literature. No attempt has been made to weight these fingings in terms of data quality or for the frequency with which they have been replicated. While there has been no systematic methodologically oriented review

Table 1.

Reported Correlates of Child Maltreatment[1]

Parent Characteristics

Schizophrenia
Psychopathy
Character or personality disorder
Impaired impulse control
Immaturity
Chronic aggression
Rigid, cold, and detached
Excessive anxiety
Chronic depression
Excessive guilt
Low intelligence
Retardation
History of abuse, neglect, or parental rejection
History of inadequate care by parents
Low self-esteem
Less than 20 years old
Intense hatred of men (mother)
Loneliness
Lack of trust in others
Poorly educated[2]
Self-centered[2]
Hypersensitive[2]
Distrust of society[2]
Inability to emphathize[2]
Inability to cope with stress[3]
High dependency needs[3]
History of minor criminal offenses[3]
Loss of a significant parental figure during childhood[3]

Family Characteristics

Unwanted pregnancy
Premarital conception
Unrealistic expectations of children ("role reversal")
Lack of empathy for child[2]
Distorted perceptions of child behavior and intention
Unrealistic demands for obedience
Highly punitive parental attitudes
Lack of understanding of child development
View of physical punishment as justified[2]
Unwillingness of either parent to take responsibility for decisions[2]
Inconsistent discipline[2]

Table 1 (Continued)

Family Characteristics (Continued)
Lack of authority patterns in family[2]
Verbal abuse of children[2]
Chronic marital difficulties and disharmony
Desertion by husband
Physical abuse of wife
Scapegoating of child by parents with strong emotional bonds to each other
Role reversal between spouses (husdand unemployed--wife wage earner)[3]
Divorce and separation[3]
Husband unemployed[3]
Husband with high job dissatisfaction[2]
Family size (four or more children)[2]
Children closely spaced[3]
Crowded living conditions[2]
Premature or low birth-weight infant
Difficult birth
Neonatal complications[2]
Early maternal-infant separation[2]
Developmental deficits (child)[2]
Feeding problems
Excessive infant crying, whining, clinging
A "non-cuddling" infant
Child between 3 months and 3 years of age
Social Relations and Socioeconomic Characteristics
Poor housing
Financial problems
Dependence on welfare agencies
Poverty[2]
Social isolation[2]
High mobility[2]
Lack of acceptance in community[2]
Unlisted telephone or no telephone[2]
Lack of family roots in the community[3]
Lack of immediate support from extended family[3]

[1]Cited in Allan (1978) unless otherwise noted.

[2]Cited in Parke and Collmer (1975).

[3]Cited in Spinetta and Rigler (1972)

of the literature, in general, studies have been marked by a high reliance on correlational data, small samples, lack of comparable measures, lack of replication, a high reliance on retrospective data, and a lack of precision in identifying abusive or neglectful parents (Wolfe, 1985). The variables identified in Table 1 have also been criticized on the grounds that while they supposedly differentiate abusive or neglectful parents from adequate parents, they are, in fact, also characteristic of a great many adequate parents (Belsky, 1980; Gelles, 1973; Zigler, 1980). At best, the information in Table 1 provides a preliminary perspective on possible antecedents of child maltreatment and a guide for further research. Any single item from that list is unlikely to be of much use as a predictor of child maltreatment when viewed in isolation.

Multivariate "Prediction" of Child Maltreatment

Cognizant of the limitations of univariate approaches to the study of child maltreatment, recently several researchers have used multiple measures and multivariate analysis strategies to discriminate abusive and neglectful parents from parents providing adequate care to their children.

Three of those studies used multiple measures to differentiate identified abusive or neglectful parents from matched controls (Gaines, Sandgund, Green, & Power, 1978; Kotelchuck, 1982; Starr, 1982a). In contrast to the strategy of retrospective comparisons between control and maltreatment groups, two major prospective

studies have yielded a number of reports on the ontogeny of maltreatment from a longitudinal perspective. One is the project of Egeland and colleagues in Minneapolis (Brunnquell, Crichton, & Egeland, 1981; Egeland, Breitenbrucker, & Rosenberg, 1980; Egeland & Brunnquell, 1979; Egeland & Vaughn, 1981; Egeland & Sroufe, 1981a; Egeland & Sroufe, 1981b) and the other is the project of Vietze and colleagues in Nashville (Altemeier, Veitze, Sherrod, Sandler, Falsy, & O'Connor, 1979; Vietze, Falsey, Sandler, O'Connor, & Altemeier, 1980; Vietze, O'Connor, Hopkins, Sandler, & Altemeier, 1982).

Table 2 lists the combinations of variables which best predicted later maltreatment (Egeland & Brunnquell, 1979; Vietze, et al., 1980) or best differentiated adequate from maltreating parents (Gaines et al., 1978; Kotelchuck, 1982; Starr, 1982). An indication of the degree of successful prediction of group membership is given by the amount of variance for which each combination of variables accounts for. A further means of assessing the utility of the discriminant function derived involves identification of the percentage of persons in the sample correctly classified solely on the basis of the discriminant function.

A common characteristic of the five studies reported in Table 2 is the empirical, rather than theoretical, generation of the regression equations or discriminant functions. The results reported are the "best" set of variables discriminating the maltreatment from control groups. Because such empirically determined strategies capitalize on chance and measurement error, it is not surprising that

Table 2

Results of Studies Using Multivariate Analysis Strategies to Predict Child Abuse

Source	"Best" Combination of Variables (in order of contribution)	Variance Explained	Percentage of Sample Correctly Reclassified
Gaines et al., 1978	1. Life stress 2. Coping ability 3. Perfectionism 4. Life changes 5. Perception of childhood 6. Perception of emotional needs being met	12%	49%
Egeland and Brunnquell, 1979	1. Mother's caretaking skills 2. Mother's positive affect 3. Neonatal orientation 4. Infant Sociability 5. Mother's understanding of the complexity of child rearing 6. Neonatal irritability 7. Mother's impulsivity/anxiety 8. Negative reactions to pregnancy 9. Neonatal consolability	Not Reported	85%
Kotelchuck, 1982	1. Infrequent visits with relatives 2. Unhappy maternal childhood 3. Infrequent repeated spanking of child 4. Mother feels no one is interested in her problems 5. Child socially immature 6. Few rooms in home 7. Ease of access to bus 8. Mother views child as difficult	47%	75%
Starr, 1982[1]	1. Mother's employment history 2. Violence between spouses 3. Number of people visited 4. Frequency of visiting relatives 5. Perception of satisfaction with frequency of contact with relatives 6. Acceptance of emotional complexity of childrearing 7. Likelihood of child below normal weight due to neglect 8. Physicians rating of likelihood of neglect 9. Child hemoglobin level	Not Reported	68% to 72%
Vietze et al., 1980	1. Maternal Risk Status (history, attitudes, parenting skills, personality, nurturance as a child, current stress, social support) 2. Infant birth weight 3. Mother-infant interactional variables--low initiation, low visual attention 4. Maternal perception of infant temperament	19%	N/A

[1]Did not report a multiple regression or discriminant function. Variables listed significantly differentiated abuse/neglect from control group ($p \leq .01$).

slightly different sets of variables emerge in different studies (Nunnally, 1978). One the other hand, the findings reported are, for the most part, consistent with the kinds of etiological variables listed in Table 1. It is also noteworthy that each of the lists of predictors contains variables from more than one of the classes of variables that Belsky has delineated (Belsky, 1980).

Because their emphasis is solely on the prediction, or correct discrimination of abusers from adequate parents, the analyses used in the five studies place little emphasis on the interrelationships among predictor variables (although some of this type of information would be available from the multiple regressions used). Thus, these studies fall short of providing the kind of dynamic picture of the etiology of child maltreatment that Belsky (1980) has urged researchers to develop.

The Minnesota Study of Child Maltreatment. Perhaps the analysis of maltreatment coming closest to the type urged by Belsky is that reported by Egeland et al. (1980). Their sample of poor "inadequate care" parents and poor "adequate care" parents was further subdivided into "inadequate care" mothers experiencing a significant number of subjectively distressing life events and "adequate care" mothers experiencing a similarly high level of distress and stress. The high-stress adequate care group differed from the high-stress inadequate care group on a range of attitudinal and personality measures. In essence, the inadequate care group was characterized by more maladaptive attitudes toward childrearing as measured by

Cohler's Maternal Attitude Scale (Cohler, Weiss, & Grunebaum, 1970), as well as by other indications of intra- and interpersonal problems. In their discussion of these findings, the authors suggested that the inadequate care mothers who experience a considerable number of stressful life events respond to those events with hostility, rather than with attempts to cope with the situation or seek help. This hostility increases the probability of further stressful events and further alienates those mothers from significant sources of support. This alienation, in turn, heightens mistrust and hostility. The authors suggested further that mothers who do not have a clear sense of interpersonal boundaries, especially between themselves and their infants, cannot isolate reactions to stressful life events to the events themselves. Rather, responsive empathy and the ability to care for a child are disrupted as the stress reaction permeates all aspects of these mothers' lives.

Recast in the language of Belsky and Bronfenbrenner's model, these results suggest that variables at the individual level became particularly relevant under adverse conditions at the family and community levels. One view of the situation is that maladaptive attitudes and psychopathological symptoms are critical only under conditions in which excessive demands are placed on the parent for coping and management of stressors. These findings also are consistsennnt with Belsky's (1984) hypothesis regarding the buffering effects of the personal psychological resources of parents. The Egeland et al. (1980) sample consisted of families living in poverty

conditions and exposed to considerable stress. These two factors, often linked to child maltreatment, were insufficient in and of themselves to lead to abuse or neglect. The more psychologically intact mothers in the study were able to manage stressors in ways that did not lead to grossly inadequate care for their infants.

The Conger et al. Study of Determinants of Parenting. Following the proposal and initiation of the present research in 1983, a paper was published which closely follows the model proposed in Belsky's (1984) paper on the determinants of parenting. Conger, McCarty, Yang, Lakey, and Kropp (1984) published research which addressed several of the specific recommendations of Belsky. Specifically (1) hierarchical multiple regression was used to (2) test a model derived from the child maltreatment literature, (3) using a sample of problematic parents who did not necessarily meet legal standards for abuse or neglect.

Conger et al. tested models of the mediation of effects of environmental stress on maternal behavior by maternal psychological characteristics. Their study employed three dimensions of demographic conditions: (1) financial stress, (2) family structure, and (3) "past events that may be associated with continuing stressful life conditions": e.g., maternal educational achievement and maternal age. These dimensions had been associated with individual differences in parental behavior, and this association was assumed to be due to more frequent, chronic exposure of families to stressful situations. Three psychological variables were identified as

potential mediators of the influence of chronic stress on maternal behavior: (1) level of emotional distress, (2) authoritarian child-rearing values, and (3) maternal perceptions or evaluative judgments of their children.

A total of 74 families, representing significant variability on demographic factors, participated in the study. These subjects were participants in child abuse prevention projects in rural Georgia. County agencies had identified 16 subjects from this sample as "mildly" abusive. The criterion measures of maternal behavior were obtained through direct observations of mother-child interaction.

Three models of the interrelationships of the three classes of variables were tested. The first was that the effects of environmental stress on maternal behavior were completely indirect, i.e., entirely mediated by the psychological characteristics. The second model tested the possibility that the relationship between psychological characteristics and maternal behavior is spurious, and due entirely to the common association of maternal behavior and psychological characteristics with chronic stress. The third model tested the possibility of direct effects of chronic stress on maternal behavior as well as indirect effects mediated by maternal psychological characteristics.

The authors found no support for the first two models, but suggested that they had found "tentative" support for the third model. Predictor variables accounted for a significant proportion of variance for the three summary scores used for observed maternal

behavior (percent positive behavior, $\underline{R}^2$ = .418; percent negative behavior, $\underline{R}^2$ = .285; percent positive affect, $\underline{R}^2$ = .440). With environmental stressors entered on the first step of the hierarchical regression, the entry of psychological variables on the second step added $\underline{R}^2$ increments of .059 for percent positive behavior ($\underline{p} < .10$), .033 for percent negative behavior ($\underline{p} > .10$), and .074 for percent positive affect ($\underline{p} < .05$). However, interaction terms for the psychological and demographic variables did not significantly increase explained variance for any behavioral measure. These results, then, provide evidence only for independent contributions for demographic and psychological variables on some behavioral measure. They do fail to support models for completely indirect effects of demographic variables on behavior, or models of a spurious correlation between psychological variables and maternal behavior. However, the lack of evidence for a significant interaction term in the hierarchical regression limits the degree to which one can view psychological variables as "mediating" the effects of environmental or demographic variables on parental behavior (Cohen, 1978). The authors view their results as partial support for the mediational model, primarily useful as a "small step" in the offer of promise for future research. However, the absence of significant interaction terms suggests that Conger et al. have overinterpreted the results of their study. In fact, their study provides no support for a mediational model.

Summary

Numerous variables have been linked to child maltreatment. These variables are drawn from the domains of parent history and characteristics, child characteristics, family relationship, stressful life events, chronic social stressors, and social and economic conditions. The few studies that address these variables from a multivariate perspective provide support for the theoretical considerations of Belsky (1980, 1984), Bronfenbrenner (1979), and Parke and Collmer (1975). Their results indicate that child maltreatment, and by extrapolation, parenting, in general, is a complex, multiply determined phenomenon.

Limitations of Past Research

The movement toward a multivariate perspective on child maltreatment represents a clear step toward the integration of what has been, until very recently, a somewhat haphazard and unsystematic effort to gain insight into, and ultimately predictive power over a very serious problem. That movement also offers promise for the basic study of the development of the parenting process, as it begins to elucidate those processes affecting the manner in which parental provision of basic care to their children is influenced. However, there are a number of limitations in this field which need to be addressed in order to maximize basic scientific information and applications gleaned from this line of inquiry.

First, child maltreatment is a very low base rate phenomenon, with an estimated prevalence rate of 5.7 per 1,000 (National Center

on Child Abuse and Neglect, 1981). In addition, parents who maltreat their children appear to be characterized by poor social relationships of the sort that would render them relatively unlikely to volunteer for participation in research programs (Crittenden, 1981). These two factors combined probably account for the fact that samples in the child abuse literature tend to be quite small. The study achieving statistically desirable sample sizes has been and will continue to be rare. However, rather than simply bemoaning that fact, the problem can be addressed through (1) more attention to replicating studies, (2) more attention to the use of standardized, or at least previously reported, measures and less reliance on measures developed for a single study, and (3) more attention to psychometric properties of measures used.

A second limitation of the available literature is relevant to the issue of sample size, but also has other conceptual and practical implications. The focus of the child maltreatment literature has been on parents whose abuse or neglect of their children has been legally documented. As result of this focus, interest has been directed only toward the most dramatically inadequate parents. This focus decreases the population from which research subjects can be drawn. In addition, it decreases the kinds of questions that can be asked and the generalizations that can be drawn about other kinds of problematic parenting. Several authors (Belsky,1984; Chibucos, 1980; Pelton, 1981) have suggested that quality of parenting is best conceived as falling on a continuum from optimal to suboptimal care.

If parenting is indeed a multiply determined process, then adequate assessment of that process requires that a range of outcomes be considered, and not only the most adverse. A focus on only the far end of the continuum of the quality of parenting gives the impression that abusing and neglecting parents are seen as qualitatively different from parents providing suboptimal, albeit legally acceptable care (Chibucos, 1980). Such a discontinuity might be established empirically; i.e., the basic operative processes may differ in the abnormal ranges of the spectrum, but as yet such a phenomenon has not been documented. That question will not be addressed until the range of outcomes examined is expanded to include troubled, but nonabusive parents.

A third limitation of the child maltreatment literature, noted by Kotelchuck (1982), has been an overreliance on poverty as a primary sample selection criteria. Both of the major prospective studies discussed previously used this criterion in establishing their pool of subjects (Egeland et al., 1980; Vietze et al., 1980). Thus, all of the relationships reported in these studies occurred under conditions of moderate to extreme poverty. The influence of discrete variables and the interaction between variables in the absence of the particular forms of chronic stress accompanying poverty cannot be discerned from these studies. While serious maltreatment is more prevalent under conditions of poverty, it also occurs under other conditions. Our understanding of how problem parenting develops outside of poverty conditions remains primitive

without an expansion of the kinds of selection criteria established to define "high risk" families.

