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DEVELOPMENTAL CHANGES IN RISK INDICATORS AND THE PREDICTION OF PARENTAL PHYSICAL AGGRESSION

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ABSTRACT

DEVELOPMENTAL CHANGES IN RISK INDICATORS AND THE PREDICTION OF PARENTAL PHYSICAL AGGRESSION

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Studies of risk indicators for maltreatment have been largely limited by cross-sectional data, which fail to account for developmental changes in the family context. Examining the developmental nature of risk levels may provide evidence that risk factors operate differentially in families to influence the emergence of child maltreatment. This study examined the developmental contexts of families to ascertain the nature of risk indicators most likely to predict parental physical aggression. Risk indicators of child externalizing behaviors and family conflict emerged as significant predictors of parental physical aggression, while parental alcohol consumption, depression, and SES did not. Risk indicators that predicted parental physical aggression were consistently high across time. Fluctuations in risk level (as measured by risk indicators) over time did not predict parental physical aggression.

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Introduction/Rationale

Our increasingly sophisticated understanding about parenting and its determinants highlights that parenting practices are multiply determined (e.g., Sameroff, 1975; Ammerman, 1990; Belsky, 1980, 1993; Cicchetti & Rizley, 1981; Sameroff & Seifer, 1983). From the earliest years of research on child maltreatment, there has been considerable effort directed toward discovering the etiology of and identifying reliable risk factors for abuse. Such elements are critical in (a) screening for high-risk groups in order to provide preventive interventions, and (b) recognizing abused children and their families so that appropriate treatments can be implemented to remediate the short- and long-term deleterious effects associated with maltreatment (Ammerman, 1991).

In the last two decades, studies (see Ayoub, Willett, & Robinson, 1992, for a review) have demonstrated that families at risk for physical abuse could indeed be identified in the general population, but the identification of characteristics that differentiate the high-risk from the low-risk family is an area of both ongoing controversy and success. Research (e.g., Belsky, 1984, 1993) has allowed the identification of a constellation of contributing factors associated with risk of physical maltreatment, including previous maltreatment, parental psychopathology, stress and social support, socioeconomic status, intelligence, child personality variables, and various other demographic variables (e.g., single parenthood).

Despite the identification of such risk indicators for physical maltreatment, little is known about how they manifest over time within the family context. Cross-sectional

data, upon which most maltreatment research is based, does not illuminate the nuances involved in the changing family environment and how developmental changes in risk factors may predict the emergence of aggressive parenting. Currently there is little information regarding the *developmental course* of risk indicators associated with child maltreatment, and whether a particular "developmental map" of risk differentiates between maltreating and nonmaltreating families.

The question left unaddressed in the current child maltreatment literature is whether a "developmental map to parental physical aggression" exists, and whether it is characterized by changes in the family context which increase or decrease risk, or by stability in risk levels of a "sufficient" degree. To fully characterize family contexts in regard to risk for parental physical aggression, stability or changes in risk must be examined repeatedly over time in a developmental framework. In addition, the intensity level of each risk indicator (e.g., amount of alcohol consumption, degree of family conflict) must be assessed for its contribution to the at-risk nature of the family context. By inspecting such contextual changes, one can investigate whether there is heterogeneity across families in terms of risk levels, or whether physically aggressive families share the same history of changes in risk indicators. Understanding how such factors affect parenting over time can have a profound impact on our ability to successfully intervene with at-risk parents and to create interventions that are more sensitive to the "long-term" developmental view of the parenting context.

Theory

Various theoretical models have been proposed to explain the etiology of child maltreatment. The *psychopathology model* (e.g., Steele & Pollock, 1968), which attributed child abuse and neglect to psychiatric disorders or personality disturbances, has fallen out of interest due to the failure of many studies to identify a syndromal pattern specific to maltreating parents (Wolfe, 1985). In the early 1970's, the *socio-cultural model* (e.g., Gelles, 1973; Gil, 1970) emerged to emphasize the role of stress engendered by poverty, unemployment, and educational disadvantage. The related *social-interactional model* (e.g., Parke & Collmer, 1975) proposed that child and parental characteristics combine with situational factors that lead to abuse. Thus the probability of maltreatment increases when child factors (e.g., severe behavior problems) interact with parental variables (e.g., low frustration tolerance) during situations of conflict (e.g., bedtime). This growing focus on multiple contributing factors, rather than on a single cause, stimulated interest in increasingly integrative models of causation.

The next generation of maltreatment models are characterized by increased levels of complexity, which resulted from attempts to simultaneously consider multiple causative factors. Belsky (1980) derived a child abuse model from Bronfenbrenner's general *ecological model*, which delineates four levels of causative influence in etiology: ontogenetic, microsystem, exosystem, and macrosystem. Ontogenetic variables are those characteristics of the individual that contribute to (or prevent) maltreatment, such as parental IQ and poor parenting skills. The microsystem includes those aspects of the family that increase (or decrease) the probability of maltreatment, such as marital conflict

or children with behavioral problems. The exosystem involves community or social forces, such as unemployment. Finally, the macrosystem consists of cultural determinants of maltreatment, such as societal acceptance of corporal punishment or economic prosperity.

Cicchetti and Rizley (1981) went beyond the ecological model in proposing the *transactional model*, in which potentiating and compensatory factors for maltreatment are examined. Temporal distinctions are made for both categories of risk factors. That is, there are transient risk factors that fluctuate and may indicate a temporary state, and there are enduring factors, which represent more permanent conditions or characteristics. In addition, biological, psychological, and social elements are hypothesized to combine in influencing the etiology of maltreatment. Cicchetti and Toth (1987; 1995) and others maintain that at the level of the microsystem, the balance of potentiating and compensatory factors, or stressors and supports (Belsky, 1980, 1993; Garbarino & Sherman, 1980), determines the presence or absence of violence within the family environment. In addition, the effects of multiple, non-specific risk factors may be cumulative in the sense that the presence of more risk factors is related to a higher certainty of negative outcome (Seifer, Sameroff, Baldwin, & Baldwin, 1992).

Wolfe (1987) built on these integrative models with his *transitional model*. As with the ecological and transactional models of maltreatment, the transitional model focuses on the importance of multiple causes and risk/protective factors. However, the transitional model views child abuse as the extreme end of a continuum of adequate to deviant parenting, in which three stages of parent-child conflict are described that

progressively heighten the probability of abuse: Stage One, reduced tolerance for stress and disinhibition of aggression; Stage Two, poor management of abuse crises and provocation; and Stage Three, habitual patterns of arousal and aggression with family members. In each stage, destabilizing factors facilitate the escalation of conflict, whereas compensatory factors prevent passage into other stages. Thus abuse is viewed as a heterogeneous form of physically punitive parenting, rather than a dichotomous phenomenon. According to this view, the parent-child relationship was either never well established from the beginning, or it began to disintegrate during periods of developmental change or family stress (Wolfe, 1993).

These models of maltreatment integrated the various factors of early unidimensional models into more complex, multidimensional models. In addition, they have accounted for the dynamic nature of the family context. Although there are important differences in the models described in the section above, all of these theoretical approaches focus on the importance of interactions and changes over time as pertaining to the emergence of child maltreatment. Yet most studies utilizing these complex theories continue to produce a "snapshot" of family risk factors and functioning, based on cross-sectional data or a retrospective research design (Azar, Fantuzzo, & Twentyman, 1984; Hillson & Kuiper, 1994; Pianta, 1984), which delimits their explanatory depth. Azar (as cited by Hillson & Kuiper, 1994) described these maltreatment studies as "... merely lists of the components of single factor theories with little attempt to specify contingent relationships between components or prioritize their contribution to causality."

Developmental-Ecological Framework

For the present study, a *developmental-ecological* framework is applied. From a *developmental* perspective, etiology is viewed as an evolving process with the possibility of continuities and discontinuities in predictor variables as children and families change over time (Fitzgerald et al., 1993). An *ecological* approach dictates that etiology is assessed around multiple "contexts of maltreatment" (Belsky, 1993), including the developmental context (the role of parent and child factors) and the immediate interactional context (such as conflict in the family environment). Combining the strengths of developmental theory with an ecological framework, risk is assessed from a related set of variables across time. Researchers using this perspective seek to document the relationship of maturation to environmental trigger events, to establish the extent to which the basic structure of developmental processes can be modified by environmental experiences, and to describe the person-environment interchanges that are necessary to bring about change or to resist it (Zucker et al., 1995). Thus, this framework is concerned with constancy and change, and the desire to map the multiple, interacting factors that produce behavior (Zucker et al., 1995).

As such, the developmental-ecological framework is particularly suitable for examining the flow of events in the family context and how certain patterns of interaction of risk factors may produce child maltreatment. Both parent and child develop through a series of stages, at any of which the potential for conflict and abuse arises (Cicchetti & Toth, 1987; Hoekstra, 1984) via parental, child, and environmental characteristics (Belsky, 1980; 1993). Capturing the developmental dynamics of risk factors in family

contexts will provide insight into the types of challenges that are most likely to predispose a family for eventual maltreatment, and answer the need to move beyond purely descriptive cases of maltreatment and risk factors to more complete process-oriented explanations of etiology (Hillson & Kuiper, 1994; Hoekstra, 1984).

The Family Context: Change or Stability in Risk Status?

When assessing the conditions that give rise to maltreatment, scientific evidence is needed to ascertain whether there is a stable vulnerability component to families that eventually maltreat their children, or if families move in and out of risk status. That is, if risk is conceptualized as the additive effect of multiple factors in the family system, do those factors change within families over time? And is it possible to distinguish physically aggressive parents from nonaggressive parents by differences in families' "risk history"?

Experts express concern about whether parental, situational, family, and individual change in functioning occurs over time, and whether it affects the presence or return of maltreatment (Ayoub et al., 1992). Some evaluation-based studies have reported stability in family functioning across time. For example, Kowal et al. (1989) found that family functioning at entry of an intervention is significantly correlated with family functioning at exit, indicating that family functioning tends to be moderately stable. Pianta and Egeland (1990) found that relationship patterns between mothers and infants at six months were consistent at 42 months. Pianta et al. (1989) observed that 76% of the mothers identified as maltreating when their offspring were two years of age were still maltreating four years later, suggesting that the stability of maltreatment may be

quite high (Belsky, 1993). Others (Roberts, Block, & Block, 1984) have also reported a considerable amount of consistency in parenting styles from child's age three to twelve.

Such reports indicate that family contexts are relatively stable, suggesting that level of risk for maltreatment does not change within families. However, other studies (Cicchetti & Howes, 1991; Justice & Duncan, 1976) have found variations in family functioning over time related to increased "movement" in the abusive family context, in that parents must cope with multiple aversive events in their environment (Spicer & Franklin, 1994). Specifically, it has been shown that abuse and neglect correspond with periods of stressful role transition for parents, such as the postnatal period of attachment, the early childhood period of increasing socialization pressures, the times of family instability and disruption, and the times following detachment from social supports and services (Belsky, 1980; Wolfe et al., 1988). Behavioral patterns that differentiate abusive from nonabusive mothers may develop during infancy (Gelardo & Sanford, 1987), but Egeland and Farber (1984) provide evidence that such behavioral patterns do change over time, related in part to either increases or decreases in life stress. Willett, Ayoub, and Robinson (1991) found that the number of parenting problems and the number of violence/maltreatment problems experienced by a family were predictive of changes in functioning over time, reporting that there is considerable variation in how much change in family functioning is observed (Ayoub & Jacewitz, 1982).

Such studies indicate that *global* family functioning is subject to change over time, although they do not provide information about the respective changes in family risk indicators. However, several studies have provided indirect evidence that risk factors

change over time. For example, Crnic, Greenberg, Robinson, and Ragozin (1984) found that maternal risk factors were only moderately stable across an eighteen-month time span. Focusing specifically on risk factors in families who participated in a parent education and support program, Whipple and Wilson (1994) found that maternal depression decreased significantly over time, as did negative life changes. Such findings suggest that maltreating families experience changes in the intensity of particular risk indicators. However, it is important to note that such findings are tied to studies devised around interventions.

Despite these findings, the literature lacks a clear picture of the pathways that lead to parental aggression. Several options are feasible, including the possibility that family risk levels are stable across time: highly physically aggressive parents experience consistently high levels of risk relative to non-physically aggressive families, who experience consistently low levels of risk. Evidence for such a pathway would lead to a dichotomous view of families, with risk status that is unlikely to change over time. However, an alternate route to parental physical aggression may be a family context that is characterized by change in the levels of risk factors. Such a pathway indicates a high-risk status that is related to turmoil and change, while a low-risk family history may be associated with stable risk levels.

Risk Indicators

The importance of different types of risk factors–social, emotional, and economic–in the etiology of child maltreatment is well documented (Egan, 1983; Garbarino & Crouter, 1978; Gelfand, Teti, & Fox, 1992; Justice & Duncan, 1976;

Koverola, Manion, & Wolfe, 1985; Muller, Fitzgerald, Sullivan, & Zucker, 1994; Pianta & Egeland, 1990; Schinke et al., 1986; Whipple & Webster-Stratton, 1991). Despite knowledge about the types of risk factors that are associated with child maltreatment, greater attention is needed to address the developmental processes by which some parents gradually acquire the preconditions that lead to maltreatment. Wolfe (1993) maintains that rather than focusing on observable factors that are often present once a family has been reported, researchers must look at the process by which more subtle, preexisting factors associated with the individual parent, child, or family situation become transformed over time into a high-risk or maltreating situation.

It is the relationships among these factors, not the individual factors per se, that generate patterns of risk in the family system. However, understanding the individual components that create risk is imperative. As such, several risk indicators that are associated with child maltreatment are described in greater detail in the following sections. In keeping with an ecological philosophy about the etiology of maltreatment, risk factors are considered from individual, microsystem, and social contexts. Research on parental depression and alcoholism, perception of child difficulty, conflict in the family environment, and socioeconomic status has revealed that these risk factors are not static and constant over time, but rather are variable and subject to fluctuation in people's lives. How these possible fluctuations over time relate to eventual parental physical aggression is presented as the consideration in focus. In addition, differences between mothers' and fathers' experiences of risk factors, and whether such differences affect the outcome of physical aggression, are examined.

Depression

During the 1960's parental psychopathology was implicated as the primary cause of child abuse and neglect. Since then, however, the idea that all abusive parents are mentally ill has been rejected (Wolfe, 1987), and in fact only 10% to 15% of abusive parents are diagnosed with a specific psychiatric condition (Ammerman, 1990; Bavolek & Henderson, 1990). Yet parent variables are highly predictive of inadequate care in high-risk families (Egeland & Brunnquell, 1979), and they are more powerful contributors to maltreatment than are child characteristics (Ammerman, 1990). Thus, the role of parental psychopathology continues to deserve examination.

Despite the fact that no particular "abusive" personality has been discovered (Ammerman, 1990), parental psychopathology is associated with physical child abuse and is a major burden for families with dependent children. Depression is the most widely studied disturbance in parental psychological functioning (Belsky, 1984; Vondra, 1990) as a well-known risk factor for impaired parent-child interactions, including abuse and neglect (Bland & Orn, 1986; Egeland, Jacobvitz, & Sroufe, 1988; Gelardo & Sanford, 1987; Gelfand et al., 1992; Pianta & Egeland, 1990; Whipple & Webster-Stratton, 1991; Whipple & Wilson, 1994). Early identification of maternal depression in particular is shown to be one promising strategy in child abuse prevention (Scott, 1992).