A fourth limitation of available research is its lack of articulation with other areas of research (Belsky's 1984 review and the Conger et al. study are exceptions) and the lack of analytic strategies that would derive from such articulation. This lack of articulation is especially apparent when one begins to build theories or apply theoretically based analytic strategies to data (e.g., hierarchical multiple regression and causal modeling). Many of the constructs prominent in the child maltreatment literature have been addressed in other areas of research and there are many documented links between variables of interest. However, these links are seldom explicitly addressed in the design or analysis of a child maltreatment research project. This may be in large part due to the emphasis on predicting the occurrence of child maltreatment and to the concomitant lack of emphasis on the relationship among those variables identified as predictors. However, these relationships must be explicated if there is serious interest in understanding the process by which parenting develops.

In summary, researchers in the area of child maltreatment will either work toward increasing sample sizes and thereby increase the generalizability of findings, or more realistically, treat small sample sizes as a fact of life and design studies and report results in a fashion that makes maximum use of available data. Parents who are experiencing difficulties with their children should be the focus

of studies in this domain, with attention given to problematic parent-child interaction that falls short of legal definitions of abuse and neglect. Troubled parents from a range of social strata need to be studied in order to assess the role of the chronic stress presumed to accompany social and economic deprivation in the development of parent-child interactional problems. Finally, studies of parenting and studies of child maltreatment need to move beyond "one-shot" univariate approaches to an approach that is more integrative.

It should be noted that the Conger et al. (1984) study addresses all of these limitations of the child maltreatment literature. Although these authors did not reference the work of Belsky or make strong links between their work and the maltreatment literature, their study clearly meets the spirit and recommendations of Belsky's proposals. However, their results, as they acknowledge, must be viewed as quite tentative and in need of replication and/or expansion. In particular, they did not find strong support for the hypothesis that psychological variables mediate the effects of environmental stress on parental behavior. Neither did they disconfirm this hypotheses. As a critical element in Belsky's (1984) model of parenting, these proposed mediating effects merit further investigation.

The Present Study

Purpose and Strategies

The purpose of the present study was to explicitly assess the interplay of a subset of the variables identified by Belsky (1980, 1984) as critical in the development of parent-child interaction. In so doing, it also provided an attempt to replicate the tentative findings of the Conger et al. (1984) study previously outlined. This study was designed to address several additional issues raised in the preceding review. First, it used a theoretical perspective (Belsky, 1984) that applies insights from the child maltreatment literature to the study of the development of mother-infant interaction. Second, hypotheses were developed on the basis of prior theory and research. In contrast to much multivariate research in the area, the analytic strategy did not seek to maximize prediction, but to test one specific model and to replicate results of a prior test of a very similar model. Because of the small sample available in this and other studies in the field, a more rigorous approach to hypothesis testing than has been the norm was taken. Third, this study assessed the development of parent-infant interaction in a sample presumed to be at risk for the development of parenting problems. However, in contrast to research previously reported, a range of social and economic backgrounds was represented. In addition the sample was not limited to parents who maltreated children to the extent that legal criteria for abuse or neglect were met. The dependent measures in this study were ordinal measures of quality and style of mother-

infant interaction rather than classification of some particular form of maltreatment. This choice of dependent measure allows an examination of the impact of etiological variables over a range of outcomes and not only the most dysfunctional.

This research adopts a strategy similar to that used by several other studies in measuring "risk" (Altemeier et al., 1979; Conger, et al., 1984; Badger, Burns & Vietze, 1981). The Badger et al., and Vietze et al. studies used maternal interviews and medical records to develop scales to measure the degree to which a mother was at risk for maltreating her child (Veitze et al., 1979) or the child was at risk for suboptimal development (Badger et al., 1981). Both scales were reasonably successful in predicting the outcome of interest. The Conger et al. study used a scale derived from financial status, educational achievement, and family structure as an index of chronic stress likely to be disruptive to parenting. In the present study social and economic variables were collapsed into scales that would provide an index of the degree of social and economic disadvantage and presumably chronic stress under which a mother is or has been operating. These scales are viewed as risk factors; i.e., a high score suggests a higher probability that a mother is or will be experiencing frequent stressful life situations. This, in turn, suggests an increased risk that mother-infant interactional problems will develop.

One scale used in this study was developed from variables indexing education, occupation, family composition, and provided an

expanded pictures of social status(similar to Conger et al., 1984). The second scale is derived explicitly from the work of Garbarino (1976) and provided an index of the quality of the neighborhood (census tract) in which the family lived. This index offered a view of the social and economic opportunities and quality of the social ecology in which a family was operating. The first scale covered current social and economic conditions within the family, as well as past events likely to be associated with continuing stressful conditions (mother's age and educational attainment). The second scale covered social and economic conditions external to the family, but which directly impact the family.

The risk factors derived were hypothesized to function as a background against which maternal attitudes and psychological status operate. Two assumptions underlie the manner in which these risk factors were used in the present study. (This is particularly true of the social status scale.) One was that they reflect long-term stability. Badger et al. (1981) reported stabilities for their risk factor ranging from .86 to .92 over one-year periods; .69 to .78 over two-year periods; and .66 over a three-year period. A further assumption was that, even if there were changes in the risk factor score for the present study, the eight-month time frame under consideration in this study would not allow such change to have significant influences. Thus, these measures were taken only at the intake point of the study.

The present study examined the influence of maternal attitude and psychological status on mother-infant interaction in light of the degree of risk inherent in the context in which these interactions are developing. In Belsky's (1984) language, the impact of mothers' personal psychological resources on their interactions with their infants were assessed against the background of chronic environmental stressors presumably impinging on the mothers.

Definitions of Constructs and Variables

Environmental stress. Environmental stress is a construct used in the present study in a manner nearly identical to that in the Conger et al. (1984) study. It refers to social and demographic indicators that have been shown to relate to stressful living conditions. These indicators are suggestive of an increased probability that a person living under certain conditions will experience a higher frequency, intensity, and density of stressful life events that are likely to result in the psychological experience of stress. This construct was indexed by two variables in the present study.

Maternal risk was defined as the degree to which past events (e.g., low educational attainment, teenage pregnancy) and current living situations (e.g., unmarried, low income, isolated from extended family, limited employment prospects) increase the probability that a mother will encounter significant problems in parenting. Presumably, this increased risk is due to the increased

exposure to stressful conditions and events, as well as limitations on social and economic solutions to common problems encountered by all parents (e.g., transportation, medical expenses, child care).

The second index of Environmental Stress is Negative Socioeconomic Climate. This variable was defined as the degree to which a mother's immediate social milieu is marked by poverty, unemployment, lack of social and economic opportunity, and lack of educational opportunity. This variable complements the maternal risk variable in indexing the degree to which a mother's potential sources of support and alternative models of parenting and problem solving are also likely to be experiencing a high level of chronic stress. It explicitly follows the work of Garbarino (1976) who has found a higher prevalence rate for child abuse in census tracts lower on the dimension herein labelled negative socioeconomic climate.

Maternal Psychological Resources. Belsky (1984) has used the construct Personal Psychological Resources as a global index of "forces emanating from within the parent" which facilitate and promote positive developmental outcomes (e.g., emotional security, behavioral independence, social competence, intellectual achievement). In general, this construct refers to attitudes, values, personality factors, parental psychological well-being, and problem solving skills which influence the manner in which parents perceive their children and their role as parents. These factors also influence the manner in which parents conceptualize tasks of parenting and implement parenting strategies.

The first index of this construct for the present study was Psychological Distress. Psychological Distress refers to the degree to which parents show observable indications of problems in day-to-day functioning. These indications are the sort typically viewed as symptomatic of some degree of psychiatric disturbance (e.g., somatization, obsessive compulsiveness, depression, anxiety, etc.). The kinds of psychological distress indexed in the present study have been strongly associated with dysfunctional parenting in the prospective child-maltreatment studies previously outlined (Egeland et al., 1982) and in studies of other types of dysfunctional parenting (Patterson, 1982), although the exact mechanism by which psychological distress disrupts parenting is not well delineated.

Adaptive Maternal Attitudes is the second index of Personal Psychological Resources used in this study. This variable refers to the degree to which mothers espouse beliefs about their roles as parents and about the developmental needs of children which, if enacted, would facilitate positive developmental outcomes for their children. Although prior research attempts to link specific parental attitudes with specific parental behavior have been only minimally successful (Walker,1980), recent use of Cohler et al.'s Maternal Attitude Scale (1970) with high risk population has shown links between overall level of "adaptive" attitudes with global quality of care.

Positive Maternal Behavior. The final major construct of this study, Positive Maternal Behavior, was defined as behavior

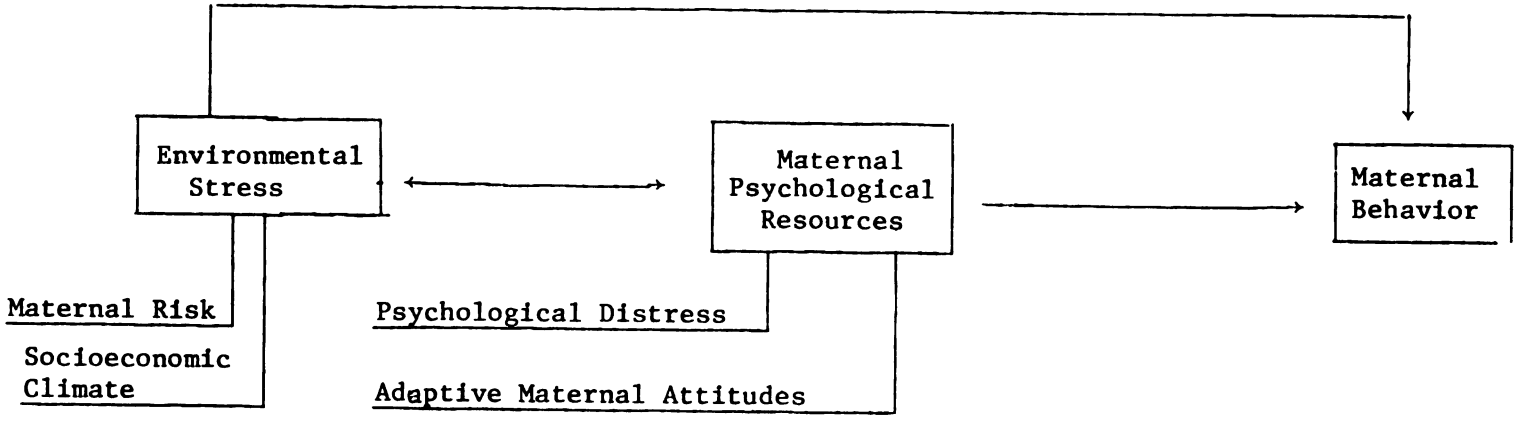
which, if consistently displayed in interaction with children, is likely to lead to children's emotional security, behavioral independence, social competence, and intellectual achievement (Barnard & Bee, 1983; Bradley & Caldwell, 1977).

Hypotheses

The present study tested a specific model of the mediation of the effects of environmental stress on maternal behavior by maternal psychological resources. This model is schematized in Figure 1. Three primary theoretical and empirical sources were used in the development of this model. First is Belsky's (1984) model of the ontogeny of individual differences in parent-child interaction. Belsky specifically hypothesized that parental psychological characteristics serve to buffer the parent-child interactional system from stressor emanating from the social context in which the family is operating.

Secondly, although Egeland et al. (1980) did not report an approach to data analysis that could directly test the model proposed by Belsky, they did provide data offering strong indirect support for the model. The most dysfunctional parents in their prospective study were those exposed to a high frequency and intensity of stressful life events and who differed significantly from more functional parents both the degree to which they reported psychological distress and the degree to which they endorsed adaptive maternal attitudes (as previously defined). Egeland et al. speculated that the absence of high levels of psychological problems or symptoms

Figure 1. General Model to be Tested



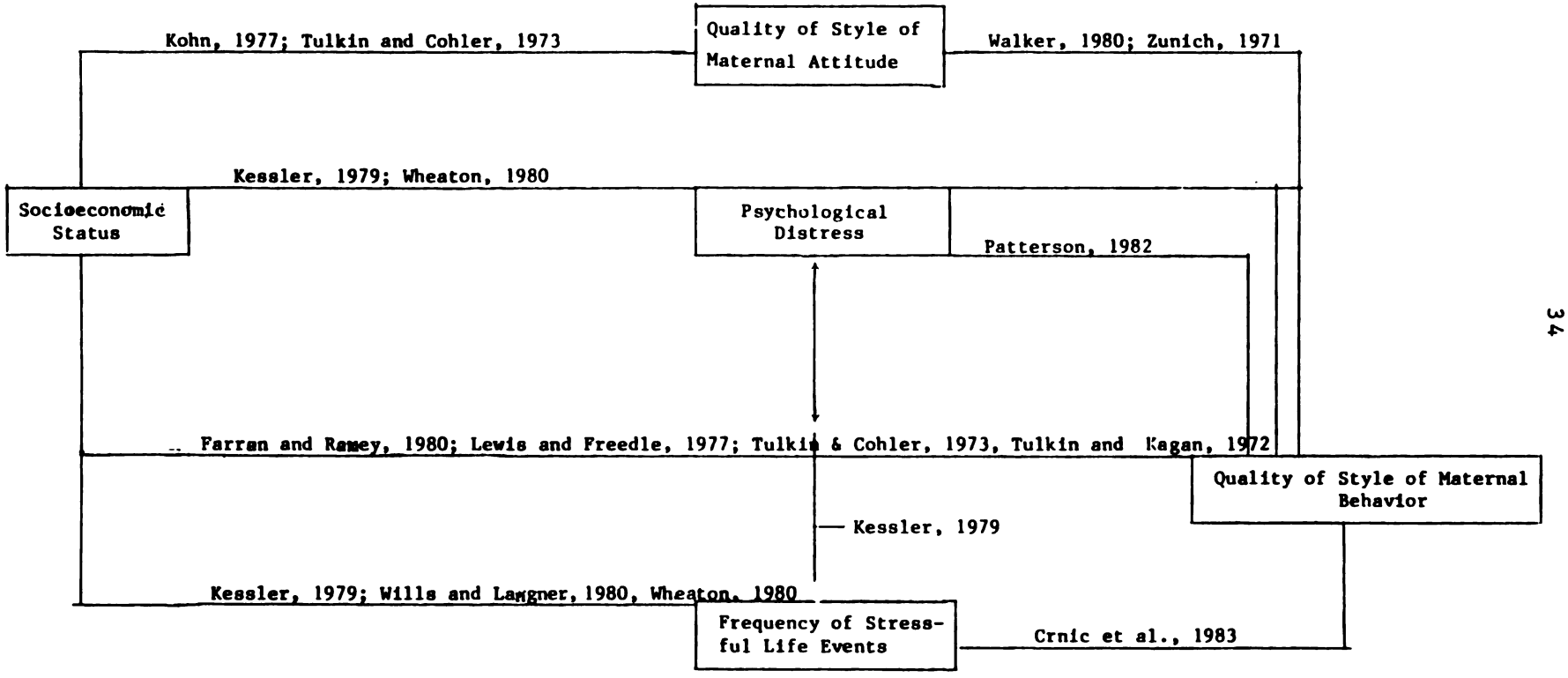
accompanied by a view of parenting that would facilitate and reinforce positive maternal behavior could prevent parents from "blending" their reactions to stressful life events with their interactions with their children.

Finally, Conger et al. (1984) specifically tested a model conceptually identical to that presented in Figure 1. However, the results were less conclusive than one might hope. They argued thtat their results provdied general empirical support for a model in which psychological characteristics mediate the effects of environmental stress on parenting. Both psychological characteristics and environmental stress were found to have direct effects on parenting. While there was no evidence for an interaction of stress and psychological characteristics, they argued that the mediational model was not ruled out by their data. Thus the present study retests the model using somewhat different variables to index the psychological characteristics construct in an attempt to further elucidate potential mediating effects of psychological resources.

There are other, less direct sources of support for these hypotheses that merit comment. Figure 2 provides a schematic representation of correlational evidence linking the constructs under investigation in the present study.

As Figure 2 indicates, socioeconomic status is linked to all of the variables of interest in the present study. Maternal attitudes (Kohn, 1977) and specifically maternal attitudes as measured by the Cohler Maternal Attitude Scale are reported to vary as a function of

Figure 2. Schematic Diagram of Relationships Reported among Constructs Related to Parenting and Child Maltreatment.



socioeconomic status (Tulkin & Cohler, 1973). Psychological distress also varies as a function of socioeconomic status (Kessler, 1979; Wheaton, 1980). The hypothesis of Conger et al. (1984) i.e., that socioeconomic status is a marker of level of environmental stress is supportedly empirically by the association between socioeconomic status and frequency of stressful life events (Kessler, 1979; Wills & Langer, 1980; Wheaton, 1980). Frequency of stressful life events also appears to play a critical role in the observed relationship between socioeconomic status and psychological distress (Kessler, 1979; Cohen & Wills, 1985). There are consistent links between individual differences in maternal behavior and socioeconomic status (Farran & Ramey, 1980; Lewis & Freedle, 1977; Tulkin & Cohler, 1973; Tulkin & Kagan, 1982). In addition to the potential influence of psychological distress on maternal behavior noted in the Minnesota prospective study of child maltreatment (Brunquell et al., 1981), Patterson (1982) (1984) has noted correlations between indices of psychopathology and problematic parenting. Finally, although there is a substantial body of research showing difficulty in directly relating attitudinal and behavioral measures (see Walker, 1980, for review), one particular instrument (Cohler's Maternal Attitude Scale) has fared somewhat better in showing a relationship with discrete maternal behaviors (Zunich, 1971) and substantially better in relating qualitative, summary attitude scores with qualitative global parenting indices in high-risk samples (Egeland & Brunnquell, 1979; Vietze et al., 1980). Walker (1980) has argued (following Fishben &

Ajzen, 1975) that multi-item attitudinal scales are likely to show much more consistency with multi-item behavioral indices than if single-item measures are used. Thus, in spite of conflicting evidence regarding attitude-behavior consistency, such a relationship is hypothesized in the present study because of the particular measures used, the manner in which the measures are used, and because theoretical perspectives (e.g., Belsky, 1984) suggest that attitudes may play a particularly critical role in high-risk families.

In summary, the model presented in Figure 1 was the hypothesis tested in this present study. This model can, however, be broken down into three discrete hypotheses:

Hypothesis 1: Maternal risk directly affects level of psychological distress, quality of maternal attitudes, and quality of maternal behavior.

Hypothesis 2: Negative socioeconomic climate directly affects level of psychological distress, quality of maternal attitudes, and quality of maternal behavior.

Hypothesis 3: Level of psychological distress and quality of maternal attitudes directly affects quality of maternal behavior.

The major thrust of the study was on the simultaneous consideration of these hypotheses through path analysis. In path analytic language, the hypotheses can be restated as:

Hypothesized Model: Maternal risk and negative socioeconomic climate have a direct effect on maternal behavior and an indirect effect that is mediated by adaptive maternal attitudes and level of psychological distress.

METHOD

Sample

Subjects for this study were participants in one of two child abuse prevention programs serving the greater Lansing, Michigan, metropolitan area. The primary referral source to these programs was the medical system, although other social services and Public Health agencies could make referrals. Subjects were referred on the basis of perceived risk for seriously dysfunctional parenting. Factors leading to a referral included: (1) problematic maternal history, (2) current psychiatric or substance abuse problems, (3) the existence of chronic or acute social stressors, or (4) observation of problematic mother-infant interaction. Developmentally delayed infants and those with congenital defects were excluded; thus, infant characteristics were not used to define the risk nature of the existence of "risk" for this sample.

Rationale--Sample Selection

The rationale for choosing this particular population to address the hypothesis raised in the review of the literature follows from two considerations. First, the sample selection procedures were such that a broad and heterogeneous group of parents would be identified. However, they would all be viewed by professionals in their communities as likely to experience (or already experiencing)

problems with their infants. Thus they meet a second desirable criterion for addressing the hypotheses raised; i.e., there is reason to suspect that problematic parenting would be likely to emerge as these parents were followed over time.

Mothers' participation in parenting programs does present a drawback to the present study. One must either refrain from generalizing results of the study to populations not participating in such programs, or one must assume that the programs do not disrupt the basic processes under consideration, and do not distort the statistical relationships among the constructs under investigation. (This point is addressed further in the discussion section.)

Sample Size

Initially, 144 mothers agreed to participate in the study. However, attrition and failure to complete research instruments left complete data sets for 118 families at intake, 55 at four months post-intake, and 40 at eight months post-intake. (Analytic issues raised by subject attrition are addressed in the Results section.)

Sample Description

The present study followed subjects from an initial intake period for a period of eight months. Intake could take place anywhere from the last trimester of pregnancy through infant age six months. Thus, a range of infant ages was represented.

Descriptive statistics for the demographic characteristics of the initial smple are presented in Appendix A. The mean age for the

55 mothers participating at four-month follow-up was 22.4 years with a range of 13 to 37 years. On the average, mothers had 11.6 years of education with a range 7 to 22 years. Approximately 59% of the mothers were married, and 51% reported a man living in the home. An additional 19% reported that the baby's father, while not living in the home, was somewhat involved with mother and baby. However, 66% of the mothers reported that the father provided minimal or no help in the care of the infant. Mean age for fathers was 26.4. The average household income was approximately $10,000 with 48% of households having no employed adult and 45% of households relying solely on public assistance as their source of income. This sample included 71% white mothers, 20% black mothers, 5% Hispanic mothers, and 4% American Indian or Asian. There was considerable range on all demographic variables.

Procedures

Mothers who attracted the attention of medical or social services personnel and agreed to a referral were contacted by a research interviewer from the Infant Development Program (IDP). (No information is available about the number of persons in the community who were approached by someone in the community about referral and declined to be contacted by IDP.) The research and prevention program were explained to interested prospective participants and their participation was sought. Research participation was not a requirement for program participation and either component could be terminated at any time. Those agreeing to participate (73% of

contacted referrals) were informed of their rights as research subjects and signed a consent form.

It is difficult to determine why those who refused to participate did so. Of those refusing to participate, 80% declined or avoided any contact with the project. Only 5% of those refusing to participate did so after hearing a full description of the project.

Those mothers agreeing to participate were randomly assigned to one of two programs. One was the Infant Development Project (IDP), a psychoanalytically oriented psychotherapy program modeled explicitly after that of Fraiberg (1980). The other was a supportive/ educational program provided by Public Health nurses. Both of these programs aim to improve maternal attitude and maternal-infant interaction. In addition, the IDP works toward the personal goal of promoting enduring personality change in mothers. Neither of these approaches to preventing child abuse has been researched to the point that estimates of program effectiveness can be made (Helfer, 1982). [Indeed, one review of the child abuse literature found only 10 articles whose abstracts suggested <u>research</u> into the <u>prevention</u> of child abuse. On closer inspection, only three studies actually presented data on the effectiveness of a prevention program (Helfer, 1982)].

The present study was not intended to evaluate the relative merits of either approach. Rather, it used the samples identified for participation in these programs because of their utility in

addressing hypotheses raised. The only program evaluation question addressed was quite indirect, i.e., was there support for the idea that influencing the level of psychological distress or quality of maternal attitude will influence the quality of mother-infant interaction?

The research component of the program involved a two hour interview/observation period at intake, at four months post intake, and eight months post intake. At the time the interview/observation was scheduled, mothers were mailed a packet of two research instruments which were to be completed and picked up at the time of the interview. The interview consisted of questions described in the instrumentation section, as well as an observation of the mother feeding her infant and engaging in structured age-appropriate teaching tasks. The project had one research interviewer with primary responsibility for gathering data; other project members were used occasionally to establish inter-rater reliabilities. Data analyzed in the present study were all collected by the Infant Development Project team. All data were collected prior to the proposal and implementation of the present analysis.

Instrumentation

Maternal Interview

One interview protocol, two self-report measures, and observational ratings, provided the data for this study. The interview information used in the present analysis was gathered at the time of intake. This interview contained items scored either on

a Likert-type scale or on a dichotomous scale. It covered demographic information, pregnancy and delivery history, mothers' perceptions of their own upbringing, current living arrangements, social isolation, and social support. The items used in constructing risk scales and their scoring can be found in Appendix B. Note that these items were coded such that a high score would indicate (on the basis of the child abuse literature) an increased risk for the development of problems in parenting.

A second source of information to be included in deriving the risk scale(s) came from 1980 Census Data. Included are ten items describing the characteristics of the areas (census tracts) in which participants live. These cover transcience, economic development, educational development, and socioeconomic conditions of mothers and provide an objective view of risk at Belsky's (1980) social contextual level. Garbarino (1976) found these particular variables to significantly predict reported rates of child abuse/neglect in three separate geographic areas.

Maternal Attitude Scale

Two self-report measures were used at four- and eight months post intake. The first is the Maternal Attitude Scale (Cohler et al., 1970). This instrument was developed specifically to assess those affectively laden attitudes toward the experiences of mothers of infants that Sander (1962) postulated as having developmental significance. Six subscales, derived through factor analysis (126 items) were used:

1. maternal satisfaction versus feeling of depletion and futility
2. acceptance versus nonacceptance of child's impulses
3. maternal flexibility and adaptability versus rigid responding
4. concern regarding performance versus denial of concerns
5. encouragement of positive interaction versus maternal hostility
6. maternal moderation of child's aggression versus control of threatening impulses.

Subjects respond to items on a six-point continuum (strongly agree to strongly disagree) and scoring is such that a high score indicates adaptive attitudes, i.e., those facilitative of a positive mother-infant relationship. Internal consistency for these factors ranges from .63 to .82 (Cohler, 1969). Factor scores on the scales have shown long-term stability with coefficients ranging from .56 to 78 over a 41-month period (Hock & Lindamood, 1981). Scores on these scales have differentiated emotionally disturbed mothers from controls (Cohler et al., 1970), working class from middle-class mothers (Tulkin & Cohler, 1973), and inadequate care mothers from adequate care mothers (Egeland & Brunnquell, 1979), particularly under conditions of chronic and acute stress (Egeland et al., 1980). These scale scores have shown significant correlations with discrete interactional variables in middle-class samples (Tulkin & Cohler, 1973).

This particular measure of maternal attitudes was chosen for this study for three primary reasons. First, it has been used in other studies in the child maltreatment literature and thus provides comparisons with relationships in other studies (Egeland & Brunnquell, 1979; Vietze et al., 1980). Second, the rationale and theoretical foundation (see Cohler et al., 1970) upon which it is based, make it particularly useful in considering whether the overall style with which mothers view their relationships with their infants is likely to be adaptive, i.e., lead to positive behavior. Third, it is designed specifically for use with mothers of infants.

Brief Symptom Inventory and Hopkins Psychiatric Rating Scale--Analogue Form

Two measures of psychological distress were used in the present study. The Brief Symptom Inventory (BSI) is the short form (53 items) of the SCL-90-R (DeRogatis, 1977). This scale has nine symptom pattern subscales derived through factor analysis, and a summary distress score. The subscales are: somatization, obsessive-compulsiveness, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Major validation studies have been done on the SCL-90-R and show adequate factorial variance across social class and psychiatric status, and adequate construct validity. Correlations between BSI and SCL-90-R subscales range from .72 to .99 and test-retest reliabilities on the BSI range from .70 to .90 (DeRogatis, 1977).

The Hopkins Psychiatric Rating Scale (HPR) is an analogue form of the BSI in which subjects are rated by an interviewer on the same dimensions as the BSI. For each scale ratings from zero to six are made, with a low score suggesting little evidence of the particular set of problems and six indicating an extreme level of distress on a given symptom domain. The HPR has been shown to have adequate interrater reliability, test-retest reliability and construct validity (DeRogatis, 1977).

These instruments were chosen for this study because they tap several dimensions of psychological distress from subjects' as well as observers' perspectives. The state of theory and research in the child maltreatment literature has not advanced to the point where particular forms of psychopathology have emerged as demonstrably more destructive to developing parent-child relationships than others. However, in line with Belsky's (1984) speculations on the personal psychological resources of parents, it is desirable to have an instrument that is sensitive to level of psychological distress, even in the absence of a clear psychiatric syndrome.

Initially it was hoped that the BSI and HPR could be used conjointly as multiple indicators of psychological distress. Unfortunately, the number of subjects failing to complete the BSI at the four- and eight-month follow up precluded systematic use of that instrument. As a result, it was used only to provide an estimate of the correspondence between observers' and subjects' ratings of psychological distress. The HPR was completed by the research

interviewer following the intake interview and four-month and eight-month follow up inteview/observation periods. These sessions typically lasted two hours. Interrater reliability was established between the research interviewer and another Infant Development Project staff member or a random sample of subjects during the intake process.

The average interrater reliability estimate was .87 (Pearson *r*). The average correlation between subjects' view of their overall level of distress (BSI total) and raters views (HPR total score) was .62.

HOME

The quality of maternal care was assessed at four- and eight-month follow ups, using Caldwell's HOME (Home Observation for Measurement of the Environment (Bradley & Caldwell, 1977; Elardo, Bradley, & Caldwell, 1975)). The HOME is a 45-item checklist assessing qualities and characteristics of the home environment. In addition to a summary score, it yields scores on (a) emotional and verbal responsivity of mother, (b) avoidance of restriction and punishment, (c) organization of the environment, (d) provision of appropriate play material, (e) maternal involvement with the child, and (f) opportunities for variety in daily stimulation. Internal consistency coefficients range from .44 to .89 for subscales and .89 for the total scale. Scale scores at six months have been shown to be significant predictors of child intellectual measures up to 54 months (Bradley, 1981). Although the measure has not been used in

studies specifically addressing child maltreatment, its domain is conceptually related to that of child neglect.

Nursing Child Assessment Feeding and Teaching Scales

The quality of mother-infant interaction was assessed at four- and eight months post intake, using the Nursing Child Assessment Feeding and Teaching Scales (NCAFS, NCATS) (Barnard & Bee, 1983). The Feeding and Teaching Scales are each made up of a number of binary items (76 and 73 items, respectively) organized into six subscales. Four describe the parents' behavior: (a) sensitivity to cues; (b) response to child's distress; (c) social-emotional growth fostering; and (d) cognitive growth fostering. Two describe the child's behavior: clarity of cues and responsiveness to parent. The feeding scale is based on an observation of an infant feeding situation, while the teaching scale is based on a situation in which the mother is instructed to teach the infant an age-appropriate game (grasping a bell, stacking blocks, etc.). Internal reliability estimates for the teaching scale parent behaviors range from .51 to .71 at infant age four months and .47 to .82 at eight months. Feeding scale reliability estimates range from .21 (sensitivity to cues) to .85 at four months and .26 to .83 at eight months. Internal consistency estimates for the combined scales range from .67 to .86 at four months and .64 to .87 at eight months. Stability of the subscale scores across a four-month period ranges from .08 to .57. The combined scales show stability coefficients ranging from .19 to

.58. The Teaching and Feeding Scale scores have a been shown to predict child intellectual functioning at 48 months (Bee et al., 1982), to vary directly as a function of maternal age (Ragozin et al., 1982), and to vary as a function of social support and social stress (Crnic et al., 1983).

The Infant Development Project research interviewer was trained at the University of Washington Nursing Child Assessment Project to .85 agreement with their project staff on the HOME, Teaching, and Feeding Scales. Seven reliability checks between this observer and a similarly trained Infant Development project staff member have yielded coefficients of agreement ranging from .85 to .92 for HOME, NCATS, and NCAFS scale scores with an average coefficient of .87.

The observational measures chosen (HOME, Teaching and Feeding Scales) sample a range of mother-infant interactional variables in two separate contexts (feeding and teaching), and provide an indication of the quality of organization of the home environment. This method of observation was chosen because (1) the dichotomous nature of the items of the instruments lends itself to greater interobserver agreement (Hollenbek, 1978); (2) the ratings emerging are meaningful descriptions of the quality of mother-infant interaction (in contrast to sampling discrete units of behavior); (3) the range of behaviors sampled was sufficiently broad and the instruments sufficiently sensitive that problematic mother-infant interactions would be registered.

RESULTS

Attrition

Of the initial 118 subjects with complete data at intake, 55 had complete data sets at four-month follow-up, 40 had complete data sets at eight-month follow up, and 21 had complete data sets at all three points in time. This marked attrition rate posed several questions about how data from the study might be best utilized. In keeping with the overall strategy of testing a specific model, it was decided to treat data as representing (1) a basic study (at four-month follow up, N = 55) with, (2) a replication at eight months, and (3) three replications using a subsample with N = 21 (four month, eight month, and a model predicting maternal behavior at eight months from four-month data). Thus, the basic model depicted in Figure 1 was tested once and replicated four times across time and subsamples. Note that these are not independent samples. Subjects with complete data at eight months were not, in all cases, the same subjects with complete data at four months. By treating the subsamples created by attrition as replications, the requirement that the researcher prove basic similarities in samples is somewhat relaxed. In fact, it becomes desirable to demonstrate replication across differing samples as a more stringent test of the model.