A predictable association exists between parental depression and child maltreatment in that depression is closely associated with stress, and that depressed mood of parents may result in decreased effectiveness in handling discipline situations (Kotch et al., 1995; Whipple & Webster-Stratton, 1991). Depressed mothers are found to make

more negative statements about their children, to use guilt- and anxiety-provoking methods of controlling their children, and to have unrealistic expectations regarding their children's ability to self-regulate (Ammerman, 1990; Jameson, Kulcsar, Gelfand, & Teti, 1995). Depressed mothers create a disruptive, hostile, rejecting home environment for their children, which in turn undermines child functioning (Campbell, Cohn, & Meyers, in press; Colletta, 1983). Moreover, an examination of mothers who were able to break the cycle of intergenerational abuse revealed that depression significantly differentiated the abusers from the nonabusing mothers (Egeland et al., 1988). The depression scores obtained by the mothers who continued the intergenerational cycle of abuse highlighted both (a) depression that was chronic and intrapsychic in nature, and (b) depression that was situational and reactive due to frustrations and helpless feelings.

Researchers (see Dore, 1993; Whipple & Wilson, 1994) have concluded that parents who are psychologically distressed have a much lower threshold of tolerance for child misbehavior and resort more quickly to high authoritarian, overcontrolling parenting. Gelfand et al. (1992) affirmed that the greater the severity of maternal depression, the more likely were depressed mothers to experience parent-related stress. Most important, depressed mothers tend to be more hostile and punitive in their responses to children at times (Davies et al., 1991; Zucker et al., 1994), and more withdrawn and psychologically absent at other times (Dore, 1993). Evidence suggests that negative effects of parental depression on children are related more to such patterns of inconsistent parenting of depressed mothers than to the depression itself (Dore, 1993).

Little is known about how changes in depressive episodes affect parenting.

Examining such changes relative to parental physical aggression is important because the vast majority of episodes of depression in adulthood are recurrences (Kessler & Magee, 1994).

Changes in parental depression over time. Due to the episodic nature of depression, it is critical to consider the timing of assessment. Much of the work on maternal depression has focused on women who have suffered an episode of depression during the child's lifetime, but the depression was not necessarily current at the time of the assessment. The data have been equivocal: although one study found that a history of depression had an impact on later mother-child interactions, even when the depression was no longer current, others suggest that current symptom levels are more important than a history of depression (Campbell et al., in press; Susman, Trickett, Iannotti, Hollenbeck, & Zahn-Waxler, 1985).

Other studies that have examined changes in maternal depression and parenting have found that mothers with past depression are more oriented toward letting their children take chances and try new things as they grow up (Susman et al., 1985). Davies and colleagues (Davies et al., 1989) found tentative evidence that when a parent has been depressed earlier in life, it is probably not a risk factor for disturbance in the later parent-child relationship. However, higher levels of self-reported current depression were associated with more negative affective parenting (Egeland et al., 1988; Gelardo & Sanford, 1987; Gelfand et al., 1992; Pianta & Egeland, 1990; Whipple & Webster-Stratton, 1991; Whipple & Wilson, 1994).

Additional evidence for the importance of assessing impact of changes in maternal

depression on parenting comes from the multitude of studies on attachment of the mother-infant dyad (see Egeland & Farber, 1984). Egeland and Farber (1984) revealed that maternal affective behaviors are particularly important for maintaining a secure attachment once it is formed, and that mothers' personality variables associated with depression (e.g., aggression and hostility) have a negative impact on the mother-child relationship over time.

Paternal and maternal depression. Studies have found that for both mothers and fathers, current depression is associated with more negatively affective parenting (Davies et al.,1989). Further, it has been found that both fathers and mothers who report greater ratings of current and worst-ever depression have higher rates of aggression toward their children (Reider et al., 1989; Zucker et al., 1994). Interestingly, Davies and colleagues (1989) found that maternal and paternal depression operate in different ways to affect parenting. Specifically, this study found evidence that there is independence between the father's parenting and the mother's depression (i.e., maternal depression did not affect the father's parenting), but that the mother's parenting is strongly affected by the father's level of depression.

Alcohol Consumption

Alcoholism and problem drinking are positively correlated with violence among family members (Barber & Crisp, 1994; Bavolek & Henderson, 1990; Famularo, Stone, Barnum, & Wharton, 1986; Muller et al., 1994; Pianta, 1984; Reider, Zucker, Maguin, Noll, & Fitzgerald, 1989; Steinberg, Catalano, & Dooley, 1981; Whipple & Wilson, 1994). Studies of the link between parental substance abuse and child maltreatment

suggest that chemical dependence is present in at least half of the families known to the public child welfare system (Dore, Doris, & Wright, 1995). Some place this figure as high as 80% (Barth, 1994).

Researchers have found significant relationships between parental alcohol abuse and child maltreatment of all types, including physical, sexual, and emotional abuse as well as physical and emotional neglect (see Dore et al., 1995). In one in-depth comparison of substance abusing and non-substance abusing parents involved in child protective cases, Murphy and colleagues (1991) found that parents with documented substance abuse histories were more likely than other parents to: (a) be repeat offenders with regard to child abuse and neglect; (b) fail to follow through with court-ordered services; and (c) eventually lose care and custody of their children.

Nevertheless, the evidence connecting alcohol and child abuse has weaknesses (Steinhausen, 1995). Although increased rates of physical abuse have been reported among alcoholic parents, data also suggest that parental withdrawal is more common than physical abuse (Zucker, 1979). In a national survey, Wolfner and Gelles (1993) found no significant differences for self-reported rates of maltreatment among abstainers, those who drink 1 - three times/month, and those who drink at least weekly. However, profiles of at-risk families frequently include histories of and current drug or alcohol abuse (Bath & Haapala, 1993; Bavolek & Henderson, 1990; Kowal et al., 1989; Muller et al., 1994), and some researchers believe that parental alcoholism is one of the most destructive of many risk factors for physical child abuse (Famularo et al., 1986).

A number of explanations have been offered for the hypothesized connection

between physically aggressive parents and alcohol problems, including that aggressive parents, in attempting to cope with the stresses of their daily lives, resort to behaviors involving alcohol use or exceedingly harsh punishment of their children (Wolfe, 1987). Another possibility relates to expectations of interpersonal interactions, such that under the influence of alcohol, individuals who are already highly stressed may misinterpret cues and resort to aggression (Widom, 1993).

One critical element that may determine the pairing of alcohol consumption with parental physical aggression is the presence of comorbidity of alcoholism with antisocial personality disorder (ASPD). Abusive parents are more likely to receive diagnoses of alcoholism and ASPD (Bland & Orn, 1986; Dinwiddie, 1993). Even without diagnostic labels of alcoholism and antisocial personality disorder, child abusers in general are found to have a history of disciplinary problems and property destruction, and as adults to engage in other violent behaviors. It could be that these maltreating parents are "contextually embedded" (see Zucker & Fitzgerald, 1991) as individuals who are predisposed for aggression or violence and demonstrate patterns over the lifespan that reflect a bias toward attracting reinforcing factors.

Although ASPD occurs in only 4 percent of the U.S. male noninstitutional population, it is 12 times more common among those with alcohol dependence (Zucker, Ellis, Bingham, & Fitzgerald, 1996), and is the psychiatric disorder with the strongest association with alcohol disorders. This dose of increased aggressivity can play a role for both males and females with alcohol problems (Department of Health and Human Services Special Report, 1993), although it is not present for all alcoholics (i.e., ASPD is

found in approximately 14% of the alcohol abuse/dependence population–see Zucker & Fitzgerald, 1991). This heterogeneity in alcoholism may give alcohol consumption several different pathways to aggression, with antisociality as a distal factor in a causal set of processes in only some cases.

Changes in alcohol consumption over time. Research shows that alcoholism is not a static component, but rather demonstrates variable patterns of behavior across time. Longitudinal studies of alcoholic behaviors have shown that there are changes in patterns of use, both in frequency and intensity (Paolino, McCrady, & Kogan, 1978). A multitude of studies (see Zucker et al., 1995) report significant shifts into and out of problem drinking classifications over intervals as short as one year, suggesting that consumption level and related problems are unstable over longer intervals of time. Studies showing the greatest stability across time were those where the initial level of risk was greatest (Bingham, Zucker, & Fitzgerald, 1996). Risk may be more fluid over time in populations involving low to midrange levels of risk (Zucker et al., 1996).

How such patterns of consumption relate to child maltreatment has been investigated: periods of active drinking increase the likelihood of direct child abuse, via parental violence and severe incapacity (Famularo et al., 1986). In addition, within aggressive parent populations there is an overrepresentation of parents with a past history of alcohol problems. Reider et al. (1989) found that both mothers' and fathers' degree of long-term alcohol-related difficulty was positively correlated with severity of aggression toward their children. Those parents with greater long-term alcohol-related troubles had higher rates of aggression toward their children, but current rates of drinking were not

significantly related. Other studies have also found that current alcohol consumption was not related to parenting measures (Davies, Zucker, Noll, & Fitzgerald, 1991). The finding that a history of alcoholic drinking in the past is a risk factor for current maltreatment reveals the degree to which alcoholism may have a deep and wide-ranging impact on parental functioning, even beyond the immediate effects of actual consumption.

Paternal and maternal alcohol consumption. Fathers' problem drinking is linked to family stress and less positive father-child relationships (Dumka & Roosa, 1993; Zucker, Ojala, Fitzgerald, & Noll, 1994). In addition, fathers' problem drinking has been shown to interfere with positive mother-child relationships (Dumka & Roosa, 1993). Data are particularly scarce concerning the effects of maternal alcohol consumption and parenting (Steinhausen, 1995), although researchers (Davies, Zucker, Fitzgerald, & Noll, 1992) have predicted more severe effects with maternal alcoholism due to the traditionally increased responsibility for child-rearing held by the mother. However, this prediction has received equivocal support: Krauthamer (1979) found that alcoholic mothers tend to be more ambivalent, confused, and inconsistent about parenting than nonalcoholic mothers, while another study (Zucker et al., 1994) found that mothers' level of alcohol-related difficulties was not predictive of any aspect of their relationships with their sons. Other studies (see Dumka & Roosa, 1993) have shown that alcoholic families are most likely to be harmful to children when both parents are caught up in problem drinking and family routines and rituals are not maintained.

Perception of Child Difficulty

A number of child characteristics are implicated in maltreatment in general, and in physical abuse in particular. It has been proposed that certain child features, such as difficult-to-manage and behavior-problem children, increase parental frustration and add to the level of overall familial stress (Crnic & Acevedo, 1995; Gelfand et al., 1992; Koverola et al., 1985; Pianta, 1984; Whipple & Webster-Stratton, 1991; Wolfe, 1985). Deviant child behavior and noncompliance are frequent precipitants of abuse (Ammerman, 1990; Gelardo & Sanford, 1987; Kadushin & Martin, 1981), as children who are abused tend to present parents with more discipline situations via disruptive and aversive behavior (Azar et al., 1984; Whipple & Wilson, 1994). These "abuse-provoking" characteristics include prolonged and irritating crying, oppositional and defiant behavior, and conduct problems (see Ammerman, 1990; 1991). These child risk factors also contribute to the maintenance of parental aggression in those families where violence is primarily caused by other factors (Ammerman, 1991).

The importance of the child's behavior in the etiology of abuse has been debated, as prospective studies of abusive families have failed to demonstrate a significant causative role for child behavior problems in abuse (Ammerman, 1990; 1991). For example, Egeland and Brunnquell (1979) found that aspects of infant temperament (e.g., infant orientation, irritability, and consolability), in contrast to parental characteristics, added little information in distinguishing between adequate and inadequate care groups.

However, parental *perceptions* of child behavior have a dramatically stronger influence than actual child behavior (Mash & Johnston, 1990; Wolfe, 1985). The parent-

child conflict in abusive families often does not appear directly attributable to difficult child behavior (Mash & Johnston, 1990), but children who are perceived as "difficult" have been found to be at higher risk of abuse and to have highly stressed parents (Garbarino & Sherman, 1980; Vietze et al., 1980). Research (Ammerman, 1990; 1991; Dore, 1993; Houck & King, 1989; Mash et al., 1983) has shown that abusive parents' perceptions are incongruent with observed child behavior; they overestimate the degree to which their children show problematic behavior and expect more troublesome behavior from their children. Whipple and Webster-Stratton (1991) found that abusive mothers are significantly more critical in their interactions with their children and report more child behavior problems, despite the fact that independent observations on home visits did not reveal significant differences in the amount of child deviance in abusive and nonabusive homes.

Physically abusive parents' expectations and perceptions of their children differ from those of nonabusive parents in such a way that they are more likely to choose harsh disciplinary tactics (Egeland & Brunnquell, 1979; Haskett et al., 1995). Maltreating parents report less satisfaction with the parenting role, have more negative perceptions of their children, and attribute their children's misbehavior to deliberate efforts to challenge their authority (Azar et al., 1984; Cicchetti & Howes, 1991; Cicchetti & Lynch, 1993; Dore, 1993; Trickett, Aber, Carlson, & Cicchetti, 1991; Creighton, 1985). Moreover, families with unrealistic expectations and cognitive distortions regarding children's intentions are significantly less likely to improve even with intervention (Kowal et al., 1989).

Changes over time in perceptions of child difficulty. Very few studies have examined changes in parental perception of child difficulty and their relationship to parental aggression (Ammerman, 1991). One study (Whipple & Wilson, 1994) that examined families in a parent education and support program found that there were no significant decreases in parental reports of child misbehavior and parental discipline over the nine-month assessment span. In addition to this finding, results revealed that despite participation in the program, parents persisted in inaccurately perceiving their children's abilities, had difficulty being aware of their needs, maintained strong beliefs in the value of corporal punishment, and expected their children to be responsible for much of their happiness. A number of other studies have pointed to similar attitudes among risk populations and the difficulty in changing such beliefs (Barber, 1992). However, such findings are based on interventions with groups of parents who have been specifically identified as at-risk for maltreatment. There is little information about changes in perception of child difficulty over time, and how this relates to parental aggression, in a non-intervention context.

Assessing parental perceptions of child difficulty over time is important due to the nature of the changing parent-child relationship. The particular developmental period through which children are progressing may be a critical determinant of the stressors associated with parenthood (Crnic & Acevedo, 1995), as the child's age has been shown to be a significant contributor to the prediction of maltreatment by mothers (Reider et al., 1989). It is critical to understand the potential for stage-salient transition periods to affect stressful experience and how that potential may predict aggressive parenting.

Paternal and maternal perceptions of child difficulty. Although studies have shown that in general mothers and fathers equivalently rate their child's behavior problems (Bingham, Fitzgerald, & Zucker, 1996; Ellis, Bingham, Zucker, & Fitzgerald, 1996, under review), other studies (Fitzgerald, Zucker, Maguin, & Reider, 1994) have found that mothers' and fathers' perceptions of child behavior are both different and subject to change over time. Specifically, Fitzgerald and colleagues (1994) found that as fathers increased the amount of time spent with their sons, parental perceptions became increasingly concordant. Fathers who spent less time with their sons perceived them as less troubled than mothers perceived them to be. As such, depending on amount of time directly spent with a child, mothers' and fathers' perceptions of child difficulty may follow different developmental courses. A broader literature base has shown that in general there are low-order correlations between mothers' and fathers' perceptions of child behavior.

Conflict in the Family Environment

A family-level component that affects the potential for parental physical aggression is the presence of conflict in the family environment. High levels of family conflict have been shown to set a foundation for coercive interactions that increase the likelihood of child maltreatment (Mollerstrom, Patchner, & Milner, 1992). In particular, conflict in the marital relationship has been hypothesized to play an important role in the development of physical aggression, as marital discord has been associated with child abuse (Barton and Baglio, 1993; Garbarino & Crouter, 1978; Pianta, 1984; Wolfe, 1985; Gelardo & Sanford, 1987; Houck & King, 1989). Abusive mothers describe significantly

more distressed marriages and conflict than nonabusive mothers (Cicchetti & Lynch, 1993; Whipple & Webster-Stratton, 1991). The effects of spousal relations, including violence among parents, general negativity and aversive behavior, on parenting has been implicated by studies of quite different developmental periods (Wolfe, 1985; Belsky, Lerner & Spanier, in press; Vondra, 1990). Both fathers and mothers in abusive families report greater levels of family conflict (Perry et al., 1983), and demonstrate particular difficulty in resolving disagreements through discussion (Silber, 1990).

In a comprehensive review of the literature, Wolfe (1985) cites studies that clearly indicate that child maltreatment is significantly associated with observable levels of conflict in the home, and that the tone of family interactions is less positive than in nonaggressive homes. The consequences of such negative and conflictual family environments are likely to be associated with poorer family system health (e.g., cohesion and adaptability) (Dumka & Roosa, 1993).

Changes in conflict in the family environment over time. Changes in conflict levels in the family environment over time is a construct that incorporates elements of crisis, communication, and interaction among family members. Such global considerations of family conflict are necessary in longitudinal studies, which include changes in family composition, such as divorces, remarriages, and other parental partners in the family environment. Changes in family composition may have a profound effect on the degree of conflict in the home (Bolton & MacEachron, 1986). For example, Kowal et al. (1989) found that the most notable risk factor accounting for worsening mother-child relationships was a change in family formation.

Disintegration and reorganization of family composition have been shown to increase the degree of stress within the family, particularly within the first two years following a separation (Bolton & MacEachron, 1986), and are likely to alter the level of conflict in the family environment. Moreover, heightened abuse potential is significantly associated with single-parent or nonparent custody (Kolko et al., 1993), and assessing changes in such family characteristics over time may reveal fluidity in risk status.

Socioeconomic Status

Of the several extrafamilial factors investigated in the etiology of child maltreatment, none has received greater research attention than economic stress. Although there has been long-lasting controversy regarding whether differences in SES affect the etiology and prevalence of abuse (Trickett et al., 1991), support for the connection between maltreatment and economic factors has been gleaned at both the aggregate and individual levels of analysis. Poverty and its associated stressors of low education and unemployment have repeatedly been found to negatively impact childrearing (Garbarino & Crouter, 1978; Trickett et al., 1991; Whipple & Wilson, 1994) by providing a stressful context for abuse (Whipple & Webster-Stratton, 1991; Zuravin, 1989).

Measures of poverty and/or unemployment have been found to clearly distinguish between physically abusive and nonabusive families (Cantrell, Carrico, Franklin, & Grubb, 1990; Cicchetti & Lynch, 1993; Gelardo & Sanford, 1987; Glachan, 1991; Whipple & Webster-Stratton, 1991) and families who reabuse (Ferleger, Glenwick, Gaines, & Green, 1988). Likewise, unemployment, educational underachievement, and

low family income are related to intrafamily violence in general (Ammerman, 1990; Kolko et al., 1993). Economic change at the community level is reflected in aggregate abuse records (Steinberg et al., 1981), and overall rates of abuse are higher in regions characterized by high proportions of low-income families and in areas with high unemployment rates (Barton & Baglio, 1993; Cantrell et al., 1990; Garbarino & Crouter, 1978b; Steinberg et al., 1981).

Despite the preponderance of evidence, the role of SES in the etiology of maltreatment is debated in the literature. It is likely that the relationship between low SES and maltreatment is inflated because lower SES families come to the attention of investigative authorities, given their more frequent contact with social service agencies when contrasted with higher SES families (Ammerman, 1990; Trickett et al., 1991). Low SES is neither a sensitive nor a specific marker for child abuse and neglect: child maltreatment occurs in all socioeconomic groups (Ammerman, 1990), and the majority of underprivileged families do not engage in maltreatment (Houck & King, 1989).

However, recent studies have indicated that although there may be a reporting bias such that lower-SES abusive families are proportionately more likely to be reported to the authorities than are middle-class abusive families, it is likely that maltreatment in fact occurs more frequently among lower-SES families (Takeuchi, Williams, & Adair, 1991; Trickett et al., 1991). In a national survey, poor respondents reported 1.5 times more abusive violence than more affluent families (Wolfner & Gelles, 1993).

Regardless of status of low socioeconomic standing, job loss and economic instability–circumstances likely to befall maltreating families (Steinberg et al.,

1981)–may be especially detrimental to family functioning (Pianta, 1984; Vondra, 1990). In fact, financial problems consistently emerge as the most prevalent risk factor in high-risk families (Herrenkohl, Herrenkohl, Rupert, Egolf, & Lutz, 1995; Kowal et al., 1989).

Changes in socioeconomic status over time. The theoretical connection between SES and child maltreatment is based on the well-established generalization that psychological distress varies inversely with level of income (Catalano & Dooley, 1983). However, the notion of SES as a stable variable is not accurate. From cross-sectional data, one might deduce that maltreating families are either "in" or "out" of financial troubles; one does not get a picture of how SES may change at the family level. Some studies (Bingham et al., 1996) that have examined multiple-risk families have assessed changes in SES and family income. Stability for family SES measured approximately three years apart was $r = .69$, while family annual income was $r = .71$. Both numbers indicate some degree of change across time. Indeed, it has been shown (Takeuchi et al., 1991) that socioeconomic status is a dynamic condition, with families entering and exiting poverty every year.

Early work (Justice & Duncan, 1976) found that abusive parents often go through many ups and downs in terms of income and expenditures, and that both contemporaneous and lagged relationships between financial strain and maltreatment exist (Zuravin, 1989). Gil (1970) reported that maltreatment is more likely among those families in which the father experienced unemployment during the preceding year.

Several studies have shown that economic and financial changes at any SES level cause stress upon families, and that both negative *and* positive changes in SES cause

stress. Thoits and Hannan (1979) examined the relationship between change in income and stress levels by studying the impact of an income-maintenance experiment, for which participants' income level was increased. Several race, sex, and marital status groups responded to the income-maintenance treatments with significantly increased distress. These responses of increased distress occurred early in the experiment, and increased over time–even when controlling for magnitude of financial change. Thus, the magnitude of the financial change appeared to be less important than the change itself (Thoits & Hannan, 1979). In addition, it had been previously shown that the experiment significantly increased the divorce rate among participants, their rate of unemployment, and their rate of geographic mobility (see Thoits & Hannan, 1979). However, no research to date has focused on the processes that could account for a relationship between changes in SES and abuse rates, and recent literature (Wolfe, 1993) agrees that the effects of socioeconomic stress and family disadvantage have not received adequate attention.

A Developmental Framework of Risk: Interrelationships among Risk Indicators

Developmental theory emphasizes the importance of viewing patterns of adaptation and change as dynamic systems operating in multiple contexts and through time (see Zucker & Fitzgerald, 1991). Utilizing such a lens when considering child maltreatment etiology, it is highly likely that risk indicators interact over time to create multiply-determined contexts that may foster maltreatment. Theories that attempt to explain the etiology of maltreatment concur that individual risk factors rarely function in isolation, and that a single risk factor does not account for a causal path to maltreatment. Most maltreating family contexts demonstrate the presence of multiple risk indicators

simultaneously, and as the number of concurrent risk factors increases, the likelihood for negative individual outcomes also increases (e.g., Sameroff & Seifer, 1983). This is related to additive risk cumulation theory (Cicchetti & Toth, 1995) and the concept of risk load (see Bingham et al., 1996).

It is likely that families in which risk factors are of a particularly intense level are more prone to experience multiple risk factors for maltreatment. To illustrate, depression occurs in a context that more often than not includes marital conflict, low social support, and low socioeconomic status (Campbell, Cohn, & Meyers, in press; Gelfand et al., 1992; Jameson et al., 1992). In addition, maternal depressed mood is related to increasingly negative perceptions of child behavior (Krech & Johnston, 1992). Poverty-stricken parents are subject to the special environmental distresses and strains associated with socioeconomic deprivation (Justice & Duncan, 1976) which incorporates a multitude of risk factors, including increased psychological distress and increased marital and family conflict (Cantrell et al., 1990).

Partners in alcohol-complicated marriages in general experience greater marital distress, marital violence, and marital dissolution than non-alcohol marriages (Dumka & Roosa, 1993), and there are significant relationships between fathers' and mothers' alcoholism and depression (Reider et al., 1989) and between paternal alcoholism and maternal depression (Davies et al., 1991; Fitzgerald et al., 1993; Zucker et al., 1994). Alcoholism is also related to increased aggression toward children and spouses, family stress and arguments, decreased attention to children's basic needs, decreased job performance, lowered income, and poor health (Department of Health and Human

Services Special Report, 1993; Famularo et al., 1986). Also, maltreatment is more highly correlated with alcoholism when alcoholism is paired with recurrent depression (Bland & Orn, 1986) and family conflict (Dumka & Roosa, 1993). At the microsystem level, changes in degree of family conflict may represent the manifestation of increasing troubles with alcoholism, depression, change in family composition, and/or stresses with finances (Bolton & MacEachron, 1986).

Despite such evidence of multiple risk simultaneously impinging upon the family, theories that focus on an additive nature of risk cumulation or risk load seem to suggest a sense of stable vulnerability in the family context, without indicating whether risk status is fluid. Further, due to the limits of cross-sectional designs, many studies cannot map out patterns of change regarding risk level in the family system. However, Zucker, Ellis, Bingham, and Fitzgerald (1996) draw attention to a probabilistic framework for viewing how risk increases and decreases over time (Zucker et al., 1996). These researchers utilized longitudinal data to describe the downward social mobility associated with alcoholics who were also antisocial. Families with such challenges demonstrated movement toward worsening conditions over time.

Thus, risk may be viewed as a fluid characteristic that increases or decreases depending on the introductions, resolutions, and interactions among causal components (see Zucker, Fitzgerald, & Moses, 1995), allowing for the assessment of alteration in risk level related to restricted social environments and opportunity. Within the developmental perspective, change and instability is as likely as stability, depending on the causal interplay among systemic interrelationships (Zucker, Fitzgerald, & Moses, 1995).

Applying this framework to the assessment of risk for parental physical aggression, one can view across time changes in the family system that may lead to the emergence of maltreatment.

Defining Child Maltreatment

Despite impressive progress in the field of child maltreatment research in the past three decades, there remains continuing controversy regarding the seemingly most basic issue of maltreatment: definition. The implications of defining maltreatment are profound and relate to issues of policy, intervention and services, and legal ramifications for perpetrators and victims. At the current time, the states have been left with the duty of defining types of child maltreatment for their inhabitants, leaving the United States with a patchwork of policies and services. This difficulty of defining maltreatment is reflected in and reinforced by research on the issue.

For the purposes of the current study, child maltreatment is evaluated as parental physical aggression. Child abuse per se is not defined within this study. Sexual abuse, which appears to be a phenomenon quite separate from physical abuse (Hillson & Kuiper, 1994), is not addressed here, nor is child neglect and emotional abuse. Parental physical aggression is operationalized as the parent's use of physical force against a child as a means of resolving conflict.

Conclusion

Despite the large amount of research on risk factors for child maltreatment, very little research has been conducted on the possibility that risk indicators change over time to predict the emergence of maltreatment. Understanding how risk factors change over

time, and how these changes impact our ability to predict child maltreatment, may reveal important nuances about the family contexts most likely to explain physically aggressive parenting. Charting changes in the family context over time may also help explain why it is so difficult to predict maltreatment based only on number of concurrent risk factors. Any one parenting outcome may be the result of very different patterns of resources and stressors (Vondra, 1990), and at this point, the processes by which these factors interact to lead to abuse remain largely speculative (Ammerman, 1990).

The approach used in this study answers the callings of students of developmental psychopathology that researchers "analyze the risk and protective factors and mechanisms operating in the individual and his or her environment across the life span," and seek to understand the individual differences in responding to stressors at different times and in different contexts (p.542; Cicchetti & Toth, 1995). In addition, many previous studies have overemphasized factors associated with abuse for mothers by virtue of using entirely female samples (Perry et al., 1983). Examining fathers' role in the etiology of parental physical aggression and searching for possible differential determinants and outcomes of maternal versus paternal risk factors is imperative. In light of known differences in the parenting experiences of fathers and mothers, it seems likely that the dynamics among risk indicators and outcomes will differ for the two parenting roles (Mash & Johnston, 1990).

Purpose & Goals

The purpose of the current study was to examine the role of several risk indicators for parental physical aggression. These risk indicators, parental depression and alcohol

consumption, perception of child externalizing behavior, conflict in the family, and socioeconomic status, were assessed for levels of intensity both concurrent with the measure of physical aggression and in the (approximately) nine-years prior to the measure of parental physical aggression. One goal was to ascertain differences in risk levels between high- and low-aggression parents. Another goal was to predict parental physical aggression based on current and past risk levels. This study aimed to track the continuity and discontinuity of risk factors in order to determine whether parental physical aggression occurs in a stable vulnerability context or is determined by family contexts characterized by disruption and change.

Hypotheses

Hypothesis 1: Parents who report high levels of parental physical aggression will experience higher levels of risk factors relative to parents with low levels of parental physical aggression.

Hypothesis 2: Risk factors levels experienced by the high-aggression parents will increase in intensity over time (i.e., increasing levels of parental alcohol consumption, parental depression, perception of child difficulty, and conflict in the family environment; decreasing levels of SES) relative to low-aggression parents.

Hypothesis 3: Greater degrees of change in risk indicators over time will predict more parental aggression.

Hypothesis 4: Higher concurrent level of risk factor will predict higher level of parental physical aggression.

Hypothesis 5: Both greater degree of change and concurrent higher level of risk

factor will jointly predict more parental physical aggression.

Follow-up questions: Families with higher levels of parental physical aggression will be characterized by lower parental IQ and parental education, and higher parental antisociality than families with low levels of parental physical aggression. Examination of these additional risk indicators is based on findings that have tied these enduring parent factors to both parenting and physical aggression (see Cantrell et al., 1990; Davies et al., 1989; Davies et al., 1991; Perry et al., 1983).

Methods

Participants

Participants for the proposed study are families involved in the Michigan State University/University of Michigan Longitudinal Study (Zucker & Fitzgerald, 1991a). This ongoing longitudinal project utilizes population-based recruitment strategies to assess alcoholic men and their families and a contrast group of families with non-substance abusing parents. The sample included 218 parents, 115 mothers and 104 fathers.

All target children were males between the ages of nine and twelve. Boys were selected as the target group for the larger study because in the general population alcoholism, the domain of primary interest, is more common with males (Zucker et al., 1996). All families are Caucasian. Census data indicated that in the area where data collection for the main study took place, non-Caucasian families comprised less than 10% of the entire sample. Given the extensive literature demonstrating a substantial relationship between patterns of alcohol involvement and ethnic/racial status, and that

effective analysis of such differences were not possible due to sample size, the ethnic/racial variation was excluded in the larger study, and subsequently, in the proposed study.