Nonetheless, it is of interest to discern differences among the four subsamples (four month N = 55; four month N = 21; eight month N

= 40; eight month N = 21). The descriptive statistics for all intake variables and measures are presented in Appendix A (demographic data), Appendix C (Hopkins Psychiatric Rating) Appendix D (Home Observation for Measurement of the Environment), Appendix E (Maternal Attitude Scale), and Appendix F (Nursing Child Assessment Scales). Although there were numerous differences noted, there are a few key factors apparent. Time, itself, did not appear to be a critical factor. Mean values for the vast majority of items on the standardized measures were consistent across sampling points (to within sampling error). However, there were differences related to dropping out of the study, or failing to complete instruments. All measures were subjected to a Chi Square analysis or analysis of variance (as appropriate for data for each measure). Comparisons were made among (1) subjects with complete data at all points in time (N = 21), (2) subjects with complete data at four months, but not eight months (N = 34), and (3) subjects with complete data at eight months, but not four months (N = 19). There were 12 variables that differentiated the 21 subjects who completed all measures at all data points from those who had complete data at only one point in time. Those who completed all phases of the study were (1) more likely to be enrolled in the Infant Development Program than the Public Health program, (2) more likely to have had a Cesarean section than a vaginal delivery (3) rated as having more problems with interpersonal sensitivity (HPR), (4) rated as higher on overall psychological distress (HPR), (5) more likely to report problems with feelings of

hostility (BSI), (6) more likely to report overall psychological distress (BSI), (7) more likely to report problems with psychiatric symptoms (BSI), (8) older, (9) more likely to describe the baby's father as a significant source of support, (10) having more years of formal education, and (11) less likely to have been alone during labor and delivery, and (12) scoring lower on the maternal risk scale.

With respect to the notion of an "at-risk" sample, the mothers who completed the study were a lower risk group than the dropouts. They were older, better educated, and appeared to have more sources of social support. However, they were also more likely to see themselves and be seen as having psychological problems. The ramifications of these differences are presented in the discussion section.

"Risk" Status

A question raised by consideration of the sample used for this study is whether or not there is reason to view the subjects as truly "at risk" for the development of parenting problems. An examination of descriptive statistics for the standard measures used in the study (Appendices C through F) indicate that none of the subsamples was marked by a significant degree of psychological distress, either by self-report or observer ratings. For the most part, the psychological distress scores are consistent with those reported for nondistressed populations (DeRogatis, 1977). The modal responses on all items were consistently in the nondistressed range with the

exception of the interpersonal sensitivity and depression scales. Modal responses on these scales were consistently in the moderately distressed range. There was a range of levels of psychological distress reported on all symptom dimensions. Range was greatest for "neurotic" symptoms (interpersonal sensitivity, depression, and anxiety) and most restricted on dimensions of paranoid ideation and psychoticism.

Data from the HOME scales suggest a more consistent picture of a sample at risk for the development of parent-child problems. Scales whose mean scores fell at no greater than the 40th percentile when contrasted with normative samples are: Verbal Responsivity of the Mother (four months), Avoidance of Restriction and Punishment (eight months), Organization of the Environment (four and eight months), Opportunities for Variety in Daily Stimulation (four and eight month). While the 40th percentile is not evidence of major parenting problems, it does represent a statistically significant deviation from the mean (Bradley & Caldwell, 1977). As such, it supports the notion that the sample had a somewhat higher probability of developing parenting problems than does a "normal" sample.

Finally, social contextual factors can be examined for further assessment of the degree to which this sample is at greater risk for the development of parenting problems than other samples. Appendix G contains descriptive statistics for the census tracts in which subjects resided. Of note is the fact that these parents lived in areas in which 27% of adults are not high school graduates, 30% of

female headed households live below the poverty level, and 25% of families with children under the age of 5 live below the poverty level. However, the median income level ($18,000) and the unemployment level (11%) suggest that overall, these subjects could not be viewed as coming from unusually economically depressed areas. While the sample as a whole cannot be viewed as atypically impoverished for a major metropolitan area (Perrucci & Knudsen, 1983), examination of the range on these variables suggests that significantly impoverished areas were represented in the study (e.g., census tracts in which 55% of adults had not graduated from high school, with a 32% unemployment rate, with a $7,000 median income, and which had 67% of families with children under the age of five living below the poverty level).

Measurement Model

Analysis followed the logic of Hunter and Gerbing (1982) in establishing a measurement model prior to subjecting data to path analysis. Three primary constructs were of interest in this study: maternal risk, personal psychological resources, and mother-infant interactional style. Items drawn from the initial parents interview (Appendix B) and census tract characteristics (Appendix G) provided the pool for measurement of the first construct. Personal psychological resources is indicated by the Maternal Attitude Scales and the Hopkins Psychiatric Rating scales. The HOME and Nursing Child Assessment Scales provide items for the maternal behavior construct.

Initial interview items and census tract items were all included in the study because of past associations reported with problematic parenting and/or child maltreatment. These 38 items were first standardized (as were all items in the study). They were subjected to a principal components factor analysis with varimax rotation. Factors accounting for less than 5% of the total variance were discarded. Three factors remained after this procedure. The three factors were inspected to ascertain the degree to which items within each factor were conceptually related. Conceptually unrelated items were deleted from the scales.

Following this procedure, the three clusters were subjected to a confirmatory factor analysis (cluster analysis) using the PACKAGE program (Hunter & Cohen, 1971). Clusters were modified to maximize adherence to four requirements outlined by Hunter and Gerbing (1982): (1) conceptual coherence, (2) unidimensionality, as indexed by evidence of a "flat" or hierarchically ordered correlation matrix, (3) external consistency as indexed by the pattern of correlation of variables outside the cluster, and finally, (4) achievement of an adequate level of reliability of the cluster score (coefficient alpha).

Two scales meeting these selected criteria resulted from the procedures outlined above. Table 3 contains the items, inter-item correlations, communalities, item-cluster correlations, and correlations of times with other clusters in the study for a scale labelled Maternal Risk. A high score on the scale describes a young,

Table 3

Maternal Risk Scale[1] (α = .92)

Item	Unmarried	Age	Education	Employment	Income	No. of Relatives	Item-cluster Correlation	Item Corr. with Psy. Distress Scale	Item Corr. with Neg. Soc. Ec. Climate
Mother unmarried (+)	87						93	-33	35
Mother's age (-)	80	78					88	-30	55
Mother's Years Education (-)	83	78	72				85	-14	34
Best Employment is Household (-)	79	62	66	56			75	-10	21
Family Income (-)	55	58	44	42	41		64	-32	38
Number Relatives in the Immediate Area (-)	53	45	63	44	46	39	62	-24	26

[1]Communalities in diagonal.

unmarried mother, who is undereducated, poor, has few relations in the immediate geographic area, and is living in a household where the best employment status is unskilled labor or unemployment.

There is considerable overlap between this scale and that used to index Environmental Stress in the study of Conger et al. (1984). The Maternal Risk scale items also overlap the Maternal Risk scales used by Badger et al. (1981), Vietze et al. (1980). The scale meets the criterion of meaningful, consistent content. The average inter-item correlation of the item is .60 with a 95% confidence interval of .48 to .72. The matrix is not "flat," i.e., it does not meet the criteria of any two items having the same correlation to within sampling error. However, it satisfies Spearman's requirement for showing a strong-weak gradient, such that when items are ordered in terms of their communality from strong to weak, high correlations can be found in the upper left hand corner of the matrix and low correlation can be found in the lower right hand corner (Hunter & Gerbing, 1982).

The Maternal Risk Scale is externally consistent, i.e., it satisfies the test of parallelism. Item correlations with other clusters drawn from intake data are equal to within sample error. Finally, the internal reliability coefficient (alpha) is .92 for the this scale.

The second scale developed from the intake information contains six items from the census tract data and is labelled Negative Socioeconomic Climate. This scale describes the census tract in

which the subject resided. A high score would indicate that there was (a) a high percentage of female-headed households living below the poverty level, (2) a high percentage of families living at less than 125% of the poverty level, (3) a high level of unemployment, (4) a low median income, (5) and a high percentage of 16-19 year olds not enrolled in any educational program. Table 4 provides the inter-item correlation matrix and related information for this scale. This scale meets the criteria of meaningfulness, hierarchal ordering, parallelism, and has a coefficient alpha of .90.

Intake scales were developed using maximum sample size available (N = 118). After refinement and selection of items and final construction of the cluster, inter-item correlation matrices were generated using the three subsamples of this study (complete data at four months, complete data at eight months, complete data at four and eight months). The correlation matrices presented in Tables 3 and 4 were, with a few minor deviations, reproduced to within sampling error. This indicates that the basic pattern observed were consistent across subsamples of the initial subject pool.

Using data from the two post intake periods, an attempt was made to develop scales that would capture the constructs of personal psychological resources and quality of maternal-infant interaction. Preliminary principal components factor analyses with varimax rotation showed clustering of items by instrument. There was a factor consisting of Hopkins Psychiatric Rating items, and one of Maternal Attitude Scale items. Maternal Attitude Scale Items and

Table 4

Negative Socioeconomic Climate Scale[1] (α - .90)

Item	% Below Poverty	% < 125% Poverty	% Unemployment	Median Income	% Not in Ed. Prog.	Item-cluster Correlation	Item Corr. with Maternal Risk	Item corr. with Psy. Distress
% of Households below Poverty Line	82					91	42	-19
% Families < 125% Poverty Level	83	71				84	36	-15
% Unemployed	70	64	65			81	51	-24
Median Income (-)	75	61	68	63		79	38	-23
% 16-19 year olds not in Ed. Prog.	56	62	59	52	47	68	38	-27

[1]Communalities in Diagonal

Hopkins Psychiatric Rating items did not correlate in a manner that would allow for consolidation into one single construct, such as personal psychological resources. Thus, they were separated into two separate scales--Psychological Distress and Adaptive Maternal Attitudes.

Numerous combinations of psychiatric rating scale items were attempted in order to maximize satisfaction of the criteria outlined above. There was no combination that came close to meeting the criteria and that could be reasonably replicated with the eight-month data. As a result, a global psychopathology score was finally selected as the cluster score. Although one would not ordinarily expect high intercorrelations among all symptom dimensions, the low level of symptoms reported in the sample led the scale to be viewed more as an index of distress than of psychopathology. From this perspective, the summary score is more justifiable.

Table 5 illustrates the adequacy of the Psychological Distress cluster at four months and eight months. The scale does not meet the criterion of unidimensionality; however, it comes reasonably close to satisfying the requirement of parallelism (to within sampling error). The coefficient alphas for the Psychological Distress scale are .83 at four months and .80 at eight months.

Table 6 contains information about the characteristics of the Adaptive Maternal Attitude Scale. This scale is a combination of three subscales of the Maternal Attitude Scale; (1) Maternal Moderation of the Child's Aggressive Challenge vs. Control of

Table 5

Psychological Distress Scale[1,2] (α = .83 at 4 months; .80 at 8 months)

	Somatization	Anxiety	Obsessive/ Compulsive	Paranoid	Depression	Phobic Anxiety	Psycho- tism	Interpersonal Sensitivity	Hositity	Item-Cluster Correlation	Item Correlation With Positive Maternal Behavior Scale	Item Correlation with Adaptive Maternal Attitude Scale
Somatization	46 (40)									67 (48)	-4 (2)	-30 (-11)
Anxiety	52 (54)	42 (34)								65 (52)	-5 (0)	-24 (-11)
Obsessive/ Compulsive	52 (44)	57 (55)	40 (36)							63 (28)	15 (0)	- 5 (-7)
Paranoid	30 (19)	32 (26)	21 (13)	39 (26)						63 (45)	-54 (-22)	-18 (-47)
Depression	42 (37)	30 (44)	26 (49)	48 (41)	38 (59)					63 (47)	-35 (-35)	- 2 (-37)
Phobic Anxiety	47 (44)	47 (12)	49 (24)	21 (20)	21 (21)	32 (20)				55 (28)	- 6 (-8)	-14 (-30)
Psychoticism	42 (31)	25 (24)	28 (26)	58 (46)	27 (48)	38 (26)	31 (31)			55 (38)	-21 (-33)	-16 (-41)
Interpersonal Sensitivity	36 (26)	23 (12)	29 (22)	27 (32)	59 (49)	34 (48)	21 (8)	28 (20)		52 (38)	-34 (-39)	-46 (-42)
Hostility	15 (26)	38 (31)	35 (36)	59 (35)	37 (39)	13 (11)	26 (40)	24 (11)	26 (25)	51 (21)	-46 (-18)	- 2 (-19)

[1]Communalities in diagonal

[2]Parenthesized values refer to 8 month data; nonparenthesized are 4 month data.

Table 6

Adaptive Maternal Attitude Scale[1,2] (α = .73 at 4 mo.; .77 at 8 mo)

Item	Maternal Flexibility	Positive Inter.	Mod. of Aggr.	Item-Cluster Correlation	Item Corr. with Psy. Distress Scale	Item Corre. with Pos. Mat. Beh. Scale
Maternal Flexibility and Adaptability	51 (69)			71 (84)	-23 (-29)	25 (40)
Encouragement of Positive Interaction	51 (49)	50 (36)		70 (59)	-33 (-42)	14 (40)
Moderation of Child's Aggression	46 (66)	45 (60)	42 (44)	64 (78)	-39 (-21)	53 (54)

[1]Communalities in diagonal.

[2]Parenthesized values refer to 8 month data; nonparenthesized are 4 month data.

Threatening Impulses, (2) Maternal Flexibility and Adaptability vs Rigid Responding regarding Childrearing, and (3) Encouragement of Positive Interaction with the Child vs. Maternal Hostility Toward Childrearing. A high score on the Adaptive Maternal Attitudes Scale suggests that a mother has a realistic conception of the demands and frustrations of her role as a mother, a view of the child as complex, with multiple needs expressed in multiple modalities, and beliefs regarding the importance, desirability, and pleasure of establishing a positive relationship with the infant. As Table 6 indicates, this scale meets the criteria of unidimensionality, parallelism, and adequate coefficient alphas (.73 at four months; .77 at eight months).

The quality of maternal-infant interaction was indexed by three sets of scales: the HOME, the NCAS teaching scale, and the NCAS feeding scales. Because these ratings are made in three different contexts, it was felt that the best measure of overall quality of interaction would be one which highlighted consistent elements across all three contexts. For this reason, the three sets of scales were considered together for reduction to a single scale. Preliminary principal components factor analysis showed high intercorrelations across scales and no distinct discrimination among scales. Numerous attempts at cluster analysis based on various combinations of subscales were made, but none was found that satisfied all the criteria outlined above and were consistent across the two follow-up periods.

Table 7 illustrates the content of the Positive Maternal Behavior scale that was finally utilized at four months and eight months post intake. The scale consists of the items (1) sensitivity (in both teaching and feeding situations), (2) socio-emotional and cognitive growth fostering in teaching and feeding situations, (3) emotional and verbal responsivity in the unstructured feeding context (HOME), (4) organization of the environment, (5) provision of appropriate play, (6) opportunities for variety in daily simulation, and (7) maternal involvement with the infant. This combination of items gives a comprehensive picture of the quality of mother's observed and self-reported interactions with their infants. The scales do not achieve a high level of unidimensionality; however, parallelism is adequate,as are coefficient alphas (.80 at four month follow up and .79 at eight month follow up).

Zero-Order Correlations

Subsequent to the development of the measurement model five variables remained to index the constructs under investigation. These were (1) maternal risk, (2) negative socioeconomic climate, (3) psychological distress, (4) adaptive maternal attitudes, and (5) positive maternal behavior. In addition, two potentially confounding variables remained: assigned treatment group and infant age.

Table 8 presents the correlation matrix for these eight variables, for both time frames and for the replication subsamples.