Recruitment

Based on the focus of the larger project, the target population consisted of alcoholic men with intact families. Maternal alcoholism was not a criterion for either inclusion or exclusion from the sample. Alcohol-abusing males, recruited from the population of all convicted male drunk drivers in the mid-Michigan area, were identified by local district courts (probation officers), and were asked for permission regarding potential involvement in a "study on child development and family health" (Muller et al., 1994). At the time of recruitment, fathers were required to be living with a biological son between the ages of three and six years old, and the child's mother. All such candidates were asked their permission to have their names released to project personnel. These candidates were visited in their homes by project staff, who further screened the family for suitability and if appropriate, recruited them into the project. To date, 79% agreed to have their names released; of those potential candidates contacted by project staff, 92% agreed to participate. After reviewing the confidentiality of the study, the project staff designed an assessment schedule that included both parents and the target child.

Additional subjects were recruited via door-to-door neighborhood canvassing. These families, recruited from the same census tract as the court-recruited alcoholic families, were identified as either non-alcoholic controls or community alcoholics. Families were matched on a number of variables, including child age (± .5 years), sex,

and sibling structure.

Data Collection

Data for the proposed study were collected via questionnaires given and interviews conducted in the participants' homes. Data were collected by trained project staff who were blind to family risk status. All families in the study were paid for their participation. Data used for the proposed study will be taken from the first, second, and third waves of measurement. Each wave was collected approximately three years apart.

Measures

Parental depression. Parental depression was assessed with the *Beck Depression Inventory* (BDI) and the *Hamilton Rating Scale for Depression* (HRSD). The BDI was used to produce an indication of current depressive symptoms, while the HRSD was used to assess the worst-ever depression episode in between measurement periods (i.e., a span of approximately three years).[1]

The *Beck Depression Inventory* (BDI) (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) is a widely used phenomenological measure of depressive state that has received extensive validational study (Carroll et al., 1973). The short form of the BDI is a 13-item self-report instrument that assesses cognitive, emotional, motivational, and physical manifestations of depression. It is a better measure of psychological depression than of the biological aspects, and is more sensitive to moderate levels of depression than

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[1] Although the Hamilton Rating Scale for Depression also assesses current depressive status, the use of the BDI for current and the HRSD for worst-ever has been used before (Ellis et al., 1996, under review; Bingham et al., 1996).

more profound states. It is used here, along with the Hamilton Rating Scale as one of several indicators of this area of functioning. Beck reports a split-half reliability of .93. Scores on the long and short forms of the BDI correlate between .89 and .97 (Beck, Sterr, & Garbin, 1988). A meta-analysis of 25 years of data on the BDI yielded an internal consistency mean coefficient alpha of .86 for psychiatric patients and .81 for non-psychiatric patients. Current parental depression was assessed by 13 statements concerning different areas of functioning known to be affected by depression.

The *Hamilton Rating Scale for Depression* (HRSD) (Hamilton, 1960, 1967), an instrument for the clinical rating of depression, is coded via interview. This rating covers a variety of behavioral, affective, somatic, and psychological dimensions associated with depression, and the score is based in the subject's responses as well as the clinician's judgments. The clinician makes both a current depression rating and a rating of the level of the subject's depression at the point in their life when they were most depressed. For the study proposed here, only the scale that assesses worst-ever depression will be used. Interrater reliabilities have ranged from .89 to .90 (Hamilton, 1969). HRSD interrater reliabilities obtained from previous studies of the population examined in the proposed study, based on a sample of 16 individuals, were .78 for current depression and .80 for worst-ever depression.

Parental alcohol consumption. Information on the parents' level of alcohol consumption in the last six months is used to compute a score for current drinking. The *Quantity-Frequency-Variability Index-Revised* (QFV-R) (Zucker & Davies, 1989) was used. This instrument is a revision of the *Quantity-Frequency-Variability* (QFV) Index

created by Cahalan, Cisin, and Crossley (1969). Scores about drinking are obtained by multiplying the QV class times the approximate number of drinking episodes per year (based on the reported average frequency). This yields a zero to 21,000 score which is then subjected to a logarithmic transformation (base 10). This revision of the scoring system increases the sensitivity of the measure over the original QFV, which is necessary given that almost all of the men in the current sample would be classified as heavy drinkers or abstainers.

Perceived child difficulty. The *Child Behavior Checklist* was used to assess the parents' perception of the child's externalizing behaviors. The *Child Behavior Checklist* (CBCL) (Achenbach & Edelbrock, 1983) is completed by each parent independently. This provides an objective assessment of behavior problems via the child's social and emotional functioning. The instrument has been normed on children 4 to 16 years of age and yields standardized scores on eight narrow band subscales and two broad band subscales concerning externalizing and internalizing psychopathology and social competence. The scale also yields an overall index of child behavior problems known as the Total Behavior Problem Score. For this study, the externalizing subscale will be used, which includes items regarding the behavior problems.

The CBCL has also been administered to parents of children less than four years of age. Although the subscale scores of these children must be interpreted with caution, Fitzgerald, Sullivan, Ham, Zucker, Bruckel, Schneider, and Noll (1993) found no substantive differences in three-year-old children's scores and those obtained by four- and five-year-olds. When applied to the same population assessed in the proposed study, in

each analysis from the Time 1 data set, approximately 30% of the high risk children scored in the clinical range on one or more of the CBCL scales.

Family conflict. The degree of conflict present in the home environment was assessed using the conflict subscale of the *Family Environment Scale*. The FES (Moos & Moos, 1976, 1981) is a 90-item true-false measure of various aspects of the family psychosocial environment that yields 10 subscale scores. As conceptualized by Moos, these subscales fall into one of three overarching mesosystem domains of the family's psychosocial environment: interpersonal relationships, personal growth, and system maintenance. The FES is an empirically based taxonomy of family social environments as perceived by the family members themselves. It requires fifth- or sixth-grade level reading skills. With slight modifications, it may be rated by a home observer or interviewer. Form R of the FES consists of a number of scales that describe dimensions if the family climate with which each individual member must cope. The scores on the subscales yield a profile with the family as a central focus; or they may be used to compare the extent of agreement between family members; or they may be used to compare and contrast family groups. The conflict subscale of the FES will be used in the current study. The instrument has been subjected to extensive reliability and validity studies.

Socioeconomic Status. Information regarding family socioeconomic status and household income was assessed as part of a demographic questionnaire. Family SES was measured using the *Revised Duncan Socioeconomic Index* (SEI) (Duncan, 1977) of occupational prestige (TSE12). Items ask about recent occupation based on measure of

socioeconomic status, job achievement level, and job stability. Mothers' and fathers' prestige scores were averaged to provide an indicator of family SES, with higher TSE12 scores reflecting higher SES.

Parental Physical Aggression. Parental physical aggression was assessed via the parent-to-child subscale of the Conflict Tactics Scale (CTS) (Straus, Gelles, & Steinmetz, 1980). The CTS measures three factorially separate tactics used in interpersonal conflict: (a) Reasoning–the use of rational discussion and agreement, (b) Verbal Aggression–the use of verbal and nonverbal expressions of anger, and (c) Violence–the use of physical force or violence. Data from the Violence Scale (items 11 through 15) were used for the current study.

Parents were asked independently to indicate the number of times they used each tactic during the past year on the target child. The items become gradually more violent toward the end of the list. The CTS can be interviewer-administered or self-administered; for the proposed study a self-administered questionnaire format was used. The 15 items of the CTS were revised in the MSU-UM Longitudinal Study with minor changes in some of the wording. The respondent is asked to rate how often he or she used each of the listed tactics during the past 12 months (a = never, B = once, C = 2 - 3 times, D = 4 - 6 times, E = 7 - 11 times, F = monthly, G = about twice a month, H = weekly, I = about twice a week, J = more than twice a week but less than daily, and K = daily).

Straus (1979) reported high reliability with item-total correlations ranging from .70 to .88 using the first version, Form A (14 items). Cronbach alphas for the Reasoning, Verbal Aggression, and Violence scales of the Form N (19 items) ranged from .77 to .88,

.62 to .88, and .50 to .76, respectively. Correlations between the CTS and other measures relevant to family violence are also shown to be high. Past studies have collapsed all items from the verbal aggression, minor violence, and severe violence subscales into a global dimension of maltreatment, for which parallel-forms reliability was estimated at .77 (Muller et al., 1994).

Based on the most recent theories that view maltreatment as a continuum, parents' physical aggression toward children will be assessed according to 'degree'. To determine degree of parental physical aggression, responses to the Violence Subscale of the Conflict Tactics Scale (items 11 through 15) were be weighted according to frequencies indicated by response categories and summed together to produce a weighted summed score. Straus' (1979) form N had response category ranges from 0 to 6; for scoring purposes, he suggests substituting for the 0 to 6 scale, 0, 1, 2, 4, 8, 15, and 25.

The items of the CTS in the MSU-UM Longitudinal Study were revised to include a greater range of responses for number of times the action occurred during the past 12 months. The respondent was asked to rate how often he or she used each of the listed tactics, ranging from never to daily. Extending Straus' suggested weighting method to the Longitudinal Study version of the CTS, scores were weighted according to frequency, along the following dimensions: (0) never, (1) once, (3) 2 - 3 times, (5) 4 - 6 times, (9) 7 - 11 times, (12) monthly, (24) about twice a month, (52) weekly, (104) about twice a week, (156) more than twice a week but less than daily, and (365) daily. Each parent received a summed weighted frequency score, indicating the overall level of physical violence reported during past 12 months.

Missing Data Estimation

The original dataset consisted of 224 parents, derived of all parents with complete Time 3 data for the Conflict Tactics Scale. Missing data was checked across the remaining six instruments at all three waves of data collection (see Appendix M for descriptive statistics). If an individual was missing more than 50% of data across all three waves, this case was eliminated. Eliminating these five cases resulted in a data set than included 219 parents.

There were 3942 data points of repeated measures (i.e., six instruments, measuring current depression, worst-ever depression, alcohol consumption, perception of child difficulty, conflict in the family environment, and socioeconomic status X three waves of data collection X number of subjects) and 657 data points for stable background characteristics (i.e., three instruments for antisociality, education, and IQ X number of subjects). The sample's missing values are presented in Appendix N.

An additional case was deleted from the sample due to the large percentage of missing data, leaving a sample size of 218. Bias analyses, conducted on the data collected from the remaining 218 individuals, indicated that participants missing one or more data points were not significantly different from those with complete data. However, the analyses revealed differences between mothers and fathers, and for parents based on risk status for the larger MSU-UM Longitudinal Study (i.e., high risk, moderate risk, and low risk, based on scores for lifetime alcohol problems and antisocial

behavior)[2], suggesting that data elimination should be conducted separately for these six groups. The sample sizes for these six groups are as follows: low risk females (N=80), low risk males (N=34), moderate risk females (N=19), moderate risk males (N=44), high risk females (N=10), and high risk males (N=31). As unequal sample sizes threaten external validity and the power of a test to detect real differences (Cohen, 1988), the missing data were estimated prior to substantive hypothesis testing.

Missing data imputation was completed separately for mothers and fathers in each of the risk groups. For the purposes of this study, only missing scale (instrument) scores, rather than individual item values, were imputed.

Scale scores were estimated using two different procedures. A longitudinal data estimation procedure developed by Peterson (1987; see Bingham, 1993; Bingham, Steinmuler, Petersen, & Graber, under review) was used to estimate the missing scale scores for instruments that were administered at Times 1, 2, and 3 (i.e., BDI, HRSD, QFVR, CBCL, FES, DSEI). For those instruments whose scores were used only at one data point (i.e., Antisociality, Education, and IQ), and for individuals missing scores for two of three waves of the same instrument, cross-sectional within-group mean substitution was used.

Longitudinal Data Estimation. Approximately 230 data points needed to be estimated (5% of the entire data set). The longitudinal data estimation procedure

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Risk groups were also formed based on diagnoses of lifetime alcohol problems and antisocial personality disorder (ASPD) (see Appendix O); this alteration did not change the results from initial risk group results.

(Petersen, 1987) was used to estimate 205 of these data points (89.1% of all missing values and 4.5% of the total data set). This estimation procedure was used only in cases where subjects were missing data at only one of the three waves.

This estimation procedure utilized two components; the nomothetic, or across-subjects, component and the ideographic, or within-subjects, component. The nomothetic component consisted of the scale score means of each group (i.e., low-, moderate-, and high-risk mothers and fathers) at each wave of data collection. The ideographic component is the average distance, in units of standard deviation, between the subjects' data points at the waves where data are not missing and the nomothetic component at the wave with missing data (Bingham et al., 1996).

First, the nomothetic component of each variable (calculated using non-missing data)was computed for each of the six subgroups at each wave. Next, an SPSS program was written to compute the missing data. A deviation score was computed for each case at each of the three waves by subtracting each individual's score from the subgroup mean for each of the three waves. For example, the deviations from the mean for Variable X were calculated as follows:

DX1 = MX1 - X1.
DX2 = MX2 - X2.
DX3 = MX3 - X3,

in which DX1 represents the deviation score for the Wave 1 variable, whereas MX1 represents the subgroup mean for Variable X at Wave 1, and X1 represents the Wave 1 score for Variable X. An average was computed using DX1, DX2, and DX3. An average score was computed across all three deviation scores (i.e., DX1 + DX2 + DX3/3).

If one of the data points was missing, then two deviation scores were computed (i.e., either DX1 & DX2, DX1 & DX3, or DX2 & DX3), and the average of these two deviation scores was used to compute the deviation (across Waves 1, 2, and 3) from the mean of Variable X. For example, DX = DX1 or DX = DX2 or DX = DX3. This deviation score was then used to compute the estimated data as follows: ED1 = MX1 - DX. The missing data point was estimated by subtracting the subgroup mean score of X from the deviation score. If the scale score was not missing, the original score was retained for that instrument (Bingham, 1993; Bingham et al., 1996).

Cross-sectional Data Estimation. Following the longitudinal data estimation, the entire sample of data, including estimated and original data, was examined for scale scores that remained missing. Twenty-five data points out of a possible 4599 data points (.5%) were still missing. These data points were missing because the instrument was only collected at Wave 1, and therefore could not be estimated with the longitudinal strategy.

These missing data points were estimated by using selected items from the sample which were highly correlated with the non-missing variable. These selected variables were then regressed onto the variable to be estimated with ordinary least squares regression. For example, education and antisociality were correlated with IQ scores. Means were computed for education and antisociality for each of the risk (low-, moderate-, and high-risk) X parent (mother, father) subgroups and substituted for the missing values so that missing value estimates could be obtained.

Bias in Estimation. Upon completion of data estimation, analyses were conducted in order to ensure that data estimation had not biased the measures. Bivariate correlational analyses were conducted between all observed measures and the outcome (physical aggression) and between all estimated measures and the outcome. The correlations for corresponding observed and estimated values were compared. Discrepancies of no more than .05 were accepted as evidence that the rank-order associations among the variables had not been unduly disrupted by the missing data estimation.

Analyses. Following missing data estimation, each participant's responses to items in the Violence subscale of the Conflict Tactics Scale were recoded based on frequency into a Physical Aggression score. The sample's Physical Aggression scores ranged from 0 to 208 ($\bar{x}$ = 5.02, s = 17.87, md = 1.00). For the first analyses the sample was divided into high- and low-aggression groups based on a median split of the physical aggression score. Physical Aggression scores from 0 to 1 were recoded as Low Aggression; Physical Aggression scores from 1.1 to 208 were recoded as High Aggression.

Hypothesis 1 was that the degree of risk indicator of high-aggression parents would be greater than low-aggression parents, and hypothesis 2 asserted that risk factors levels experienced by the high-aggression parents would increase in intensity over time (i.e., increasing levels of parental alcohol consumption, parental depression, perception of child difficulty, and conflict in the family environment; decreasing levels of SES) relative to low-aggression parents.