Inspection of Table 8, the correlation matrix for all variables in the study, shows the following significant relationships:

Table 7

Positive Maternal Behavior Scale[1,2] (α = .80 at 4 months; .79 at 8 months)

Item	Cog. Growth (T)	Soc. Emo. (F)	Mat. Inv.	App. Play	Cog. Growth (F)	Soc. Emo. (T)	Daily Stim.	Sens. (F)	Sens. (T)	Org. Env.	Item-Cluster Correlation	Item Corr. with Psy. Distress Scale	Item Correlation with Adaptive Attitude Scale
Cog. Growth Fostering (Teach)	60 (57)										78 (75)	-29 (14)	26 (37)
Soc. Emo. Growth Fostering (Feed)	39 (41)	45 (29)									67 (54)	- 8 (-12)	9 (14)
Maternal Involvement (HOME) Mat.	41 (32)	36 (19)	37 (22)								61 (47)	1 (- 1)	19 (32)
Provision of App. Play Mat. (HOME)	27 (11)	33 (31)	46 (34)	29 (15)							54 (39)	- 8 (12)	63 (31)
Cog. Growth Fostering (Feed)	29 (40)	67 (36)	32 (17)	36 (16)	28 (27)						53 (52)	- 4 (-17)	28 (70)
Soc. Emo. Growth Fostering (Teach)	67 (62)	31 (23)	21 (32)	1 (17)	16 (21)	27 (36)					52 (60)	-31 (8)	10 (34)
Opp. for Variety in daily stim. (HOME)	18 (29)	26 (24)	17 (35)	6 (23)	17 (25)	19 (21)	27 (30)				51 (55)	-21 (-17)	- 4 (19)
Sensitivity to Cues (Feed)	38 (27)	30 (34)	37 (13)	45 (6)	19 (45)	19 (20)	25 (22)	20 (9)			49 (30)	-24 (-23)	38 (26)
Sensitivity to Cues (Teach)	33 (46)	39 (10)	14 (38)	0 (-12)	33 (17)	34 (36)	29 (17)	15 (33)	15 (12)		39 (35)	-16 (-19)	2 (28)
Organization of Environment (HOME)	46 (15)	9 (24)	30 (18)	6 (32)	9 (18)	45 (18)	7 (28)	18 (6)	4 (8)	12 (14)	35 (38)	-18 (-34)	9 (44)

[1]Communalities in the Diagonal.

[2]Parenthesized values refer to 8-month data; nonparenthesized are 4-month data.

Table 8

Correlation Matrix

	Treatment Condition	Infant Age	Maternal Risk	Socio-economic Climate	Psychological Distress (4 month)	Adaptive Attitudes (4 months)	Positive Behavior (4 months)	Psychological Distress (8 months)	Adaptive Attitude (8 months)	Positve Behavior (8 months)
Treatment Conditions	1.00	.15 (.15)	-.13 (-.14)	.22 (.23)	.08 (.09)	-.09 (-.11)	-.23 (-.26)	.21 (.23)	.11 (.13)	.13 (.15)
Infant Age	-.11 (-.11)	1.00	.04 (.04)	.08 (.08)	-.09 (-.10)	.27+ (.32)	.24 (.27)	.15 (.17)	.16 (.18)	.28 (.31)
Maternal Risk	-.13 (-.14)	-.28 (-.29)	1.00	.25+ (.27)	.01 (.01)	-.05 (-.06)	.33+ (.39)	00 (00)	-.28 (-.33)	-.35* (-.41)
Negative Socioeconomic Climate	-.17 (-.18)	00 (00)	.54* (.59)	1.00	.03 (.03)	.06 (.09)	.11 (.13)	-.14 (-.16)	-.26 (-.31)	-.17 (-.20)
Psychological Distress (4 months)	.12 (.13)	-.02 (-.02)	-.19 (-.22)	-.07 (-.08)	1.00	-.28+ (-.36)	-.33+ (-.43)			
Adaptive Maternal Attitude (4 months)	.06 (.07)	-.17 (-.20)	.04 (.05)	-.10 (-.13)	-.37 (-.48)	1.00	.42+ (.53)			
Positive Maternal Behavior (4 months)	-.05 (-.06)	-.17 (-.19)	.29 (.34)	.21 (.25)	.33* (-.41)	.38* (.50)	1.00			
Psychological Distress (8 months)	.01 (.01)	.23 (.26)	.07 (.08)	-.37 (-.44)	.22 (.27)	-.40* (-.53)	-.32 (-.41)	1.00	-.33* (-.42)	-.30* (-.38)
Adaptive Maternal Attitude (8 months)	.29 (.33)	.06 (.07)	-.38* (-.45)	-.13 (-.16)	.32 (.41)	.10 (.14)	-.14 (-.18)	-.24 (-.31)	1.00	.50* (.65)
Positive Maternal Behavior (8 months)	.15 (.17)	.19 (.21)	-.32 (-.38)	.13 (.15)	.06 (.07)	-.23 (-.30)	.01 (.01)	-.30 (-.38)	.66* (.86)	1.00

* $p \leq .05$ (N = 21)

+ $p \leq .05$ (N = 55)

X $p \leq .05$ (N = 40)

[1]Values below the diagonal refer to the sample available at both 4- and 8-month follow ups (N = 21); values above the diagnonal refer to the largest sample available at 4 month follow up (N = 55) or 8 month follow up (N = 40). Parenthesized values are coefficients corrected for attentuation.

1. maternal risk and socioeconomic climate (.54)
2. maternal risk and adaptive maternal attitude at 8 months (-.38)
3. adaptive maternal attitude at 4 months and positive maternal behavior (4 months) (.38)
4. adaptive maternal attitude (4 months) and psychological distress (8 months) (-.40)
5. adaptive maternal attitude (8 months) and positive maternal behavior (8 months) (.66)

These findings provide basic support for the significance of adaptive attitudes in the development of the mother-infant relationship.

There are several other noteworthy trends in the matrix:

1. Neither of the potentially confounding variables, treatment condition nor infant age shows any significant or consistent relationship to other variables.

2. Stability of the three primary measures across a four-month span ranged from .01 to .22 with none of the observed values reaching statistical significance.

3. Of the 45 nonredundant correlations in the ten by ten matrix, 22 were predicted or assumed to be statistically related. Of the five observed statistical significant correlations, four were predicted or assumed. Thus, 15% of predictions were substantiated by the data.

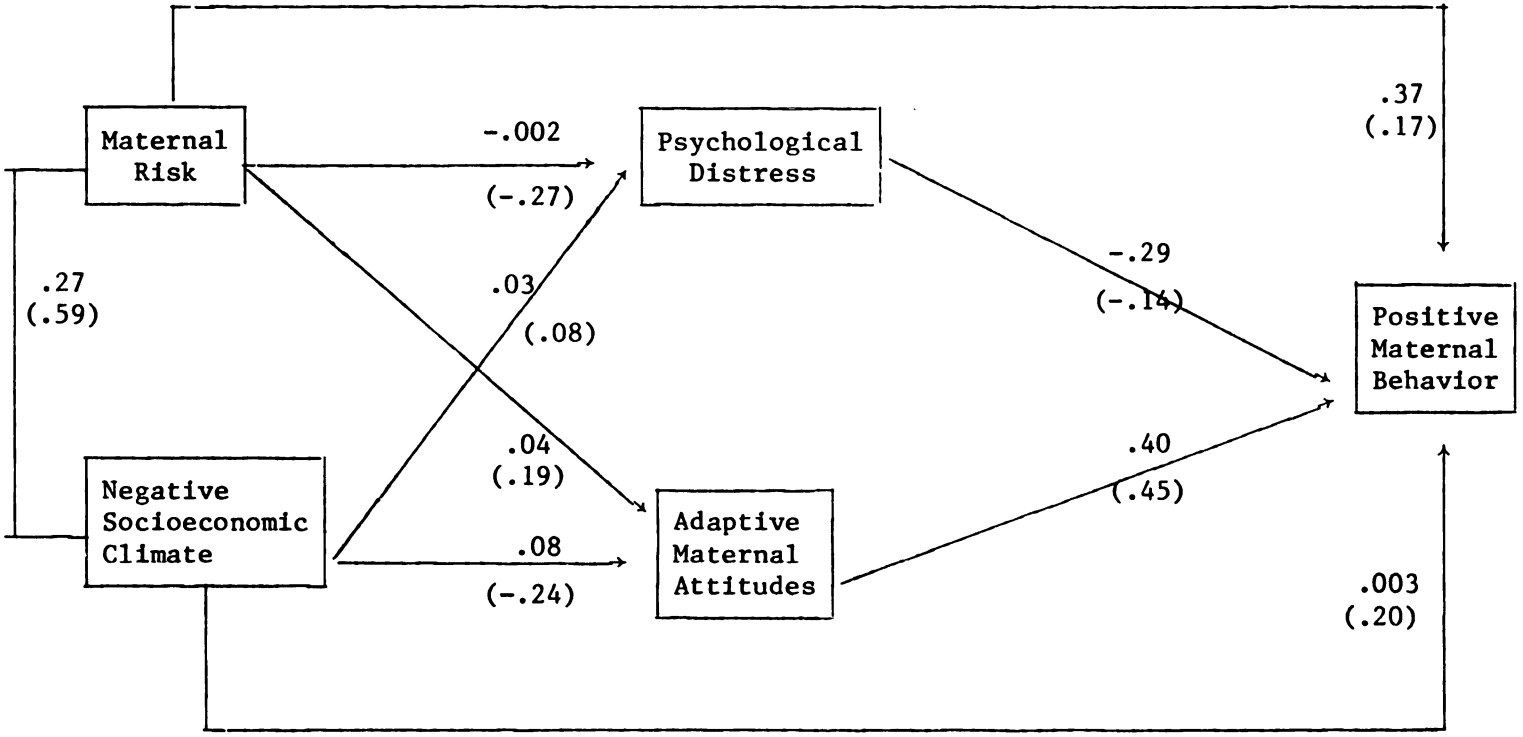
Examination of Table 8 shows consistent interrelationships among psychological distress, positive maternal attitudes, and

positive maternal behavior in the slightly larger samples available for four months or eight month fellow ups. Significant relationships between maternal risk and positive maternal behavior were also found in these samples ($r = .33$, $N = 55$, $p < .05$ at four months; $r = -.35$, $N = 40$, $p < .05$ at eight months). However, the four-month coefficient is not in the predicted direction.

Path Analysis

Figure 3 presents the results of the path analysis for the predicted model at four months post intake. Path coefficients (standardized partial regression coefficients) above the lines reflect the use of the larger subsample ($N = 55$). Path coefficients below the line are based on the 21 subjects available at all the data points. The hypothesized mediation of maternal risk and socioeconomic climate by psychological distress and adaptive maternal attitude is not supported by the data. Rather, the results of the path analysis show significant direct effects for maternal risk psychological distress, and positive maternal attitude, on positive maternal behavior. However, the relationship between maternal risk, and positive maternal behavior ($\beta = .37$) is not in the predicted direction. Data from the reduced subsample are consistent with the larger sample (to within sampling error) and show a similar pattern of direct effects with no mediating effects for the personal psychological resources variables.

Figure 3. Results of Path Analysis at 4 months.[1]



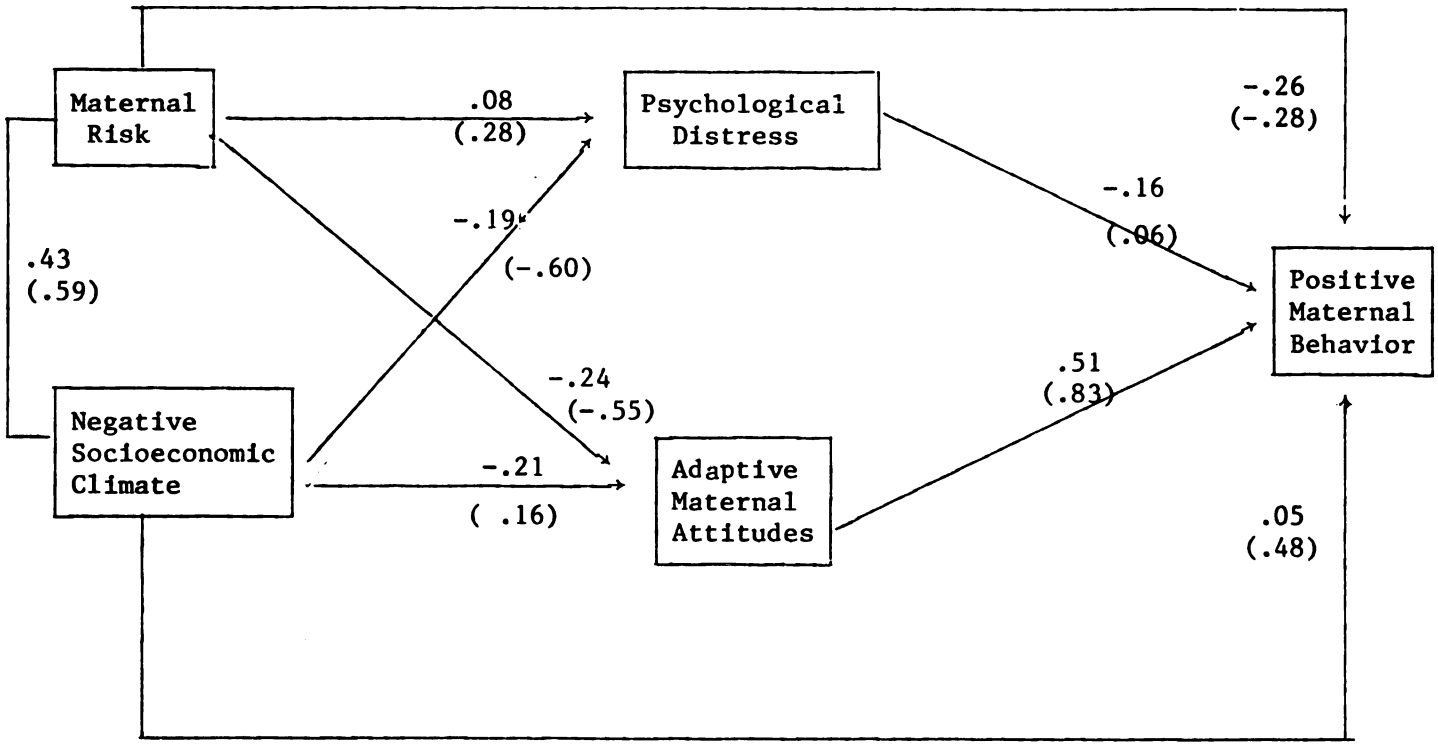
[1]Parenthesized values refer to subsample (N = 21) replication.

Figure 4 shows the replication of the path model at the eight months post intake. As with the four-month model, the data do not support hypothesized mediating effects for adaptive maternal attitudes and psychological distress. Adaptive maternal attitude is the only variable showing a significant direct effect on positive maternal behavior ($\underline{\beta}$ = .51). When the model generated by data from the reduced sample (N = 21) is examined, there are significant variations between the two models. A significant effect of negative socioeconomic climate is observed on both psychological distress ($\underline{\beta}$ = -.60) and on positive maternal behavior ($\underline{\beta}$ = .48). Neither of these relationships is in the predicted direction. There are significant relationships in the hypothesized direction between maternal risk and positive maternal attitudes ($\underline{\beta}$ = -.55), maternal risk and positive maternal behavior ($\underline{\beta}$ = -.28), maternal risk and positive maternal attitudes ($\underline{\beta}$ = -.54), and positive maternal attitudes and positive maternal behavior ($\underline{\beta}$ = .83).

Figure 5 depicts the model in which intake and four-month data are used to predict positive maternal behavior at eight months. In the model, maternal risk is strongly related to the criterion ($\underline{\beta}$ = -.76), but is the only significant path in the model.