The association between parental physical aggression and degree of risk factor and the association between parental physical aggression and movement in risk factors across time, was tested with a 2(mothers, fathers) X 2(high aggression, low aggression) X 3(times of measurement) repeated-measures ANOVA design. This (2 x 2 x 3) repeated-measures ANOVA was run for each risk factor, with degree of risk as the dependent measure. Hypothesis 1, that high- versus low-aggression parents differ in degree of stress indicators, was tested with the between-subjects segment of the analysis [2(mothers, fathers) X 2(high aggression, low aggression)]. Hypothesis 2, that risk indicator level for highly-aggressive parents worsen over time relative to low-aggression parents, was tested with the within-subjects segment of the analysis [(2(high aggression, low aggression) X 3(times of measurement)]. In addition, differences between risk indicator level for mothers and fathers was examined. Lastly, interactions among group, time, and parent sex were assessed.

For the remaining hypotheses, physical aggression scores were rank-transformed, such that percentile rank scores were substituted for observed scores for each case. For tied values, the average value for that rank was calculated and assigned to all ties. The percentile ranked physical aggression score was calculated separately for fathers and mothers. This method was used to limit the effects of outliers in regression analyses. Regression analyses were conducted with the percentile ranked values.

Hierarchical regression was used to assess the association between parental physical aggression and cross-temporal change in risk factors (Hypothesis 3). For these analyses, the change scores were calculated as follows:

$\Delta = |(Xi2 - Xi1)| + |(Xi3 - Xi2)|$. The change score is the sum of the absolute values of differences between Times 1 and 2 and between Times 2 and 3, an indicator of overall change per risk factor for each parent. A change score was calculated for each risk factor, with a higher score indicating a greater degree of change.

The regression models were constructed using a proximal-to-distal approach in which the indicators were ordered according to their relative proximity to current parental experiences. The order of entry for the change measures was individual-level variables first [(1) parental depression, (2) parental alcohol consumption, and (3) perception of child difficulty], familial-level variables second [(4) conflict in the family environment], and community-level variables third [(5) represented by SES]. For indicators assessed with multiple measures, the change scores representing multiple measures of the same risk factor were entered simultaneously. To assess their place within the model, the background characteristics were added both first and last, given their high cross-temporal stability and their temporal separation from current parental experiences.

The order of proximity was internal states (i.e., depression), behaviors (i.e., alcohol consumption), ratings or perceptions of others (i.e., perception of child difficulty), family-level variables (i.e., conflict within the home), and contextual elements of the developmental framework (i.e., socioeconomic status). This method, which allows for the examination of differential effects of variables within and between distal-proximal levels, has been previously used with data from the larger study (Bingham, Fitzgerald, W., Fitzgerald, H., & Zucker, 1996; Bingham, Fitzgerald, Townsend, & Zucker, 1995; Jansen, Fitzgerald, Ham, & Zucker, 1995), as well as other studies (Bingham, Miller, &

Adams, 1990; Miller & Bingham, 1989).

From these analyses, a model predicting parental physical aggression by degree of change in risk factor was generated for mothers and fathers. The model was trimmed of nonsignificant predictors. Hierarchical regression was also used to test patterns of association between parental physical aggression and concurrent degree of risk factor (Hypothesis 4 and follow-up questions). For these analyses, parental physical aggression was regressed onto degree of risk indicator from Time 3. In addition, background characteristics of parental antisociality, IQ, and education were added to the model. Order of entry of each concurrent degree of indicator into the formula was the same as the previous models, but with concurrent predictors rather than change scores.

To compare the relative importance of degree of change and concurrent degree of risk factor in predicting level of parental physical aggression (Hypothesis 5), hierarchical regression was used to generate a model for which significant change indicators (from results of analyses to Hypothesis 3) and significant concurrent level indicators (from results of analyses to Hypothesis 4) were combined. Essentially, the trimmed models produced by the previous analyses were combined in a hierarchical order so that both concurrent degree and change in risk factors were used to predict parental physical aggression. Based on this analysis, it was ascertained whether: (a) a history of change in risk indicators is predictive of parental physical aggression, (b) concurrent degree of risk factor is predictive of parental physical aggression, or (c) both degree of change and concurrent degree of risk factor differentiate between types of parent, and whether degree of change or concurrent level is a stronger predictor.

Results

The first set of analyses addressed the question of differences in levels of parental risk indicators. Means, standard deviations, and range of values for all variables were calculated for the entire sample and then separately for mothers and fathers. These statistics are presented in Appendix A (Entire sample, N = 218), Appendix B (Mothers, N = 115), and Appendix C (Fathers, N = 103). Child externalizing behaviors and conflict in the home were higher for mothers than fathers on average. Fathers' mean levels of alcohol consumption, antisociality, education, IQ, and socioeconomic status were higher than those of mothers.

Bivariate correlations were conducted to ascertain interrelationships among predictor variables. These correlations were conducted separately for fathers (Table 1) and mothers (Table 2). Then relationships between fathers' and mothers' risk factors were assessed (Table 3).

Correlations among fathers' variables revealed that higher current depression was related to higher depression in the past, and that reports of high child externalizing behaviors were associated with greater conflict in the home environment. Several Time 1 variables were positively associated with many of the risk factors: in particular, paternal antisociality, depression, and ratings of child externalizing behaviors at Time 1 were positively correlated with virtually all other paternal risk factors. Lower paternal IQ and education corresponded to lower SES.

Mothers' variables were more highly related than fathers', suggesting that maternal risk occurred in a context of highly integrated indicators (for fathers, the matrix

Table 1

Correlations among Fathers' Risk Indicators & Stable Characteristics

	Beck1	Beck2	Beck3	Ham1	Ham2	Ham3	QFVR1	QFVR2	QFVR3	ChExt1	ChExt2	ChExt3	Conf1	Conf2	Conf3	Ses1	Ses2	Ses3	Asb	educ	IQ
B1	1.00																				
B2	.58 ***	1.00																			
B3	.66 ***	.63 ***	1.00																		
H1	.38 ***	.28 **	.31 ***	1.00																	
H2	.42 ***	.27 **	.40 ***	.52 ***	1.00																
H3	.46 ***	.14	.42 ***	.23 *	.33 ***	1.00															
Q1	.07	.14	.17	.16	.20 *	.03	1.00														
Q2	.06	.19 *	.13	.03	.08	-.04	.59 ***	1.00													
Q3	.07	.01	.03	.09	.19 *	.05	.32 **	.11	1.00												
E1	.29 **	.23 *	.27 **	.21 *	.24 *	.15	.24 *	.21 *	.00	1.00											

(Table 1, con't)

	Beck1	Beck2	Beck3	Ham1	Ham2	Ham3	QFVR1	QFVR2	QFVR3	ChExt1	ChExt2	ChExt3	Conf1	Conf2	Conf3	Ses1	Ses2	Ses3	Asb	educ	IQ
E2	.25 *	.16	.22 *	.15	.19	.12	.12	.19	.04	.67 ***	1.00										
E3	.18	-.03	.15	.09	.04	.30 **	.12	.11	.12	.45 ***	.65 ***	1.00									
C1	.35 **	.11	.26 **	.25 **	.17	.16	.08	-.11	-.07	.33 ***	.37 ***	.26 **	1.00								
C2	.14	.15	.13	.10	.14	-.07	-.04	-.09	-.01	.21 *	.41 ***	.22 *	.68 ***	1.00							
C3	.20 *	.06	.17	.07	.12	.08	.04	-.13	-.01	.32 ***	.47 ***	.42 ***	.71 ***	.74 ***	1.00						
S1	-.20 *	-.15	-.17	-.20 *	-.14	-.02	-.08	-.19	.02	-.27 **	-.16	-.10	-.09	-.02	.01	1.00					
S2	-.16	-.12	-.18	-.24 *	-.27 **	-.12	-.12	-.09	-.01	-.18	-.09	.06	-.07	-.06	-.04	.73 ***	1.00				
S3	-.24 *	-.15	-.22 *	-.26 **	-.25 **	-.10	-.12	-.14	.05	-.20 *	-.10	-.02	-.09	-.07	-.07	.73 ***	.85 ***	1.00			
Asb	.22 *	.08	.19	.37 ***	.28 **	.07	.31 **	.19	.09	.36 ***	.22 *	.11	.27 **	.23 *	.16	-.34 ***	-.24 *	-.25 **	1.00		
Educ	-.12	-.01	-.16	-.27 **	-.24 *	-.11	-.10	-.03	.01	-.13	-.13	-.04	.07	.05	.04	.54 ***	.56 ***	.59 ***	-.36 ***	1.00	
IQ	.02	-.00	-.14	.01	-.04	.01	-.18	-.11	.02	-.16	-.06	-.13	.21 *	.18	.17	.27 **	.25 *	.26 **	-.04	.43 ***	1.00

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 2

Correlations among Mothers' Risk Indicators & Stable Characteristics

	Beck1	Beck2	Beck3	Ham1	Ham2	Ham3	QFVR1	QFVR2	QFVR3	ChExt1	ChExt2	ChExt3	Conf1	Conf2	Conf3	Ses1	Ses2	Ses3	Asb	educ	IQ
B1	1.00																				
B2	.65 ***	1.00																			
B3	.50 ***	.60 ***	1.00																		
H1	.46 ***	.29 **	.26 **	1.00																	
H2	.40 ***	.31 ***	.27 **	.43 ***	1.00																
H3	.50 ***	.50 ***	.49 ***	.51 ***	.54 ***	1.00															
Q1	-.03	-.08	.01	.09	.16	.02	1.00														
Q2	.00	.09	.14	.14	.13	-.00	.83 ***	1.00													
Q3	.32 ***	.43 ***	.27 **	.26 **	.18	.29 **	.01	.04	1.00												
E1	.10	.33 ***	.19 *	.22 *	.34 ***	.30 ***	.15	.19 *	.21 *	1.00											

(Table 2, con't)

	Beck1	Beck2	Beck3	Ham1	Ham2	Ham3	QFVR1	QFVR2	QFVR3	ChExt1	ChExt2	ChExt3	Conf1	Conf2	Conf3	Ses1	Ses2	Ses3	Asb	educ	IQ
E2	.17	.34 ***	.22 *	.17	.30 ***	.32 ***	.19 *	.29 **	.13	.60 ***	1.00										
E3	.13	.32 ***	.26 **	.23 *	.29 **	.40 ***	.15	.28 **	.04	.45 ***	.72 ***	1.00									
C1	.41 ***	.32 ***	.38 ***	.24 **	.36 ***	.38 ***	.16	.21 *	.15	.26 **	.23 *	.21 *	1.00								
C2	.31 ***	.25 **	.23 **	.20 *	.30 ***	.21 *	.21 *	.28 **	.15	.28 **	.39 ***	.35 ***	.69 ***	1.00							
C3	.29 **	.34 ***	.36 ***	.15	.21 *	.27 **	.21 *	.26 **	.14	.19 *	.31 ***	.38 ***	.61 ***	.69 ***	1.00						
S1	-.07	-.10	-.08	-.21 *	-.26 **	-.11	-.16	-.16	.01	-.20 *	-.18	-.20 *	-.06	-.01	-.17	1.00					
S2	-.05	-.42	-.06	-.22 *	-.24 **	-.16	-.16	-.16	.05	-.12	-.10	-.12	-.02	.00	-.07	.70 ***	1.00				
S3	-.14	-.14	-.13	-.27 **	-.42 ***	-.22 *	-.16	-.15	-.06	-.27 **	-.17	-.20 *	-.15	-.12	-.19 *	.74 ***	.79 ***	1.00			
Asb	.23 **	.11	.26 **	.31 ***	.41 ***	.42 ***	.33 ***	.19 *	.169	.35 ***	.20 *	.20 *	.25 **	.16	.18	-.28 **	-.27 **	-.32 ***	1.00		
Educ	-.17	-.09	-.02	-.23 *	-.29 **	-.16	-.09	-.09	.04	-.05	-.12	-.17	.017	.033	.070	.51 ***	.53 ***	.55 ***	-.30 ***	1.00	
IQ	-.01	.024	.10	-.10	-.18 *	-.01	-.06	-.09	.01	-.06	-.09	-.10	.10	.04	.14	.42 ***	.41 ***	.42 ***	-.19 *	.56 ***	1.00

* $p < .05$ ** $p < .01$ *** $p < .001$

does not create this impression because the correlations were lower). In particular, increased maternal depression, pronounced child externalizing behaviors, and high levels of family conflict were associated with "worse" levels of essentially all other maternal risk factors. Higher maternal antisociality also emerged as a key variable, related to higher levels of depression, increased alcohol consumption, more child behavior problems, and lower socioeconomic status. Correlations for both mothers' and fathers' alcohol consumption at Times 1, 2, and 3 demonstrated a lack of stability, while correlations among conflict scores were stable for both mothers and fathers, regardless of possible changes in the family structure over time. Mothers' stable background characteristics (i.e., antisociality, education, and IQ) were highly interrelated, in that higher antisociality was associated with lower IQ and lower educational status.

Parental physical aggression was also examined regarding its correlations with risk indicators and stable background characteristics. Mothers' physical aggression was significantly correlated at all three data points with both child behavior problems ($r = .21$, $p < .05$; $r = .25$, $p < .01$; $r = .33$, $p < .001$) and family conflict ($r = .29$, $p < .001$; $r = .38$, $p < .001$; $r = .22$, $p < .05$). For fathers, level of physical aggression was significantly related to child externalizing behaviors, but at Time 3 only ($r = .23$, $p < .05$), whereas family conflict was significantly related at all three time points ($r = .22$, $p < .05$; $r = .27$, $p < .01$; and $r = .34$, $p < .001$, respectively). For both mothers and fathers, physical aggression and child behavior problems were more strongly correlated at Time 3 than during earlier time periods. However, family conflict operated differently for mothers and fathers: the relationship between paternal physical aggression and conflict in the home grew stronger

Table 3

Correlations between Fathers' & Mothers' Variables

		Fathers' Current Depression			Fathers' Worst-ever Depression			Fathers' Alcohol Consumption			Fathers' Rating of Child Difficulty			Fathers' Conflict Rating			Fathers' SES			Asb	Educ	IQ
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
Current Depression	1	.40 ***	.31 **	.28 **	.07	.02	.29 **	-.11	-.06	-.08	.01	.12	.00	.19	.20 *	.17	-.0	-.07	-.14	.13	-.17	.07
	2	.31 **	.31 **	.28 **	.05	.03	.18	.08	.21 *	-.13	.1	.2 *	.16	.11	.14	.19	-.12	-.11	-.18	.13	-.12	.11
	3	.29 **	.06	.37 ***	.06	.02	.28 **	-.09	-.05	-.05	-.04	.07	.10	.11	.11	.18	-.07	-.11	-.15	.11	-.14	-.00
Worst-ever Depression	1	.19	.16	.13	.25 *	.07	.00	-.07	-.07	-.06	.04	-.01	-.08	.18	.12	.15	-.16	-.20 *	-.24 *	.11	-.12	.20 *
	2	.32 ***	.14	.27 **	.27 **	.49 ***	.28 **	.05	-.07	-.10	.17	.16	.14	.29 **	.21 *	.26 **	-.20 *	-.27 **	-.39 ***	.24 *	-.16	-.04
	3	.20 *	.03	.17	.01	.18	.41 ***	-.01	-.08	.03	.12	.17	.22 *	.24 *	.13	.23 *	-.06	-.12	-.20 *	.09	-.08	.00
Alcohol Consumption	1	.12	-.02	.17	.04	-.05	.04	.20 *	.08	.07	.22 *	.11	.03	.21 *	.04	.13	-.14	-.17	-.12	.19	-.08	-.06
	2	.04	-.03	.14	.07	-.06	-.01	.30 **	.20 *	.09	.16	.09	.06	.09	.00	.07	-.13	-.14	-.11	.29 **	-.10	.02
	3	-.01	-.00	-.07	-.01	.09	-.06	-.04	-.04	.01	.12	.12	-.05	-.05	-.01	.12	.02	-.02	-.06	-.09	-.11	.07