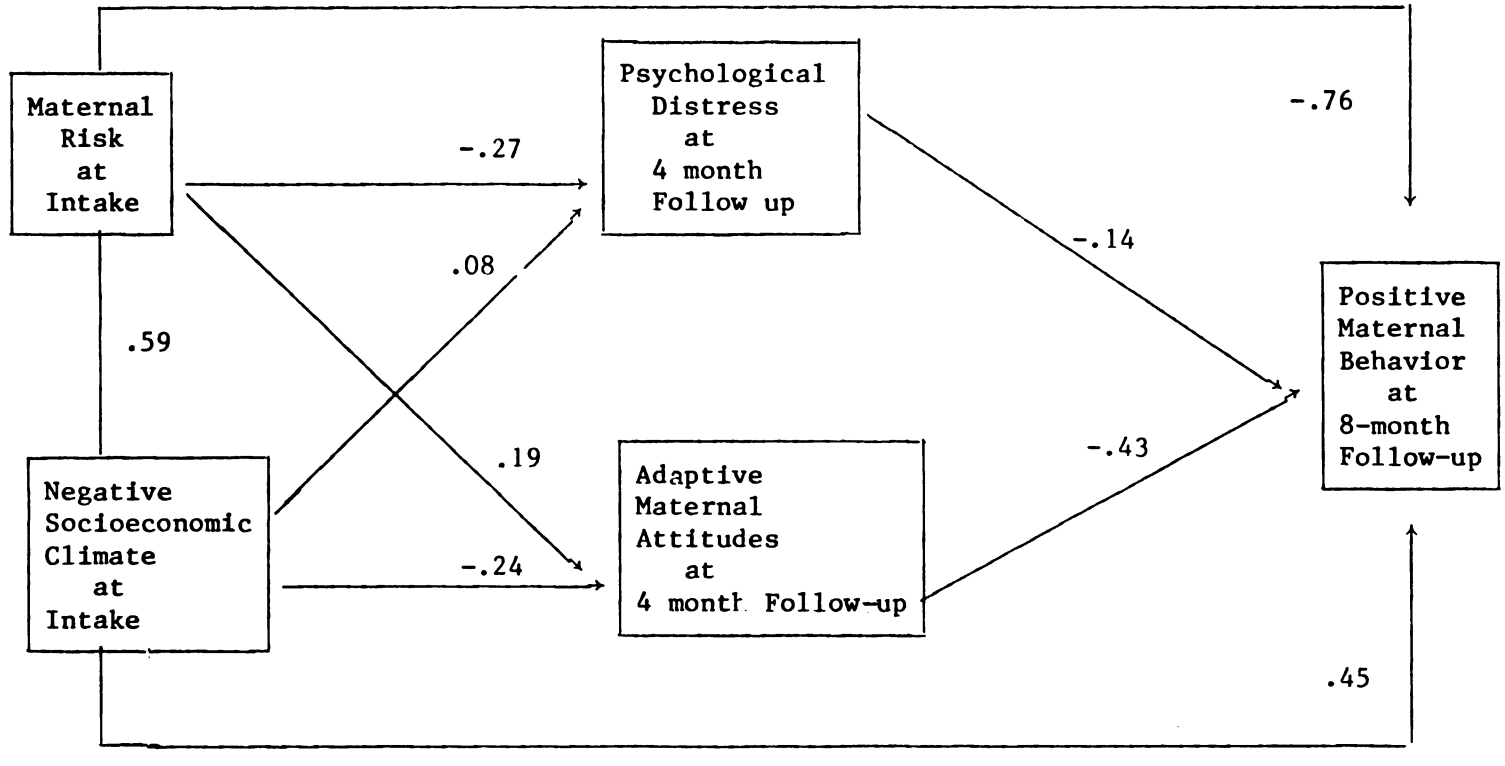
The results depicted in Figures 3, 4, and 5 do not show a consistent pattern of statistically significant standardized partial regression coefficients in the predicted direction. However, small sample sizes require large coefficients to achieve a level of

Figure 4. Results of Path Analysis at 8 month Replication.[1]



[1]Parenthesized values refer to subsample (N = 21) replication.

Figure 5. Results of Path Analysis for Longitudinal Replication



statistical significance (Nunnally, 1978). Rather than summarily dismissing the model, several other tests were performed in order to assess the possibility that the results represent an accurate representation of the strength of effects in the model.

The first test concerns the degree to which the variance in the criterion variable, positive maternal behavior, is "explained" by predictor variables. Table 9 presents $\underline{R}^2$ values for each replication. In four of five subsamples, the model accounts for statistically significant amounts of variance. $\underline{R}^2$ values range from .39 to .87 with an average value of .54. However, the inclusion of several relationships that are not in the predicted direction in the calculation of $\underline{R}^2$ renders the results inconclusive. The capitalization on chance that is a pitfall of multiple regression procedures may account for the overall strengths of effects and replication of significant $\underline{R}^2$ values (Nunnally, 1978).

A second test concerns the degree to which path coefficients are replicated across subsamples. The possibility remains that nonsignificant coefficients, or coefficients in the wrong direction reflect consistent empirical trends and that the model is simply poorly specified. Table 10 summarizes replication of values for each predicted relationship across subsamples. As inspection of the table reveals, there is no predicted relationship for which values were consistently within the range of sampling error of each other.

A third test involves examination of the degree to which the observed data "fit" the theoretical model. Table 11 presents the

Table 9

Replication of R^2 Values Across Subsamples

(Dependent Variable--Positive Maternal Behavior)

Time	Sample	R^2
4 mo	N = 55	.48[1]
4 mo	N = 21	.39
8 mo	N = 40	.49[1]
8 mo	N = 21	.87[1]
4 - 8 mo	N = 21	.48[1]

[1] $p \leq .05$

Table 10

Replications of Path Coefficients Across Subsamples

Path	Time	Sample	β	.95 Confidence Interval
Maternal Risk → Psychological Distress	4 mo	N = 55	-.002	- .28 → .29
	4 mo	N = 21	-.27	- .82 → .30
	8 mo	N = 40	.08	- .27 → .44
	8 mo	N = 21	.28	- .23 → .78
Maternal Risk → Adaptive Maternal Attitude	4 mo	N = 55	.04	- .24 → .32
	4 mo	N = 21	.19	- .37 → .76
	8 mo	N = 40	-.24	- .57 → .09
	8 mo	N = 21	-.55*	-1.06 → -.03
Maternal Risk → Positive Maternal Behavior	4 mo	N = 55	.37*	.16 → .58
	4 mo	N = 21	.17	- .32 → .66
	8 mo	N = 40	-.26	- .53 → .01
	8 mo	N = 21	-.28*	- .53 → -.03
	4-8 mo	N = 21	-.76*	-1.02 → -.50
Psychological Distress → Positive Maternal Behavior	4 mo	N = 55	.40*	- .50 → -.07
	4 mo	N = 21	-.14	- .60 → .31
	8 mo	N = 40	-.16	- .44 → .12
	8 mo	N = 21	.06	- .16 → .29
	4-8 mo	N = 21	-.10	- .69 → .29

*$p \leq .05$

Table 10 (Continued)

Path	Time	Sample	β	.95 Confidence Interval
Adaptive Maternal Attitude → Positive Maternal Behavior	4 mo	N = 55	.40*	.19 → .62
	4 mo	N = 21	.45	-.003 → .90
	8 mo	N = 40	.51*	.22 → .81
	8 mo	N = 21	.83*	.61 → 1.05
	4-8 mo	N = 21	-.43*	-.85 → .10
Negative Socioeconomic Climate → Psychological Distress	4 mo	N = 55	.03	-.25 → .31
	4 mo	N = 21	.08	-.49 → .64
	8 mo	N = 40	-.19	-.55 → .16
	8 mo	N = 21	-.60*	-1.1 → -.09
Negative Socioeconomic Climate → Adaptive Maternal Attitudes	4 mo	N = 55	.08	-.20 → .36
	4 mo	N = 21	-.24	-.81 → .32
	8 mo	N = 40	-.21	-.54 → .13
	8 mo	N = 21	.16	-.35 → .67
Negative Socioeconomic Climate → Positive Maternal Behavior	4 mo	N = 55	.003	-.20 → .21
	4 mo	N = 21	.20	-.29 → .69
	8 mo	N = 40	.05	-.24 → .33
	8 mo	N = 21	.48*	.22 → .74
	4-8 mo	N = 21	.45	-.003 → .90

*$p \leq .05$

Table 11

Direct and Indirect Effects on Positive Maternal Behavior[1]

Sample		Direct Effects	Indirect Effects	Total Effect
4 month (N = 55)	Maternal Risk	.37	.02	.39
	Negative Socioeconomic Climate	.00	.04	.04
4 month (N = 21)	Maternal Risk	.17	.12	.29
	Negative Socioeconomic Climate	.19	.12	.31
8 month (N = 40)	Maternal Risk	.26	.13	.39
	Negative Socioeconomic Climate	.05	.13	.18
8 month (N = 21)	Maternal Risk	.28	.47	.75
	Negative Socioeconomic Climate	.48	.17	.65
Longitudinal (4-8 month; N = 21)	Maternal Risk	.76	.12	.88
	Negative Socioeconomic Climate	.45	.11	.56

[1]Direct effect of maternal risk on positive maternal behavior = the standardized partial regression coefficient (β) of maternal risk on positive maternal behavior. Indirect effect maternal risk on positive maternal behavior = $\underline{p}$ (maternal risk, psy. distress) x$\underline{\rho}$(psy. distress, mat. beh) + $\underline{p}$ (maternal risk, adapt att.) x $\underline{p}$ (adapt att, pos. beh) (following Reis, 1982).

decomposition of the path analysis results into direct and indirect effects (Asher, 1976). The theoretical model predicted that effects of maternal risk and negative socioeconomic climate are mediated by psychological distress and adaptive maternal attitudes. Although the model did not specify relative sizes of the indirect or mediated effects, in all but one replication the indirect effect for maternal risk and negative socioeconomic climate was less than .18. Direct effects ranged from 0 to .76 and averaged .30. On the average, direct effects accounted for 59% of the overall effect size while indirect effects accounted for 41%. Examination of Table 11 shows 7 of 10 relationships in which direct effects were large in absolute value than indirect effects. These data suggest that indirect effects play a role, but that the direct effects of the social contextual variables consistently override effects mediated by personal psychological resources variables.

A fourth and final test also concerns the degree to which the observed data "fit" the theoretical model. In a correctly specified model, the empirical correlation between any two variables should be equal to the sum of the simple and compound paths linking the two variables, to within sampling error (Asher, 1976). Table 12 presents the comparison of the correlations generated by the path analysis results for each replication. As the Table indicates, six of ten relationships were successfully reproduced; four of the successful reproductions involved four month data. However, the successfully reproduced correlation coefficient is not in the direction predicted

Table 12

Regenerated Correlation Coefficients

Relationship		Observed Correlation[1]	.95 Confidence Interval	Correlation Generated by Path Analysis Results
Maternal Risk with Positive Maternal Behavior	4 month, N = 55	.39	.23 → .55	.39[2,3]
	4 month, N = 21	.34	.05 → .63	.29[3]
	8 month, N = 40	-.41	-.60 → -.23	-.39[3]
	8 month, N - 21	-.38	-.57 → -.19	-.75
	4-8 month, N = 21	-.38	-.57 → -.19	-.88
Negative Socio-economic Climate with Positive Maternal Behavior	4 month, N = 25	.13	-.10 → .36	.04[3]
	4 month, N = 21	.25	-.08 → .58	.31[3]
	8 month, N = 40	-.20	-.45 → .05	-.18[3]
	8 month, N = 21	.15	-.22 → .42	.65
	4-8 month, N = 21	.15	-.22 → .42	.56

[1]Corrected for Attenuation.

[2].39 = $\underline{p}$ (mat. risk, psy. distress) $\underline{p}$ (psy distress, pos. mat. beh.) + $\underline{p}$ (mat. risk, adapt att.) x$\underline{p}$(adap. att., poss. mat. beh.) + $\underline{p}$ (mat. risk, pos. mat. behavior) (following Reis, 1982).

[3]"Fit" observed data, to within sampling error (Hunter, 1983).

by the model. For the larger sample of eight months post intake, the data do "fit" the model. There is consistent little evidence to support the view that the theoretical model is supported by the observed relationships.

It should be noted that all path analyses were performed a second time using a correlation matrix from which the effects of the potentially confounding variables, treatment condition, and infant age were partialled. This procedure resulted in minimal differences in values and $\underline{R}^2$ values when contrasted with the results presented thus far. All differences were well within the range of sampling error. The basic processes under investigation do not appear to have been influenced by the age of the infant or the type of prevention program in which subjects participated.

In summary, the adequacy of the path models were assessed by (1) the statistical significance of values and $\underline{R}^2$ values; (2) the degree to which these values were replicated across subsamples; (3) the degree to which decomposition of the models provided support for the hypothesized indirect effects; and (4) the degree to which the path analysis results successfully reproduced original observed correlations. Because of the small sample size involved and the problems associated with application of multiple regression estimation techniques to small samples (Nunnally, 1978), criteria for acceptance of the hypothesized model were made deliberately strict. The results of the four basic approaches to testing the theoretical model show no <u>consistent</u> support for the theory under investigation.

However, one single test of the model (8 months N = 40) did meet all the criteria outlined for acceptance of the hypothesized model.

DISCUSSION

The purpose of this research was to test a specific model that would account for a significant amount of the variance in the behavior of mothers of infants. Demographic circumstances of families were conceptualized as environmental stressors. These environmental stressors were thought to influence maternal behavior in a number of ways. Specifically, psychological characteristics of mothers were thought to be altered by frequent exposure to stressful life events and that these characteristics would mediate the effects of environmental stressors on maternal behavior. The environmental stressors were thought to alter maternal behavior in other, as yet theoretically unspecified ways, which would show up as a direct effect of environmental stress on parenting in the test of the model.

Support for the Hypothesized Model

The theoretical model was tested five different times; with a sample of 55 at four months after intake into a child abuse prevention program; with a sample of 40 at 8 months after intake, with subsamples of the original sample at four and eight months post-intake (N = 21); and via prediction of the criterion measure at eight months from predictor measures obtained at four months (N = 21).

At first glance it would appear that the model is fairly successful in accounting for variance in positive maternal behavior. For the five tests of the model, $\underline{R}^2$ values ranged from .39 to .87 (see Table 9) with four of five values achieving statistical significance ($\underline{p} \leq .05$). Note, however, that three of the four significant $\underline{R}^2$ values are derived from $\underline{\beta}$ values that are substantial and in the opposite of the predicted direction ($\underline{\beta}$ = .37, maternal risk with positive maternal behavior, N = 55; $\underline{\beta}$ = .48, negative socioeconomic climate with positive maternal behavior, eight months, N = 21; $\underline{\beta}$ = -.43 adaptive maternal attitude at four months with positive maternal behavior at eight months, (N = 21). On the basis of statistically significant $\underline{R}^2$ values obtained from $\underline{\beta}$ values having the predicted sign, only the eight month (N = 40) test of the model achieves the predicted results.

In other tests of the model, the results are equally disappointing. The $\underline{\beta}$ weights (standardized partial regression coefficients) do not consistently achieve statistical significance for any of the hypothesized causal links in the model. Two of the five tests of the link between maternal risk and positive maternal behavior are significant and in the predicted direction; three of the five tests of the link between adaptive maternal attitude and positive maternal behavior are significant and in the predicted direction. No other relationship demonstrated a statistically significant $\underline{\beta}$ weight in more than one of the five tests.

It has been suggested that problems of power with small samples (as well as triviality with large samples) make absolute value a

better criterion for assessing the contribution of a particular path to a model than a statistical significance level (Reis, 1982). Adoption of that strategy requires development of strategies other than statistical significance to assess the model. One such strategy simply involves assessment of the stability of the observed coefficients. Consistent $\underline{\beta}$ values, however small, may be indicative of the possibility that an accurate estimation of the strength of a causal chain has been made. However, the present study resulted in no relationship being consistently replicated to within sampling error, in spite of the very wide confidence intervals obtained from using such small samples. Thus, the data provide no reason to believe that the five tests of this model have yielded a useful estimate of the strength of relationships hypothesized in the causal model.

While there is no evidence of successful replication of the model across subsamples, the test of the model made with a sample of 40 at eight months post intake (Figure 4) achieves a significant $\underline{R}^2$ with all $\underline{\beta}$ values in the predicted direction (or inconsequential in magnitude). Further examination of these results also shows that the model "fits" observed data, i.e., the correlations generated through use of $\underline{\beta}$ values successfully replicate observed correlations among variables and the criterion measure (see Table 12). That particular test of the model shows a relatively strong direct effect and a moderate indirect effect of maternal risk on positive maternal behavior. It shows a trivial direct effect and a moderate indirect

effect of negative socioeconomic climate on positive maternal behavior. In short, this particular test of the model satisfies all the criteria outlined for acceptance as support for the causal model.

The critical question concerning these results is why only the eight month data support the model? On one hand, the supportive findings may simply represent the chance fluctuations of a small set of data subjected to numerous statistical manipulations. On the other hand, there may be something about the particular time sampled or the particular subsample of research subjects which accounts for the eight month findings.

With regard to the time sampled (eight months post intake into a child abuse prevention program), several results argue against viewing this point at time as providing a qualitatively different test of the hypothesized model. First, data obtained from a subsample (N = 21) overlapping with the full eight month sample (N = 40) did not support the model. Indeed, the path coefficient from negative socioeconomic climate to positive maternal behavior differed dramatically between the two subsamples (.48 vs. .05). Second, mean scores on obtained values for all measures were generally consistent from four to eight months, to within sampling error (see Appendices C through F). Third, the pattern of correlations observed among four month variables was consistent with the pattern observed among eight month variables, to within sampling error (see Table 8). Finally, it should be noted that most families were enrolled in the project at different points during the last trimester of pregnancy or during the

first six months of infancy. Thus, the eight month sampling point does not represent a specific point in the development of the mother-infant relationship that may have special significance. As mentioned in the results, partialling out the effects of infant age from the correlation matrix used to generate the path analysis resulted in minimal differences in $\underline{\beta}$ values. All of these differences were well within the range of sampling error.