(Table 3, con't)

ChildDifficulty	1	.18	.04	.03	-.05	.05	.056	.15	.130	.01	.48 ***	.36 ***	.34 ***	.06	.11	.24 *	-.22 *	-.18	-.27 **	.27 **	-.20 *	-.08
	2	.05	.03	.02	-.08	-.04	.11	.20 *	.23 *	-.02	.28 **	.37 ***	.32 ***	.13	.16	.25 **	-.14	-.06	-.12	.15	-.10	-.03
	3	.12	.05	.16	-.03	-.05	.25 *	.20 *	.19	-.01	.19	.38 ***	.58 ***	.21 *	.20	.31 ***	-.17	-.06	-.16	.09	-.13	-.07
Conflict	1	.21 *	.10	.27 **	-.10	.00	.10	.03	-.23*	-.03	.145	.054	.067	.49 ***	.38 ***	.50 ***	-.07	-.09	-.15	.22 *	.01	-.02
	2	.19	.11	.12	-.02	-.01	.05	.05	-.14	-.03	.16	.20 *	.11	.46 ***	.40 ***	.49 ***	-.01	-.10	-.13	.24 *	.03	.05
	3	.19	.05	.14	-.04	-.10	.19	.10	-.03	-.04	.09	.11	.20 *	.38 ***	.30 ***	.48 ***	-.18	-.15	-.20	.23 *	-.01	.07
SES	1	-.22 *	-.14	-.14	-.16	-.17	-.01	-.09	-.20	.02	-.27 **	-.17	-.11	-.09	-.02	-.01	1.00 ***	.73 ***	.72 ***	-.31 **	.53 ***	.26 **
	2	-.17	-.11	-.17	-.22 *	-.26 **	-.11	-.14	-.10	-.02	-.18	-.08	.05	-.08	-.09	-.06	.73 ***	.10 ***	.84 ***	-.22 *	.54 ***	.236 **
	3	-.26*	-.15	-.23 *	-.25 *	-.25 **	-.11	-.13	-.14	.05	-.21 *	-.11	-.03	-.11	-.08	-.09	.72 ***	.84 ***	1.00 ***	-.23 *	.58 ***	.26 **
Asb		.10	-.01	.11	.06	.15	.17	.07	-.08	-.03	.27 **	.21 *	.19	.14	.09	.22 *	-.25 *	-.28 **	-.27 **	.28 **	-.34 ***	-.17
Educ		-.04 *	-.19	-.25 *	-.14	-.08	-.17	-.09	-.09	.21 *	-.15	-.06	-.07	-.10	-.00	-.01	.48 ***	.51 ***	.53 ***	-.09	.51 ***	.26 **
IQ		-.08	-.08	.03	-.25*	-.18	-.02	-.16	-.15	-.04	-.16	-.09	-.03	-.03	-.10	.07	.41 **	.37 **	.41 **	-.25 **	.44 ***	.23 *

over time, while the relationship between maternal physical aggression and conflict in the home was strongest early in the study.

Several patterns emerged among correlations for fathers' and mothers' risk indicators and stable characteristics, providing interesting information about the family context of the sample (Table 3). Depression (both current and past levels) was positively correlated for fathers and mothers. Mothers' higher past levels of depression were associated with fathers' reports of increased family conflict, especially during Times 2 and 3. In addition, mothers' rates of past depression were related to lower socioeconomic status. Parents' ratings of both child difficulty and conflict in the home were highly correlated. Stable background characteristics (i.e., antisociality, education, & IQ) were highly related between fathers and mothers, as well as both groups of parents' background characteristics with socioeconomic status.

Higher paternal antisociality was related to several maternal variables, including higher levels of worst-ever depression (Time 2), increased alcohol consumption (Time 2), higher rates of perceived child difficulty (Time 1), and elevated conflict in the home (Times 1, 2, and 3). Mothers' higher antisociality was also correlated with fathers' variables, most notably his perception of more child externalizing behaviors (Times 1 and 2). In addition, higher maternal education and IQ were associated with lower current paternal depression, although mothers' current depression was not significantly correlated with fathers' education or IQ.

Correlations among Change Variables

Since historical changes in risk factor level were an integral part of this study, correlations between mothers' and fathers' change scores and their respective degree of physical aggression were also calculated. For fathers, larger degrees of change in three risk indicators was correlated with other variables: more change in reports of family conflict was associated with variability in worst-ever depression; greater changes in alcohol consumption were related to both higher antisociality and lower IQ; and more change in socioeconomic status was related to higher paternal education. (Appendix D). These relationships indicate that absolute amount of change, rather than direction of change, is related among risk indicators. In no case did risk factors change in directions opposite of the other; that is, greater change in one risk factor was not related to less change in another.

For mothers, there were five significant correlations among her change variables and background characteristics. Greater changes in current depression were related to greater changes in depression levels in the past. In turn, greater changes in past depression were associated with higher maternal antisociality. Variation in amount of alcohol consumed was related to *less* change in family conflict and higher antisociality. In addition, changes in maternal perception of child difficulty were associated with variation in socioeconomic status, which was related to higher maternal education and IQ (Appendix E). For neither parent was physical aggression related to changes in these risk indicators.

Correlations among Concurrent Variables

Next, bivariate correlations were run among *current* (T3) levels of risk factors and parental physical aggression (i.e., risk indicators and physical aggression measured at Time 3). For fathers, physical aggression was related to elevated perceptions of both child difficulties ($r = .229$, $p < .05$) and conflict in the home ($r = .340$, $p < .001$). In turn, higher levels of current child difficulties was associated with both higher worst-ever depression and conflict in the home ($r = .420$, $p < .001$). Higher current socioeconomic status was related to lower current rates of depression ($r = .222$, $p < .05$) and antisociality ($r = -.249$, $p < .01$), and higher education and IQ ($r = .590$, $p < .001$; and $r = .258$, $p < .01$, respectively) (Table 4).

For mothers, concurrent risk indicators were highly related. Like paternal physical aggression, maternal physical aggression was associated with perceptions of more child behavior problems ($r = .332$, $p < .001$) and conflict in the home ($r = .217$, $p < .05$). Higher levels of maternal current depression were related to multiple factors, including higher levels of past depression ($r = .491$, $p < .001$), higher alcohol consumption ($r = .274$, $p < .01$), the perception of more child externalizing behaviors ($r = .260$, $p < .01$), more conflict in the home ($r = .361$, $p < .001$), and higher antisociality ($r = .422$, $p < .001$). Higher levels of worst-ever depression were related to the same variables and to lower current socioeconomic status ($r = -.222$, $p < .01$) as well.

Maternal perception of current high child externalizing, besides being significantly correlated with physical aggression and current and worst-ever depression,

Table 4

Correlations between Fathers' Concurrent Variables & Physical Aggression

	Phys Aggr	Current Dep	Current Worst Dep	Current Alc	Current Perc of Child Diff	Current Conflict	Current SES	ASB	Educ	IQ
Phys Aggr	1.00									
Current Level of Dep	-.02	1.00								
Level Worst Dep	-.02	.42 ***	1.00							
Current Alc Consn	.13	.03	.05	1.00						
Current Perc of Child Diff	.16	.15	.30 **	.12	1.00					
Current Conflict	.34 ***	.17	.08	-.01	.42 ***	1.00				
Current SES	.01	-.22 *	-.10	.05	-.02	-.06	1.00			
ASB	-.07	.19	.07	.094	.11	.16	-.25 **	1.00		
Educ	.05	-.16	-.11	-.014	-.04	.04	.59 ***	-.32 ***	1.00	
IQ	-.13	-.14	.014	.02	-.13	.17	.26 **	-.04	.43 ***	1.00

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 5

Correlations between Mothers' Concurrent Variables and Physical Aggression

	Physical Aggression	CurrentLevel of Dep	Level Worst	Alc Consn	Child Diff	Conflict	SES	ASB	Educ	IQ
Phys Aggr	1.00									
Current Level of Dep	.14	1.00								
Level Worst Dep	.09	.49 ***	1.00							
Alc Consn	.05	.27 **	.29 ***	1.00						
Child Diff	.33 ***	.26 **	.40 ***	.04	1.00					
Conflict	.22 *	.36 ***	.27 **	.14	.38 ***	1.00				
SES	.01	-.14	-.22 **	-.06	-.20 *	-.19 *	1.00			
ASB	.12	.26 **	.42 ***	.17	.20 *	.18	-.32 ***	1.00		
Educ	-.06	-.02	-.16	.04	-.17	.07	.55 ***	-.30 ***	1.00	
IQ	-.03	.10	-.01	.01	-.10	.14	.42 ***	-.19 *	.56 ***	1.00

* $p < .05$ ** $p < .01$ *** $p < .001$

was also related to higher current family conflict ($r = .378$, $p < .001$), lower current SES ($r = -.197$, $p < .05$), and higher antisociality ($r = .200$, $p < .05$). Higher socioeconomic status was related to lower recent levels of depression ($r = -.222$, $p < .05$), fewer child externalizing behaviors ($r = -.197$, $p < .05$), and less conflict in the home ($r = -.187$, $p < .05$) (Table 5).

These matrices suggest that both fathers' and mothers' current risk factors were highly related, but that risk factors were more interrelated for mothers and that the nature of her current risk "status" was dependent on multiple and interacting components.

Relationship between High- and Low-Aggression Parents & Risk Indicators

Parents were divided into two groups based on the degree of their reported use of physical aggression (i.e., low or high levels of physical aggression). The relationships between group status (i.e., low- or high-aggression) and risk indicators (and across time) were examined with repeated measures multivariate analysis of variance. Significance for all multivariate tests was determined using Wilks Lambda. Within-subjects and between-subjects effects for the two groups of parents are presented in Table 6.

Depression. Significant main effects of Time were found for Current [$F(1, 214) = 6.48$; $p < .01$] and Worst-ever Depression [$F(1, 214) = 6.51$; $p < .01$]. As a whole, parents experienced increases in current depression over time, but decreases in worst-ever depression. In addition, mothers and fathers across groups differed, with mothers consistently reporting greater worst-ever depression [$F(1, 214) = 12.42$; $p < .01$]. However, levels of depression did not significantly differ between low- and high-aggression parents.

Alcohol Consumption. There was a significant Parent Sex X Time interaction for Alcohol Consumption [$F(1, 214) = 7.68$; $p < .001$]. For the entire sample, there was a significant decrease in amount of alcohol consumed across time. In addition, mothers' and fathers' levels of drinking changed in different ways over time, with fathers' consumption decreasing more than mothers' (Figure 1). At Time 1, fathers' consumption was significantly greater than mothers', although this difference dissipated across time: differences between mothers' and fathers' alcohol consumption that were significant at Time 1 of data collection were not significant at Times 2 or 3. Moreover, levels of alcohol consumption did not differ significantly between low- and high-aggression parents.

Child Externalizing Behavior. A significant multivariate interaction of Group X Time was found for child externalizing behavior [$F(1, 214) = 3.26$; $p < .05$]. High-aggression parents reported high levels of child externalizing behaviors that were maintained over time. In contrast, low-aggression parents reported moderate levels of child externalizing behaviors when children were ages three to five (Time 1), then reported diminished child behavior problems over the next six to seven years (Times 2 & 3). At the time when parental physical aggression was measured (Time 3), high- and low-aggression parents reported significant differences in their children's acting-out behaviors (Figure 2).

Conflict in the Home Environment. A significant three-way multivariate interaction of Parent Sex X Group X Time was found for conflict in the home environment [$F(1, 214) = 4.70$; $p < .01$]. This interaction arises from: (1) differences

Table 6

Repeated Measures Multivariate Analysis of Variance for High- & Low-Aggression Parents

Within-Subjects				
	Multivariate F			
Variable	Parent Sex x Group x Time	Group x Time	Parent Sex x Time	Time
Current Depression	0.05	0.64	0.05	6.48**
Worst-ever Depression	.66	.54	.07	6.51**
Alcohol Consumption	1.29	1.07	7.68***	9.90***
Child Externalizing Behaviors	.50	3.26*	.61	4.59**
Family Conflict	4.70**	.44	.57	1.29
SES	.57	.26	.01	9.3***

Between-Subjects								
Variable	Sex of Parent		Group (High/Low Aggression)		Sex of Parent X Group		Within + Residual Error	
	df	F	df	F	df	F	df	F
Current Depression	1	3.13	1	2.92	1	2.32	214	(22.95)
Worst-ever Depression	1	12.42***	1	.44	1	2.10	214	(109.18)
Alcohol Consumption	1	7.23**	1	.28	1	.19	214	(14869614)
Child Ext Behaviors	1	3.33	1	15.10***	1	.12	214	(88.96)
Conflict	1	3.26	1	19.18***	1	.06	214	(9.83)
SES	1	.01	1	.47	1	.11	214	(37023.14)
Antisocial Behavior	1	27.72***	1	.00	1	1.54	214	(76.27)
Education	1	4.33*	1	.01	1	.11	214	(3.55)
IQ	1	15.66***	1	.48	1	.16	214	(181.45)

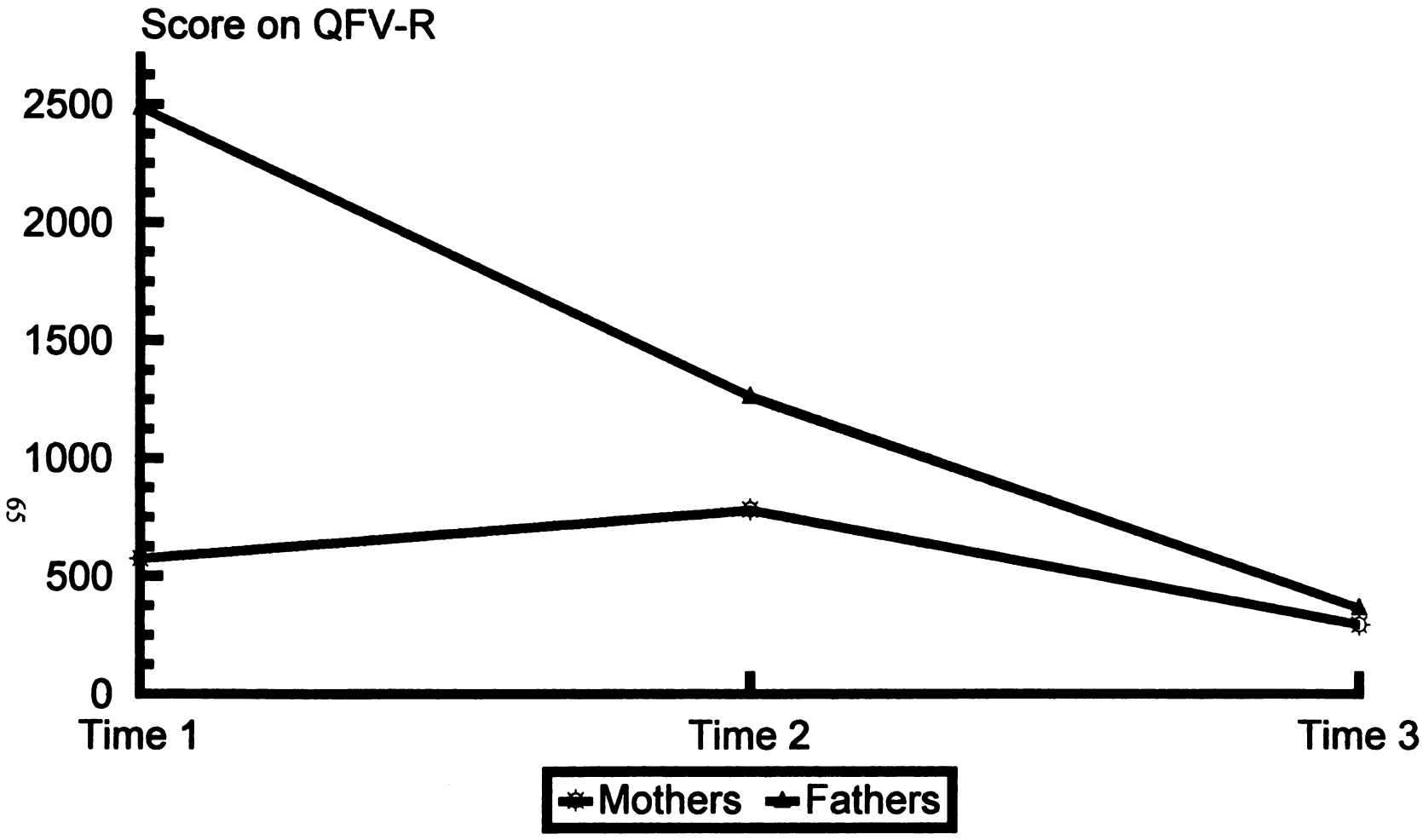

Figure 1

Interaction between Parent Sex & Amount of Alcohol Consumed

between high- and low-aggression families and mothers and fathers, (2) high aggression fathers reporting lower aggression at Times 1 and 2 than high-aggression mothers, but equal levels at Time 3, and (3) low-aggression mothers and fathers differ at Time 3.

High-aggression mothers consistently reported the highest conflict scores, which remained high across time. High-aggression fathers also reported relatively high degrees of conflict in the home, and mean conflict scores increased over time. For low-aggression mothers, ratings of conflict changed over time, with a decrease in conflict at Time 2, when the child was approximately 6 to 8 years of age, and a return to higher ratings of conflict at Time 3, when the child was approximately 9 to 11 years of age. Low-aggression fathers rated conflict the lowest of all four groups in this interaction, with low levels of conflict that were consistent and stable across time (Figure 3).

High- and low-aggression parents were significantly different regarding this risk factor. Difference between high- and low-aggression groups was maintained consistently over time. In addition, ratings of conflict for high aggression mothers and fathers converged at Time 3, while conflict scores for low aggression mothers and fathers diverged at Time 3.

Socioeconomic Status. A significant main effect of Time was found for Socioeconomic Status [$F(1, 214) = 9.3$; $p < .001$]. All families in the sample experienced improved occupational prestige over time, which did not differentiate low- and high-aggression parents.

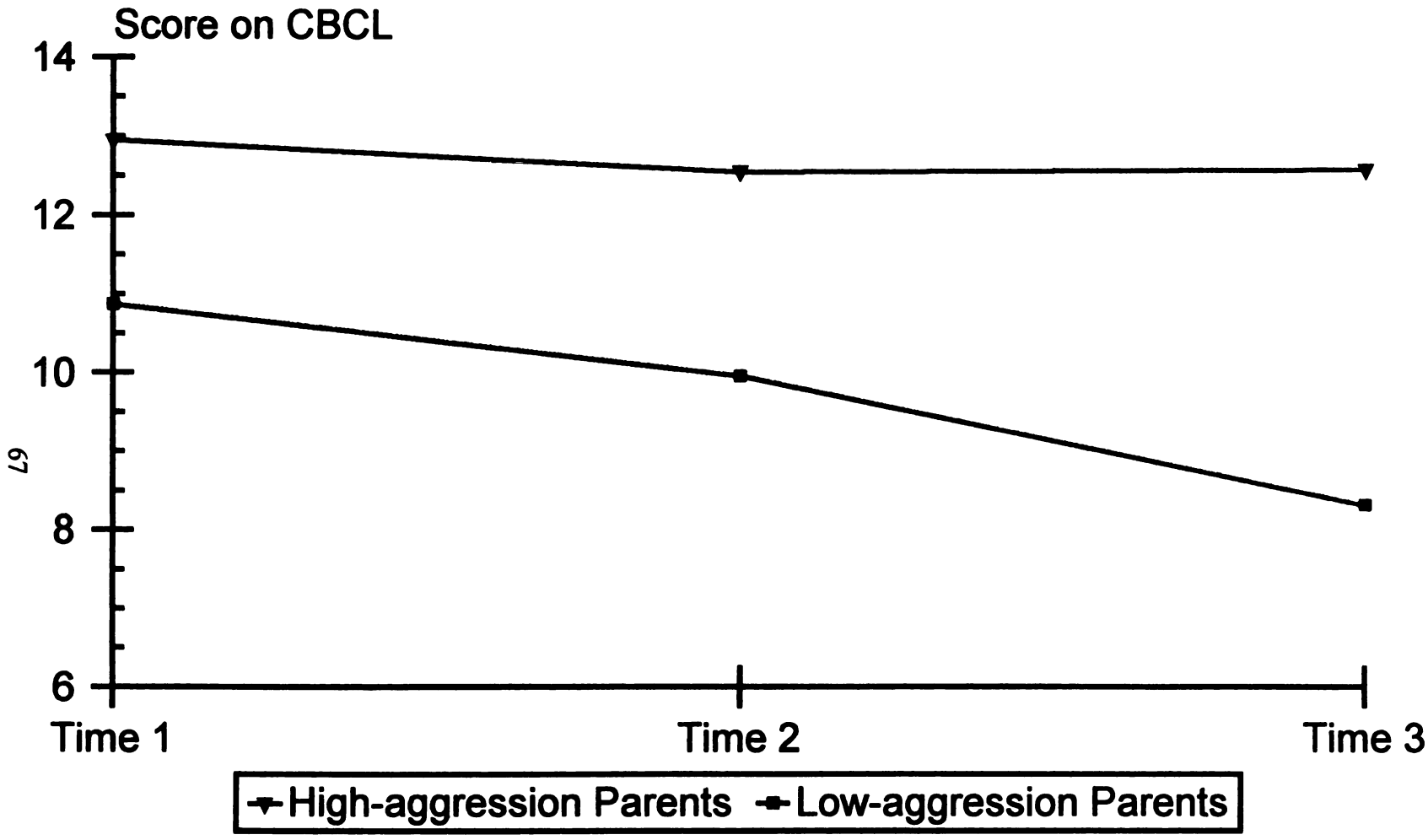

Figure 2

Interaction between Aggression Level & Child Externalizing Behaviors

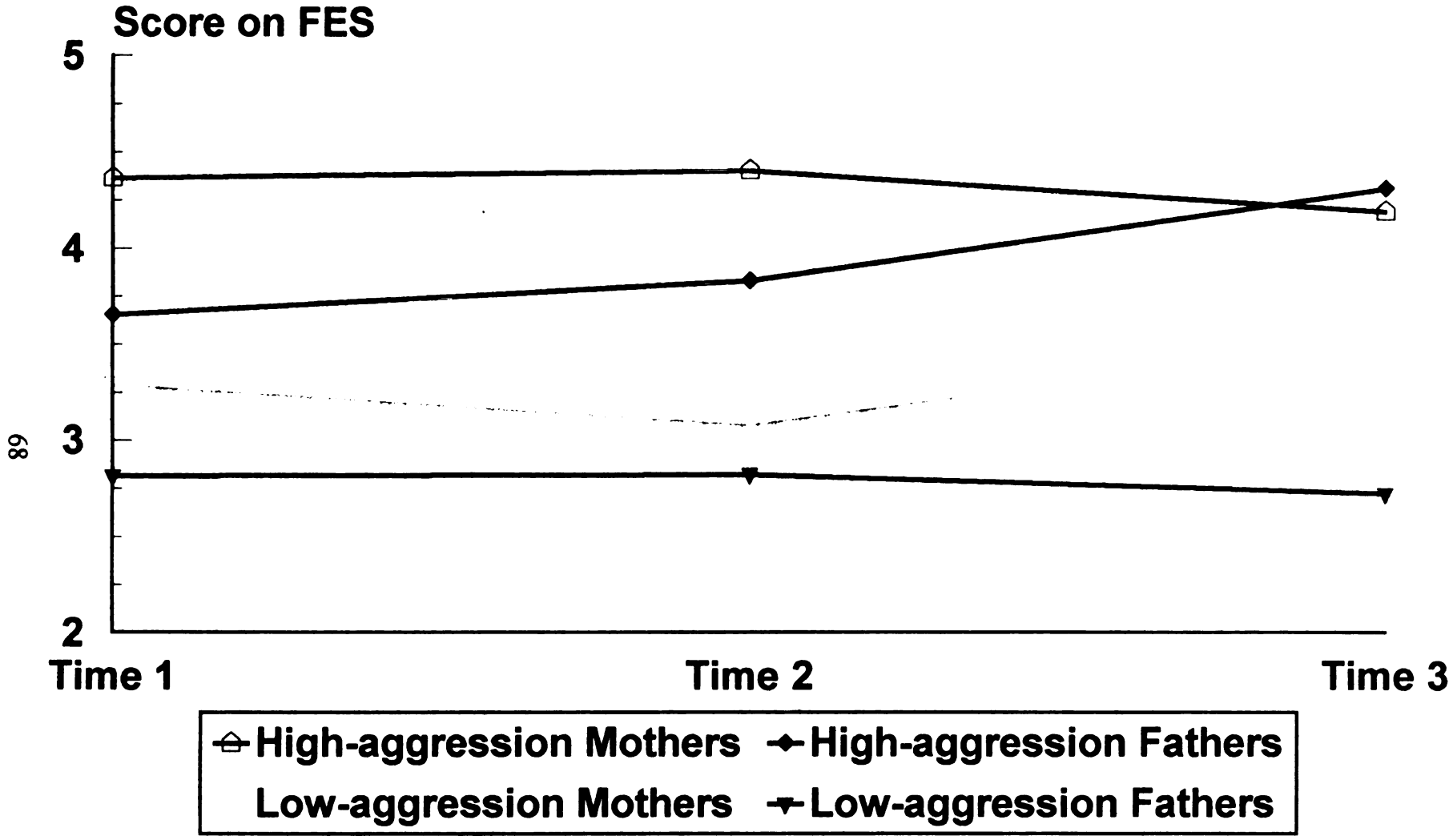

Figure 3
Interaction among Conflict in Home Environment, Parent Sex & Aggression Level

Stable Background Characteristics. Regarding stable background characteristics, fathers had significantly higher antisocial behavior scores [$F(1, 214) = 27.72$; $p < .001$], educational status [$F(1, 214) = 4.33$; $p < .05$], and IQs [$F(1, 214) = 15.66$; $p < .001$] than did mothers. However, these features did not differentiate between high- and low-aggression parents.

For the next set of analyses (i.e., hierarchical regressions testing hypotheses 3 & 4), physical aggression was viewed as a continuous variable, rather than the discreet high- and low-aggression groups. In this continuum, scores for physical aggression ranged from 0, indicating no threat or use of physical aggression, to 208, indicating frequent threat or use of physical aggression.

Relationship between Change in Risk Indicators & Degree of Physical Aggression

The relationship between *change* in risk indicators and parental physical aggression was examined within a proximal-to-distal hierarchical regression model[3]. The role of parental background characteristics (i.e., antisociality, education, and IQ) in helping to predict physical aggression was examined by entering simultaneously as the first step in the proximal-to-distal model based on the theoretical logic that variables inherent to the individual parent would have more predictive power than variables farther removed from the individual. Thus the order of entry into the regression equation was as

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Parental physical aggression was also regressed onto change scores independently (Appendix G), within a hierarchical regression model of change scores without the inclusion of stable background characteristics (Appendix H), and within a hierarchical regression model of change scores for which stable background characteristics were added as a last step in the equation (Appendix I). In each of these cases, parental physical aggression was not significantly predicted.

follows: 1. antisociality, education, IQ; 2. change in depression (Current, Worse); 3. change in alcohol consumption; 4. change in child externalizing behaviors; 5. change in conflict; 6. change in SES. For both mothers and fathers, the change model did not significantly predict physical aggression[4] (Appendix F).

Relationship between Concurrent Risk Indicators & Degree of Physical Aggression

The next analyses examined *concurrent*, rather than historical, levels of risk indicators as predictors of parental physical aggression. In this case, risk indicators were measured at the same time that parental physical aggression was assessed (i.e., Time 3).

Stable background characteristics were added simultaneously as the first step of the equation. Thus, the variables were entered in the following order: 1. antisociality, education, IQ; 2. concurrent depression (Current, Worse); 3. concurrent alcohol consumption; 4. concurrent child externalizing behaviors; 5. concurrent conflict; 6. concurrent SES.

This model significantly predicted parental physical aggression. Fifteen percent of mothers' physical aggression was accounted for, with high levels of child externalizing behaviors emerging as the only significant predictor of higher physical aggression in this sample (Table 7). When concurrent child externalizing behavior was considered alone (i.e, parental physical aggression regressed onto concurrent Time 3 child externalizing

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[4] The inclusion of antisociality, education, and IQ added little predictive power to the model, accounting for an additional 3% of fathers' physical aggression (up from 6% in the model that included change variables only), and adding no predictive power to mothers' physical aggression model (see Appendices H & I). In addition, whether these stable background characteristics were considered first or last within the model did not alter their predictive importance.

Table 7

Summary of Hierarchical Regression Analysis for Physical Aggression Regressed onto Stable Background Characteristics and Concurrent Predictor Variables

		Fathers			Mothers		
Step	**Variable**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
1	IQ	-.18	.03	n/a	.01	.01	n/a
	Antisociality	-.04			.11		
	Education	.11			-.03		
2	IQ	-.18	.03	.00	-.01	.03	.02
	Antisociality	-.03			.08		
	Education	.11			-.02		
	Concurrent Depression:						
	Current	-.02			.12		
	Worst	.01			-.01		
3	IQ	-.18	.05	.02	-.01	.03	.00
	Antisociality	-.05			.08		
	Education	.11			-.03		
	Concurrent Depression:						
	Current	-.02			.12		
	Worst	.00			-.01		
	Concurrent Alcohol Consumption	.14			.01		
4	IQ	-.14	.10	.05	.01	.13*	.10
	Antisociality	-.07			.08		
	Education	.08			.00		
	Concurrent Depression:						
	Current	-.02			.08		
	Worst	-.07			-.14		
	Concurrent Alcohol Consumption	.12			.04		
	Concurrent Child Externalizing Behavior	.23*			.35***		
5	IQ	-.24*	.21**	.11	.00	.13**	.01
	Antisociality	-.11			.07		
	Education	.08			-.01		
	Concurrent Depression:						
	Current	-.10			.06		
	Worst	-.01			-.13		
	Concurrent Alcohol Consumption	.14			.03		
	Concurrent Child Externalizing Behavior	.05			.32**		
	Concurrent Conflict	.40***			.09		

(Table 7, con't)

6	IQ	-.25*	.21**	.00	-.03	.15*	.02
	Antisociality	-.11			.08		
	Education	.09			-.08		
	Concurrent Depression:						
	Current	-.09			.06		
	Worst	-.01			-.13		
	Concurrent Alcohol Consumption	.15			.04		
	Concurrent Child Externalizing Behavior	.04			.32**		
	Concurrent Conflict	.39***			.13		
	Concurrent SES	-.01			.16		

Trimmed Models

Fathers			**Mothers**		
	β	**R^2**		**β**	**R^2**
Concurrent Conflict	.38***	.15***	Concurrent Child Externalizing Behavior	.33***	.11***
IQ	-.19*				

(* p ≤ .05 ** p ≤ .01 *** p ≤ .001)

behaviors), R^2 remained significant but dropped from .15 to .11 ($p \leq .001$).