With no strong evidence to support the idea that eight months post-intake is a time of particular significance for the relationships under investigation, one must turn to less parsimonious explanations. The next avenue for exploration is the possibility that the particular subsample available at eight months, in interaction with the time period sampled, provides a "better" test of the hypothesized model than the other tests. Acceptance of the view entails a belief that the period of eight months following intake into a prevention program provides a critical test for the model, but only for the slightly higher risk sample (N = 40). The model did not "work" for the sample which completed all phases of the study (N = 21). The larger sample was higher risk in the sense that it contained mothers who were younger, less educated, and more socially isolated. The smaller sample was described as having higher level of psychological distress. Thus the data "fit" the model only at eight months and only for samples of people who are less psychologically distressed and more environmentally stressed. One could hypothesize that the critical interplay among variables in the model only

operates when the level of psychological distress is modest and the level of environmental stress to moderate to high. In other words, the model does not "work" for individuals with more serious psychological problems or when the demands placed on mothers due to environmental stress are less pronounced. These possibilities suggest a model in which critical processes occur only with limited ranges of the spectrum in which each variable falls. Such a model would be quite complex; adding a requirement that there is some sort of developmental discontinuity, such that these processes operate as predicted only during a particular, limited time frame dramatically reduces the explanatory power of the model In short, the type of conjecturing required to account for the fact that only one of five tests of the hypothesized model was supported by data leads one to a choice between an extremely elaborate and intuitively unsatisfying model or the conclusion that the data do not support the model. The latter appears to be the most plausible conclusion.

Comparison of Results to Conger et al. Results

When compared to the Conger et al. (1984) study, which tested a conceptually similar model of the determinants of parenting, this study does not consistently support those findings. In contrast to their report of a consistent positive association between environmental stressors and maternal behavior, the present study did not find a consistent relationship between maternal risk and positive maternal behavior. Only the eight month data provided strong support for the relationship between maternal risk and positive maternal

behavior ($\underline{\beta}$'s = -.26, -.28, -.76). On the other hand, all of the regression coefficients between negative socioeconomic climate and positive maternal behavior were positive; this relationship had been hypothesized to be an inverse relationship.

Conger et al. also found that their measures indexing maternal psychological characteristics made small but statistically significant contributions to one of three maternal behavior measures, and a marginally significant ($\underline{p} < .10$) contribution to a second. The present study found no consistent significant association between psychological distress and positive maternal behavior. However, these was a strong and generally consistent relationship between adaptive maternal attitude and positive maternal behavior. This measure emerged as a powerful "predictor' of maternal behavior ($\underline{\beta}$'s values ranged from .40 to .83, except for the prediction of eight month behavior from four month attitudes. This value was -.43).

The hierarchical multiple regression approach to model testing used by Conger et al. showed no interaction effects for the psychological characteristics x environmental stress variables. The path analytic test of those effects is the examination of indirect effects (maternal psychological variables mediating environmental stress variables). In the present study, there was some support for this type of interaction, but it was not consistent. There were no significant relationships between maternal risk and psychological distress. There were sizable negative $\underline{\beta}$ values for the relationship between maternal risk and adaptive maternal attitude, but only for eight month data (-.24, -.55). Examination of the decomposition of

results into direct and indirect effects (Table 11) is suggestive of an interaction between environmental and psychological variables for the eight month data only.

In summary, the present data do not consistently support findings reported by Conger et al. (1984). However, the eight month data support their findings for effects of environmental, as well as psychological variables on maternal behavior. However, as discussed previously, there is no conceptually plausible explanation for why this particular replicating and no other should support their findings.

Limitations of the Present Study

Some account is necessary for the failure of the research to support the hypothesized model. The individual links among variables in the model are substantiated by prior correlational evidence and there is partial empirical support for the model as a whole from the Conger et al. (1984) study. Yet the present study consistently replicated neither the Conger et al. results nor the prior correlational findings.

Three sources provide potential explanations for the failure of this study to confirm the hypothesized model or replicate the findings the Conger et al. (1984) study. First are specific differences between the sample, instruments, and methods of the Conger et al. study and the present study. Second are conceptual issues or potential specification errors in generating the hypothesized model (Asher, 1976). In other words, there are

plausible links in the model that were not included and that may be critical. Third are methodological limitations, both in sample selection and in measurement issues. Of particular importance are possible violations of requisite assumptions about error terms in the use of general linear models to estimate other coefficients (Asher, 1976; Reis, 1982).

Specific Differences from the Conger et al. Study

In contrast to the Conger et al. study, the present study involved a sample of families with younger mothers, fewer children in the families, and lower income level. However, in both studies there was a deliberate effort to include a wide range on the demographic variables. Conger et al. studied children in preschool, or early elementary school; the present study focused on infants. Nearly 50% of Conger et al.'s subjects were black; 20% of the subjects for the present study were black. Rural Georgia was the site of the Conger et al. study, while a northern urban area was the site of the present study. In the Conger et al. study, interactional variables were sampled prior to any involvement in a child abuse prevention program; in the present study data were collected concurrently with participation in a prevention program.

Some of these differences might be critical. Both studies examined the joint impact of environmental stressors and maternal psychological characteristics on maternal behavior. In the Conger et al. sample, mothers had an average of five more years in an ongoing relationship with the target child than the mothers in the present

study. In addition, they were more likely to have experience with more older children in the family. The contribution of the target child to problematic parent-child interactions may be more salient for later years than for infancy. As a part of their prospective study of child maltreatment, Egeland and Sroufe (1981) have identified different developmental sequelae for different types of dysfunctional parenting. They argue that their data demonstrate a minimal contribution for early individual differences in children to severely problematic parent-child interactions. However, they do note an accrual of developmental deficits resulting from the course of involvement in a relationship with a troubled parent. These deficits then contribute to an exacerbation of the problematic interactions between parent and child. In a series of studies of problematic parent-child interaction, Patterson and colleagues (summarized in Patterson, 1982; 1986) note a similar phenomenon. To the extent that children's moment-to-moment and day-to-day transactions with parents are marked by inconsistency, coercive influence tactics, and ineffectual child management practices, the children become less responsive to parent efforts to intervene in instances of problematic or undesirable child behavior. Both children and parents become increasingly incompetent and increasingly reliant on coercive interpersonal tactics. Once this style of interaction is well organized, it becomes very sensitive to stress, such that competing demands on parents or child lead to

dramatic escalations in conflictual interactional styles. Egeland et al. (1980) suggested that problematic parenting is marked, in part, by an inability of parents to focus their reactions to stressful situations on the source of that stress. Rather, reactions spill over into their relationships with their children. Patterson's (1982, 1986) findings support this perspective and suggest an increased likelihood of viewing the child in such a global and negative fashion that the child is seen as the source of most stress in the family. In short, problematic families with a longer history of exposure to stressful events might have developed a more precarious parent-child relationship. These precarious relationships might be more susceptible to the effects of individual differences in density of exposure to stressful events and individual differences in parent's skills in managing such events. Thus, the model tested by Conger et al. and in the present study may actually "fit" more for older children.

On a related note, one of the psychological measures employed by Conger et al. was a measure of negative perceptions of the target child in the study. This variable was one of three psychological characteristics of parents that was sampled. Their report does not contain information about the strength of this particular variable as an independent contributor to the overall findings. However, it may be a critical component of the parental psychological resources domain and it is a component that was not sampled in the present study. In a recent review of studies designed to elucidate

differences between abusive and nonabusives parents, Wolfe (1985) noted that those studies showing significant differences between such groups on psychological symptoms were more likely to have employed measures containing specific questions about the parenting role. He concluded that the emotional distress often reported in connection with problematic parenting could be expressed in a situational context (such as childrearing) but not be in evidence without reference to other specific problematic events. Thus, the failure of the present study to support a strong role for psychological characteristics may result from the use of an assessment tool (Hopkins Psychiatric Rating) not sufficiently specific to parenting. It is noteworthy in this regard that the Maternal Attitude Scale, an instrument very specific to the parenting role (although not to a specific child) was much more consistently correlated with maternal behavioral measures in the present study than were the Hopkins Psychiatric Rating scores.

A final difference between the present study and that of Conger et al. concerns the manner in which subjects' participation in prevention programs was handled in the two studies. All Conger et al. data were collected prior to subjects' involvement in the programs for which they were recruited. In the present study data were collected during subjects participation in a child abuse prevention program. Because many subjects for the present study were recruited during pregnancy, they were not immediately available for the observational components of the study. The theoretical rationale

of the program for which they were primarily recruited (see Fraiberg, 1980) leads to a strong emphasis on early and intensive involvement with mothers. Psychotherapeutic involvement with the mother early in infancy is seen as critical for the success of the preventive function of the Fraiberg approach. As a result of this emphasis, ethical and programmatic concerns prevented delaying the involvement of mothers in a prevention program.

It is possible that this decision regarding time frames for sampling maternal behavior may have led to results that reflect some distortion of the basic relationships under investigation.

One of the primary purposes of the prevention programs in which subjects of the present study participated was to provide support for high-risk "mothers as they attempted to negotiate a relationship with their newborn infants" (Wright, 1982). The support may be a specific example of the kind of social support that has been found to directly influence quality of maternal behavior (Crnic et al., 1983; Crittenden, 1985; Pascoe et al., 1981) and that has been hypothesized as a potential mediator of the effects of stress on parenting (Howze & Kotch, 1984). In fact, this process of social support is viewed as a critical "buffer" between stressful events and a range of dimensions of psychological and physical well-being (Cohen & Wills, 1985). While it was originally supposed that participation in a prevention program would not distort the processes under investigation, this may have been a naive assumption. The function of social support may very well be to disrupt the interconnections among environmental stress, psychological characteristics, and

parenting. One view of this possibility is offered by Howze and Kotch (1984) who suggest that social support offer persons alternative views of stressful events, alternative problem solving strategies, and alternative models for managing stress. When these alternatives are available, the effects of stress are less certain to be detrimental and individual differences in global psychological characteristics may play a less vital role. In summary, the present study might have failed to further substantiate Conger et al.'s support for the hypothesized model because the participation of subjects from the present study in prevention programming interrupted the interplay among the three key constructs. The mechanism for this interruption is the systematic introduction of a specific source of social support (Infant Development Project therapist or Public Health nurse) into the lives of the mothers participating in the study. This difference between the two studies, coupled with different ages of children seems to provide the most plausible explanation for differences in results obtained in the two studies.

Conceptual Limitations (Potential Model Specification Errors)

In addition to specific differences between the present study and that of the Conger et al. study, other issues germane to the failure to support the hypothesized model merit discussion. One possibility is that the hypotheses are incorrect, or at least incorrect as stated. In the language of path analysis, one would say that the model is improperly specified (Asher, 1976; Hunter &

Gerbing, 1982). The correlational support for the model presented in developing the hypotheses suggests that rather than totally abandoning the model, one might look for significant links that were omitted from the model.

One potentially significant link mentioned earlier is a measure addressing mothers' specific perceptions of the target child in the study. In addition to Wolfe's (1985) arguments regarding the necessity for including measures of parent psychological characteristics that are specific to the parenting role, there is evidence that parent perceptual processes significantly influence child behavior (e.g., Michaels, Messe, & Stollak, 1983). Presumably, distortions or biases in parent's perceptions of their children are reflected in interactions between parents and children. Distorted parental expectation of children and distorted attributions regarding child behavior have been linked with child maltreatment (Larrence & Twentyman, 1983). The model tested in the present study may have been in error to the extent that the maternal psychological resources construct was not indexed by a measure specific to the mother's view of her own child.

A second possible specification error may result from the manner in which environmental stress was conceptualized and measured. In the present study, it was assumed that the demographic indicators measured provided an index of the degree to which families were likely to encounter stressful situations. Presumably, the link between these variables and individual differences in parenting is

related to the detraction from the parenting role resulting from the necessity of coping with frequent stressors. These stressors are assumed to be day-to-day "hassles" accompanying social and economic deprivation.

There are two potential problems with this set of assumptions. First there is no measure of the actual events or day-to-day problems encountered by families in the study. While the studies cited earlier show a connection between socioeconomic status (and related variables) and frequency of stressful life events, the small sample used in the present study may have been atypically understressed. Sampling error may have resulted in a sample high on the environmental stress dimensions, but which randomly happen not to experience a high density of stressful life events. This problem is a variant of the "ecological fallacy" involved in the application of aggregate data to the individual case. Even if the census tracts scoring high on the negative socioeconomic climate scale were a source of stress, there is no guarantee that the particular families in this study were exposed to those stressors. Measurements to address this potential problem were not made. The use of life events surveys is one way to address this issue (e.g., Dohrenwend et al., 1978). This approach has been expanded to include measures of specific day-to-day problems in living likely to be related to environmental stress (Nezu and Ronan, 1985). Thus, exposure to stressful life events and day-to-day "hassles' could have been included in the model as links between environmental stress variables and other constructs in the model.

A second problem with the assumptions surrounding the environmental stress construct concerns the failure to include any appraisal by the mothers in the study of the degree to which they perceived their circumstances as stressful. Lazarus (1980) argues that psychological stress does not "reside" in events, but arises in the course of a person's appraisal of the situation. When a situation is appraised as threatening or demanding, and a response is required, and a response is not immediately available, then a state of negative psychological stress occurs. It is this type of argument that has led to debate over whether life event inventories require weighting for the degree to which individuals view events as stressful (see Sarason et al., 1978). In any case, the model tested in the present study may have been improperly specified in that there was no link included that would address subjects' own appraisals of the degree to which they were experiencing stress. In line with Lazarus (1980) model of stress and coping, Wolfe (1985) has suggested that tolerance for stress and problem-solving skills are both parental psychological characteristics that might prove more useful in studies of child maltreatment than do more typical, global measures of psychopathology.

In summary, the model tested may have been insufficiently specified. Omitted links that may be critically important are (1) measures of actual stressful events and situations, (2) appraisal of these situations by subjects, (3) measures of personal psychological characteristics that include tolerance for stress and an assessment

of repertoire of problem-solving skills, and (4) measures of available social support.

Methodological Limitations

The final source to be addressed in accounting for failure of the data to support the model is methodological limitations of the present study.

The first addressed previously, involves the potentially distorting effect of sampling the variables under investigation while subjects were actively participating in child abuse prevention programs. While pragmatic and ethical concerns dictated the strategy employed, this strategy may have proven to be more problematic than simply a limitation on generalizability of results as originally expected.

A second issue involves measurement problems that developed over the course of the study. Both the psychological distress and positive maternal behavior scales failed to meet the internal consistency criterion of unidimensionality (Hunter & Gerbing, 1982). In other words, the failure to find a "flat" correlation matrix for items within these scales indicates that factors other than the "underlying trait" or construct determine responses to items on the scale (Nunnally, 1978). One possible source of error in both of these measures is observer effects (Hollenbeck, 1978). Unfortunately, there was an insufficient number of completed self-report versions of the psychological distress scale (Brief Symptom Inventory) to use them in the study. This prevented having multiple

measures of psychological distress. In addition, it resulted in the same method being employed to assess a predictor and criterion variable. To the extent that observer effects contribute to both psychological distress scales and positive maternal behavior scale scores, then the error terms for these measures may be correlated. A fundamental assumption in path analysis is that residual variables (error terms) are pairwise uncorrelated and that all independent variables in an equation are uncorrelated with residual variables in that equation (Asher, 1976). When these assumptions are not met, then the ordinary least square regression techniques used to estimate path coefficients are seen as yielding incorrect estimates (Reis, 1982). Thus, the hypothesized model may be correctly specified; however, improper measurement of the constructs that developed over the course of the study may have been partially responsible for the failure to find empirical support for the model.

Finally, (and obviously), the final sample size available in this study is not particularly appropriate to the type of analysis undertaken (Asher, 1976; Nunnally, 1978). The loss to attrition (from an original sample of 118 to a final sample of 21) was significant. The potential sampling error problem and the unreliability of regression weights generated from such samples are well documented (Nunnally, 1978).

In summary, methodological limitations of the present study included the potentially biasing effects of study subjects who were participating in child abuse prevention programs, measurement

problems in development of the psychological distress and positive maternal behavior scales, and the limitations attendant upon using large sample statistics with small samples.

Implications for Future Research

The preceding discussion of the limitations of the present study suggests directions for future research aimed at identifying causal factors involved in individual differences in the behavior of mothers of young children. The present study was offered as an effort to replicate and extend the findings of Conger et al. (1984). However, this study was planned and implemented prior to the availability of the Conger et al. results. As a result, it was not a replication in the true sense of the word; it tested the same model using somewhat different methods, measures, and a different sample. Findings supportive of the Conger et al. results would have been impressive support for the hypothesized model, given the substantial differences between the two studies. Unfortunately, the failure to reproduce their results provides a more ambiguous state of affairs. Differences in the two studies are of a magnitude sufficient to suggest that the Conger et al. findings remain tantalizing, not wholly conclusive, and still in need of replication and extension. The Belsky (1980, 1984) proposal for the study of the determinants of parenting continues to loom as a thoughtful and provocative integration of data and theory from a variety of sources and one that merits further testing.

To that end, the following suggestions are made for future research:

1. The model proposed herein, as well as by Conger et al., should be tested again.

2. Future tests of the model should be guided by careful attention to measurement issues. Multiple indicators for key constructs should be available and these should be assessed by multiple methods (self-report, observational, spouse report, etc.). Efforts should be made to develop a measurement model and refine it until unidimensional, i.e., internally and externally consistent measures are developed (Hunter & Gerbing, 1982). The environmental stress measures in the present study were adequate as scales but weakened by the ecological fallacy involved in their use. Considerable work is needed in developing a psychological characteristic measure (or measures) that covers the domains of (a) emotional distress, (b) attitudes about children in general, (c) attitudes about the specific child in the study, (d) perceptions of the specific child, (e) parents problem-solving and stress-management skills.

3. The model should be expanded to include assessment of major stressful life events, as well as day-to-day "hassles" encountered by parents and their perceptions of the degree of disruption engendered by these events.

4. The model should be expanded to include an assessment of the types, range, and level of involvement of social support persons in the family's network.

5. Once the conceptual model is expanded, it can be tested and then "trimmed" using criteria and procedures available in the causal modeling literature (Heise, 1975). However, at present, these links should not be omitted a priori.

6. Careful attention needs to be paid to the potential social support function of research teams involved in assessment (particularly repeated assessments) of high-risk families. Experimental manipulation of the degree of involvement with the family would provide information about possible confounding effects such as those hypothesized to have influenced the present study.

7. Creative attention to increasing the numbers of families recruited, insuring heterogeneity on "risk" dimensions, and maintaining involvement of high and low risk elements of the sample for research of this kind is needed. Belsky (1980) makes a convincing case for the type of analytic strategies necessary to test models of the determinants of parenting. These statistical methods are all designed to be used with high number of cases relative to the number of measures (Nunnally, 1978). Because the model proposed will incorporate numerous measures, there must be significant samples available.

Summary

This research tested a model of the mediation of the effects of environmental stress on maternal behavior by maternal psychological characteristics. This model was developed following Belsky's (1984)

proposed integration of the child maltreatment literature with other more normative studies of influences on parenting.

Subjects for this study were participants in one of two child abuse prevention programs. They completed self-report attitudinal measures and were interviewed and observed interacting with their infants at two separate points in time. These two sampling points, as well as samples of convenience resulting from subject attrition led to the availability of five tests of the hypothesized model.

Zero order correlational data showed a consistent positive relationship between adaptive maternal attitudes and positive maternal behavior. No other correlation was consistently significant.

The model tested met all of the tests for significance in only one of five replications. Examination of these results led to the conclusion that the one significant replication was probably a chance finding and that, overall, the data did not "fit" the model.

Failure to confirm the hypothesized model was discussed in terms of (1) differences between this study and another study providing a prior test of a conceptually similar model (Conger et al., 1984), (2) conceptual limitations, or specification errors in the present model, and (3) methodological limitations. Suggestions for future research were offered.

APPENDICES

APPENDIX A

STATISTICS TABLE

APPENDIX A

Table A1.--Descriptive Statistics--Original Sample[a]

Variable	Mean	Stand. Dev.	Range
Mother's Age	22.40	5.65	11-37
Mother's Education (in years)	11.69	2.84	7-22
Number of people in home	3.98	1.75	1-9
Infant age at intake (Negative number indicates mother pregnant at intake	4.31	6.96	-15 - 23
Father's Age	26.42	5.75	19-44
Highest Education in home (in years)	12.54	2.54	8-22
Household Income (in thousands)	10.16	8.11	1-40
Number of Agencies Involved with Family	1.76	1.43	0-12
Time Couple Together (in months)	34.64	40.35	0-216
Infant Birthweight (In ounces)	109.28	23.55	34-156
Number of Siblings	.68	1.13	0-6

Treatment Condition	IDP = 29; Public Health = 26
Phone in Home	Yes = 40; No = 15
Mother's Ethnicity	White = 39; Black = 11; Hispanic = 3; Native American = 1; Asian = 1

Table A1.--Continued

Mother's Occupation (Prior to Birth of Infant)	Professional =3; Managerial = 1; Skilled = 3; Unskilled = 10; Student = 15; Unemployed = 23
Mother's Occupational Status at intake	Employed = 3; Unemployed = 49; On Leave = 3
Mother Married	Yes = 22; No = 33
Biological Father living with Mother	Yes = 25; No = 30
Ethnicity of Father	White = 46; Black = 6; Hispanic = 2; Asian = 1
Occupation of Father	Professional = 4; Skilled = 11; Unskilled = 13; Student = 2; Unemployed = 8; Unknown = 24
Highest Occupation Status in Home	Professional = 4; Managerial = 1; Skilled = 9; Unskilled = 13; Student = 2; Unemployed = 26
Use of Public Assistance Income	Public Assistance only = 15; Public Assistance + income = 3; Income + Extended Family Assistance = 11; Income Only = 16
Protective Services involvement	Yes = 4; No = 51
Prenatal Care Used	Yes = 45; Sporadic = 8; None = 2
Well-Baby Care Used	Yes = 24; Sporadic = 15; No = 16
Alone in Labor Room	Yes = 7; No = 48
Alone in Delivery Room	Yes = 24; No = 31
Type of Delivery	Vaginal = 41; Cesarean Section = 14
Initial Reaction to Pregnancy	Delighted = 10; Generally Pleased = 14; Mixed Feelings = 15; Generally Displeased = 9; Totally Displeased = 7

Table A1.--Continued

Father's Involvement in Caregiving	None = 22; Minimal = 10; Some Offered = 12; Major role = 11
Mother has source of help for baby (outside immediate household)	Yes = 36; No = 19
Mother's Primary Source of Emotional Support	Biological Father = 17; Grandmother = 8; Other Relative = 7; Friend = 6; No one = 17

[a]N = 55

APPENDIX B

MATERNAL INTERVIEW CODING

APPENDIX B

MATERNAL INTERVIEW CODING

1.	Mother's Age	(Code 100-age in years)
2.	Mother's Education	(Code 24-age in years)
3.	Marital Status	(Code married = 0; unmarried = 1)
4.	Mother's satisfaction with her mother as a child	(Code Satisfied = 0; Dissatisfied = 1)
5.	Mother's wish to parent her child as she was parented	(Code Yes = 0; No = 1)
6.	Feelings about discovering pregnancy	(Code 1-6; 1 = Delighted; 5 = Totally Displeased; 6 = Don't Know
7.	Father's feelings about pregnancy	(Code 1-6; 1 = Delighted; 5 = Totally Displeased; 6 = Don't Know
8.	Prenatal care	(Code 0 = Yes; 1 = Some; 2 = None)
9.	Mother alone in labor room	(Code No = 0; Yes = 1)
10.	Mother alone in delivery room	(Code No = 0; Yes = 1)
11.	Infant birth weight	(Code 2,000-weight in ounces)
12.	Number of children in home	(Code number of children)
13.	Sibling density	(Code (number of children/age range) x number of children)
14.	Number of unrelated adults in home	(Code number)
15.	Is father in the home	(Code Yes = 0; No = 1)
16.	Source of family income	(Code 0 = Employment; 1 = Mixed; 2 = Total Welfare Dependence)
17.	Family income	2 = Total Welfare Dependence (Code 50,000-income in dollars)
18.	Perception of adequate help with child	(Code Yes = 0; No = 1)
19.	Father's involvement in baby care	(Code 0-4; 0 = Primary caregiver; 4 = None)
20.	Help with physical care of infant	(Code Someone = 0; No One = 1)
21.	Source of emotional support	(Code Someone = 0; No One = 1)
22.	Alternative caregiving arrangements	(Code Yes = 0, No = 1)
23.	Current pregnancy	(Code No = 0; Yes = 1)
24.	Family involved with legal system	(Code No = 0; Yes = 1)
25.	Family involved with mental health system	(Code No = 0; Yes = 1)
26.	Well baby care/immunizations	(Code Yes = 0; No = 1)
27.	Source of Information about baby's health	(Code Someone = 0; No One = 1)
28.	Telephone	(Code Yes = 0; No = 1)

APPENDIX C

STATISTICS FOR HOPKINS PSYCHIATRIC RATING SCALE

APPENDIX C

Table C1.--Descriptive Statistics for Hopkins Psychiatric Rating Scale (HPR)

Variable Name	Time[a]	Mean	Stand. Dev.	Observed Range[b]	Average Correlation with Corresponding BSI Scale
Somatization	4 mos.	.56	.97	0-4	.49
	8 mos.	.82	1.06	0-4	
Obsessive-Compulsive	4 mos.	1.65	1.14	0-5	.31
	8 mos.	1.71	1.21	0-4	
Interpersonal Sensitivity	4 mos.	2.17	1.17	0-5	.29
	8 mos.	2.12	1.11	0-4	
Depression	4 mos.	2.16	1.14	0-5	.48
	8 mos.	2.29	1.05	0-5	
Anxiety	4 mos.	1.71	.93	0-4	.45
	8 mos.	1.91	1.18	0-4	
Hostility	4 mos.	1.29	.93	0-4	.38
	8 mos.	1.53	.88	0-3	
Phobic Anxiety	4 mos.	.35	.75	0-3	.11
	8 mos.	.35	.62	0-3	
Paranoid Ideation	4 mos.	1.13	1.02	0-4	.35
	8 mos.	1.29	.99	0-3	
Psychoticism	4 mos.	.23	.55	0-3	.12
	8 mos.	.26	.48	0-2	
TOTAL DISTRESS	4 mos.	11.22	5.58	2-28	.62
	8 mos.	12.27	5.41	3-24	

[a]N = 55 at 4 months; N = 40 at 8 months

[b]A rating of 0 indicates no evidence of symptom; 6 indicates severe problems.

APPENDIX D

STATISTICS FOR HOME OBSERVATION FOR MEASUREMENT OF THE ENVIRONMENT

APPENDIX D

Table D1.--Descriptive Statistics for Home Observation for Measurement of the Environment (HOME)

Variable Name	Time[a]	Mean	Stand. Dev.	Observed Range	Possible Range
Emotional and Verbal Responsivity of Mother	4 mos.	6.20	2.21	0-11	0-11
	8 mos.	9.91	1.96	3-11	
Avoidance of Restriction and Punishment	4 mos.	5.43	1.85	0-8	0-8
	8 mos.	4.37	2.23	0-8	
Organization of Environment	4 mos.	4.68	1.05	2-6	0-6
	8 mos.	4.74	.94	2-6	
Provision of Appropriate Play Materials	4 mos.	6.32	2.13	1-9	0-9
	8 mos.	7.44	1.68	2-9	
Maternal Involvement with the Child	4 mos.	4.79	1.42	0-6	0-6
	8 mos.	5.26	1.09	1-6	
Opportunities for Variety in Daily Stimulation	4 mos.	1.90	1.14	0-5	0-5
	8 mos.	2.50	1.36	0-5	
TOTAL HOME	4 mos.	32.34	6.07	11-44	0-45
	8 mos.	34.13	5.07	20-42	

[a]N = 55 at 4 months; N = 40 at 8 months

APPENDIX E

STATISTICS FOR MATERNAL ATTITUDE SCALE

APPENDIX E

Table E1.--Descriptive Statistics for Maternal Attitude Scale (MAS)

Variable Name	Time[a]	Mean	Stand. Dev.	Observed Range	Possible Range
Maternal Satisfaction vs. Feelings of Depletion and Futility	4 mos.	66.15	15.02	4-123	21-126
	8 mos.	61.78	12.23	35-90	
Nonacceptance vs. Acceptance of Child's Impulses	4 mos.	57.50	14.41	27-90	0-140
	8 mos.	56.85	16.07	18-92	
Maternal Moderation of Child's Aggression vs. Control of Threatening Impulses	4 mos.	65.63	16.37	25-99	2-141
	8 mos.	67.44	17.24	31-99	
Maternal Flexibility and Adaptability vs. Rigid Response to Potentially Satisfying Child-Rearing Experience	4 mos.	57.50	9.16	38-80	18-108
	8 mos.	57.07	8.12	37-72	
Concern Regarding Performance of Maternal Role vs. Denial of Concerns regarding Childrearing	4 mos.	57.47	9.17	36-76	18-108
	8 mos.	58.00	9.07	36-73	
Encouragement of Positive Interaction with the Child vs. Maternal Hostility	4 mos.	30.94	14.52	-3-65	-46.86
	8 mos.	29.40	13.22	2-61	

[a]N = 55 at 4 months; N = 40 at 8 months.

APPENDIX F

STATISTICS FOR NURSING CHILD ASSESSMENT SCALES

APPENDIX F

Table F1.--Descriptive Statistics for Nursing Child Assessment Scales (NCAS)

Variable Name	Situation	Time	Mean	Stand. Dev.	Observed Range	Possible Range
Sensitivity to Cues	Feeding	4 mos.	11.79	2.47	4-16	0-16
		8 mos.	10.92	1.94	7-16	
	Teaching	4 mos.	8.23	1.43	5-11	0-11
		8 mos.	7.98	1.71	4-11	
Responsivity to Distress	Feeding	4 mos.	8.93	2.24	2-12	0-12
		8 mos.	7.86	2.38	2-11	
	Teaching	4 mos.	10.21	1.43	6-12	0-12
		8 mos.	8.45	2.42	3-11	
Social-Emotional Growth Fostering	Feeding	4 mos.	10.23	2.84	1-14	0-14
		8 mos.	10.12	2.05	6-14	
	Teaching	4 mos.	8.07	1.93	3-11	0-11
		8 mos.	7.76	2.01	3-11	
Cognitive Growth Fostering	Feeding	4 mos.	5.67	1.94	2-9	0-9
		8 mos.	6.53	1.60	2-9	
	Teaching	4 mos.	9.48	3.13	2-17	0-17
		8 mos.	9.98	3.29	1.17	

TABLE F1.--Continued.

Variable Name	Situation	Time	Mean	Stand. Dev.	Observed Range	Possible Range
Clarity of Cues (Infant)	Feeding	4 mos.	12.49	1.85	8-15	0-15
		8 mos.	13.12	2.25	4-15	
	Teaching	4 mos.	7.23	1.91	1-10	0-10
		8 mos.	8.35	1.73	3-10	
Responsiveness to Parent	Feeding	4 mos.	7.56	1.84	3-11	0-11
		8 mos.	7.57	1.85	3-11	
	Teaching	4 mos.	5.98	2.93	0-13	0-13
		8 mos.	7.90	2.77	3-13	
TOTAL	Feeding	4 mos.	56.85	9.17	31-72	0-76
		8 mos.	55.71	7.52	35-70	
	Teaching	4 mos.	49.14	8.22	30-63	0-74
		8 mos.	49.85	8.52	26-69	

[a]N = 55 at 4 months; N = 40 at 8 months.

APPENDIX G

CENSUS TRACT CHARACTERISTICS FOR ORIGINAL SAMPLE

APPENDIX G

Table G1.--Census Tract Characteristics for Original Sample[a]

Variable	Mean	Stand. Dev.	Observed Range
% of families not in the same house as 5 years ago	56.91	14.91	37-99
% of population not born in state	32.01	13.61	14-93
% of 16-19 year olds not enrolled in an education program	32.29	29.04	0-99
% of adults not high school graduates	26.90	12.71	1-55
% of adults unemployed	10.91	6.52	1-32
% of women in the labor force with children less than 18 years of age	54.03	15.17	0-99
Median income for families (in thousands)	18.03	6.53	7-39
% of female headed households below the poverty line	29.49	20.79	0-65
% of families with children < 5 below the poverty line	24.00	18.86	0-67
% of families with income < 125% of the poverty line	21.93	13.81	0-58

[a]N = 55; 22 census tracts represented in sample.

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