This model also significantly predicted paternal physical aggression. Twenty-one percent of fathers' physical aggression was accounted for. Two factors emerged as significant predictors of his physical aggression: lower IQ scores and higher concurrent conflict in the home.[5]

Follow-up regression analyses were conducted to ascertain the importance of these two significant predictors in a trimmed model. When concurrent conflict and IQ were considered together outside of the model, R^2 remained significant but dropped from .21 to .15. Concurrent conflict emerged as the stronger predictor of the two (conflict β = .38; $p \leq .001$), but both remained significant (IQ β = -.19; $p \leq .05$). This finding indicates that in circumstances where the level of family conflict was high, fathers with lower IQs were more likely to be physically aggressive toward their sons.

A partial correlation was run on these two significant predictors to clarify their relation to physical aggression. The correlation between current conflict and physical aggression controlling for IQ was .27 ($p \leq .01$); the correlation between IQ and physical aggression controlling for current level of conflict was -.14 (nonsignficant). Thus, fathers' perceptions of current conflict in the home was the more essential predictor of

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Concurrent risk indicators of child externalizing and family conflict also significantly predicted parental physical aggression when assessed separately (Appendix J). These Time 3 risk indicators also significantly predicted parental physical aggression without consideration of stable background characteristics, and when stable background characteristics were entered last into the regression equation (Appendix L). It did not matter if stable background characteristics were considered first or last within the model; the amount of variance accounted for did not change.

paternal physical aggression.

Predicting Physical Aggression from Partner's Risk Indicators

In an effort to more fully understand the pathways that lead to parental physical aggression, additional regression analyses were conducted. Of particular interest here was the prediction of a parent's degree of physical aggression toward his or her children based on the *partner's* risk factors (Table 8).

Fathers' physical aggression was not predicted by any maternal risk factors but was predicted by higher levels of maternal physical aggression ($R^2 = .12$, $p < .001$). Maternal physical aggression was predicted by fathers' current experience of conflict in the home ($R^2 = .19$, $p < .001$) and fathers' reports of concurrent child externalizing behavior ($R^2 = .06$, $p < .01$). In addition, mothers' higher physical aggression was predicted by higher physical aggression by fathers ($R^2 = .12$, $p < .001$).

Regressing maternal physical aggression onto these three significant paternal variables (Fathers' concurrent conflict, Fathers' concurrent child externalizing behaviors, and Fathers' physical aggression), accounted for 11% of the variance in maternal aggression.

Discussion

Much research on risk for parental physical aggression is based on cross-sectional data. Such studies fail to address whether risk associated with a family history of disruption and change is more likely to predict physical aggression than levels of risk factors impinging upon a parent at a given point in time. The main finding from the current study was that parents' current risk levels were predictive of physical aggression,

Table 8

Predicting Physical Aggression from Partner's Risk Indicators

Predicting Fathers' Physical Aggression from:	R^2	*Predicting Mothers' Physical Aggression from:*	R^2
Mothers' Antisociality, Education, & IQ	.01	Fathers' Antisociality, Education, & IQ	.00
Change in mothers' Depression	.02	Change in fathers' Depression	.00
Change in mothers' Alcohol Consumption	.00	Change in fathers' Alcohol Consumption	.00
Change in mothers' rating of Child Externalizing Behavior	.01	Change in fathers' rating of Child Externalizing Behavior	.00
Change in mothers' reports of Conflict	.00	Change in fathers' reports of Conflict	.01
Change in mothers' SES	.00	Change in fathers' SES	.01
Mothers' Concurrent Depression	.00	Fathers' Concurrent Depression	.03
Mothers' Concurrent Alcohol Consumption	.01	Fathers' Concurrent Alcohol Consumption	.00
Mothers' Concurrent rating of Child Externalizing Behavior	.03	Fathers' Concurrent rating of Child Externalizing Behavior	.06**
Mothers' Concurrent reports of Conflict	.03	Fathers' Concurrent reports of Conflict	.19***
Mothers' Concurrent SES	.00	Fathers' Concurrent SES	.00
Mothers' Physical Aggression	.12***	Fathers' Physical Aggression	.12***

*p ≤ .05 **p ≤ .01 ***p ≤ .001

while amount of change in the parental history or risk was not. In particular, current levels of perceived child difficulty and family conflict predicted parental physical aggression. Moreover, these two risk indicators were elevated consistently across time for high-aggression parents. The results of each hypothesis tested are discussed in the following sections.

Risk Levels & Aggressive Parenting

Hypothesis 1 suggested low- and high-aggression parents would differ in their levels of risk factors. That is, parents who demonstrated higher levels of aggression toward their children would experience greater levels of depression, alcohol consumption, child behavior problems, conflicted family environments, and lower socioeconomic status.

Depression, alcoholism, and lower socioeconomic status did not differ for high versus low aggression parents. However, Hypothesis 1 was supported by the finding that physically aggressive parents were more likely to have children who were high externalizers and to live in home environments that were more conflicted than low-aggression parents.

Hypothesis 2, that risk factor levels experienced by the high-aggression parents would increase in intensity over time relative to low-aggression parents, was not supported. The differences between high- and low-aggression parents that emerged with Hypothesis 1–high-aggression parents experience greater child behavior problems and more conflict at home–were stable across time, suggesting that risk for physical abuse is present early on and is maintained over time. Thus, parents did not appear to move in and

out of risk status so much as remain at a risk level characterized by consistently elevated levels of conflict and child behavior problems.

Change versus Stability in Predicting Parental Aggression

The notion of risk for physical aggression as stable versus fluid was addressed by comparing the predictive importance of *history of changes* in risk indicators to *concurrent levels* of risk indicators. Hypothesis 3, that a parent's history of changes in risk indicators predicted aggression toward children, was not supported, while Hypothesis 4, that the levels of risk factors currently experienced by a parent predicted physical aggression, was supported by the data.

Overall, a family's map of developmental changes in risk factors was not predictive of aggressive parenting, while a "snapshot" of current levels of certain risk components was: the prediction of physical aggression was strongest when risk levels were measured concurrently. In particular, the current amount of conflict within a family and the perception of children's current externalizing behaviors were significant predictors of parental physical aggression. In addition, conflicted families with fathers possessing fewer intellectual resources were at greater risk for physical aggression. Thus, in the case of parental aggression, it appears that the "here and now"of the parenting context is more influential of parents' use of aggression than are historical risk levels.

An important trend should be noted that adds depth to the notion of risk for parental aggression. The risk indicators that predicted parental physical aggression–high current levels of child externalizing behavior and family conflict–were stable and elevated across time. This element of stability is supported by earlier studies that have

also shown that enduring risk indicators place families at greater risk than change, and that prolonged exposure to stress (rather than isolated stressful events) distinguishes between abusive and nonabusive parents (Ammerman, 1991; Spicer & Franklin, 1994). The cumulative impact over time of experiencing "typical" chronic parenting hassles–being nagged or whined to, being interrupted, dealing with difficult behavior, continuously cleaning up after children–and the parental response to them, may eventually have an adverse influence on the quality of parenting (Crnic & Acevedo, 1995).

Researchers have suggested that the nature of daily parenting hassles is mediated by both the family's and the child's developmental stage, such that different factors exert their influence at different periods in the life course (Crnic & Acevedo, 1995). However, during the time frame of the current study, which covered multiple developmental changes (including the child's entry into school and early adolescence), parental aggression was not influenced by different risk factors at different periods: the two risk indicators predictive of parental aggression, perceived child externalizing behavior and family conflict, were consistently influential over time. Although the results of the current study cannot be compared to past parenting practices (i.e., one cannot know if this sample's parental physical aggression emerged over time or existed all along), they provide tentative evidence that cumulative daily hassles associated with parenting may, over time, change the nature of parent-child relationships to become more problematic, conflictual, and aggressive. Almost a decade of parental exposure to perceived child behavior problems and a conflicted family environment appears to be the risk factor that

leads some parents to physically aggress against their sons. These two indicators are examined in greater detail in the following sections.

Perception of Child Difficulty. This study provides strong evidence that the perception of child behavioral problems is indeed a marker of risk for physical aggression. Children who are perceived as "difficult" (e.g., overactive, aggressive, noncompliant) are more likely to engage in conflict-ridden and coercive interactions with their parents, are at higher risk of abuse, and tend to have highly stressed parents (Campbell, 1997; Garbarino & Sherman, 1980; Milner, 1993; Vietze et al., 1980). Parents with externalizing children report more negative impact on their social life, more negative and less positive feelings about parenting, and higher child-related stress; indeed, parents of high-externalizing children report levels of stress as high as those reported by parents of children with autism (Donenberg & Baker, 1993). These parents also typically use aversive, yet ineffective discipline and high rates of aggression in interactions with their children (Patterson, 1982).

Parent-child interactions are often a focal point for the manifestation of the effects of a variety of other proximal and distal sources of parenting stress (Mash & Johnston, 1990; Shaw, Owens, Vondra, Keenan, & Winslow; 1996). Holden and Banez (1996) found that levels of abuse potential did not differ significantly across low, medium, and high levels of child-associated stress *when parent stress was low*. However, at high levels of parent stress, abuse potential was significantly higher and increased substantially as child-associated (i.e., externalizing behaviors) stress increased. Both child behavior and negative parental control contribute unique and independent variance to maternal

ratings of externalizing behavior problems (Campbell, 1997).

In the current study, high-aggression parents reported higher levels of child behavior problems than did low-aggression parents *consistently* across time, suggesting that parents in this group were consistently more stressed by their children's behavior. Low-aggression parents reported fewer troublesome behaviors over time. Campbell's recent (1997) summary of behavior problems in young children aptly provides an explanation for this finding. She observes that when initial symptoms are more severe, mothers are negative and controlling, and family stress is elevated and chronic, child behavior problems are likely to persist. Other children with lower levels of initial problems, living in less stressful family circumstances, will continue on a normal developmental trajectory. Parental perceptions of their child's behavior may or may not reflect the reality of child behavior, but are (regardless of the accuracy of these perceptions) more important in predicting parenting practices than are observers' ratings of child behavior (Mash, Johnston, & Kovitz, 1983). The finding that high-aggression parents view their sons as high externalizers can be interpreted in several ways. While the accuracy of parental perceptions in this sample cannot be addressed within the confines of this study, multiple explanations of the results should be considered.

The high-aggression parents may be biased toward viewing their sons' behavior in a negative light. In particular, mothers prone to physically abuse their children hold inaccurate interpretations and expectations of their children, and these inaccurate interpretations and expectations become more distorted and biased as distress levels increase (Ammerman, 1991; Milner, 1993). Many other studies have found persistently

inaccurate parental perceptions of their children's behaviors, despite participation in a program designed to address such incorrect perceptions (Barber, 1992; Perry, Wells, & Doran, 1983; Whipple & Wilson, 1994).

Parents who view their children as high externalizers may be less able to alter the negative patterns established early on between themselves and their children, while low-aggression parents experience improving perceptions of their children over time. Mash and Johnston (1990) describe some parenting behaviors as "automatic" in the sense that a history of repeated experiences with a particular child (e.g., acting out behaviors) may result in certain parenting responses (e.g., physical aggression), preceded by little parental appraisal of the event. They report that "parents of problem children form a cognitive map for anticipating deviant behavior that functions not only as a guide for parent behavior but also as a filter through which child behavior is interpreted" (p. 316). In fact, the best predictors of stability in early child behavior problems are a family climate of disruption and child-rearing practices (Campbell, Breaux, Ewing, & Szumowski, 1986).

Another interpretation is that certain families genuinely experience difficult child management problems as children progress through developmental stages, and thus resort to physical aggression, while children in other families do not present such challenges (and thus are not victims of parental physical aggression). Donenberg and Baker (1993) speculate that in a reasonably well-adjusted family, there may be a cumulative process, with stress focused in the early years on difficulties posed by the child and progressively generalizing to the family system if the child's problems have not been reduced. With this interpretation, child behavior is an initial stimulus and ongoing "cause" of parental

aggression. However, there is little evidence to support the notion that difficult child behavior in abused children precedes harsh parental treatment (Mash & Johnston, 1990). Thus, when a mother reports that she uses considerable aggression when disciplining her child, she may also exaggerate her child's behavioral problems, justifying her use of aggression. This possibility has been suggested elsewhere (O'Keefe, 1994).

Children's behavioral difficulties may be the cause of parental stress, the consequence of parental stress, or, more likely, a combination of both, in an escalating cycle of child misbehavior and parental reactions (Baker & Heller, 1996). Children with externalizing problems are often reciprocating family aggression and parental punitiveness with high levels of aggression (Dadds, et al., 1992; O'Keefe, 1994; Patterson, 1982). Such child behavioral difficulties are closely related to widespread negative family interaction patterns (Dadds, Sanders, Morrison, & Rebgetz, 1992), and enhance existing levels of conflict in the home environment.

Conflict. Results of the current study strongly support many others (Belsky, Lerner & Spanier, in press; O'Keefe, 1994; Perry, Wells, & Doran, 1983; Straus & Gelles, 1990; Vondra, 1990; Wolfe, 1985) that have found greater parental aggression in highly conflicted homes. Physically aggressive families in this study demonstrated no healthy resolve to family conflict. Consistently high levels of conflict may suggest that changes in the structures of these families' relationships did not occur, and that family members were "stuck" in persistent conflict with each other. Rutter (1994) found that family discord was a substantial risk factor in the absence of family changes (e.g., divorce, separation, loss of parent through death), whereas family changes constituted a

risk only when they reflected discord. When family relationships in general are strained, parents tend to express their negative feelings on one child (Rutter, 1994). Thus, behavior disturbances in children are part of a system that models and reinforces the particular behavioral "symptoms" (Patterson, 1982). More frequent family conflict increases children's negative responding to such conflict (Cummings, 1994).

The importance of family conflict in predicting physical aggression by fathers is affected by his IQ. That is, fathers with general deficits in cognitive functioning may be less able to tolerate family conflict before "losing their cool," as discordant home environments may overtax the coping resources of lower-IQ fathers. Alternatively, the role of paternal IQ here may be representative of characteristics that affect the father-child interaction without being specific to the parenting role (Mash & Johnston, 1990). That is, fathers with fewer intellectual resources may demonstrate less tolerance for conflict in other dimensions of their lives.

As a global indicator of the degree of friction present in the family environment, conflict may include marital troubles, difficulty between parents and children, and contention among siblings, and as such, has been identified as a key factor in understanding the etiology and maintenance of aggressive behavior (Doumas, Margolin, & John, 1994). Indeed, different forms of family violence co-occur and are highly correlated, including verbal, physical, and escalated aggression (McCloskey, Figueredo, & Koss, 1955). Thus, a home environment that is characterized by conflict is a particularly strong marker for high levels of aggression–suggesting not only parent-to-child aggression, but parent-to-parent, child-to-parent, and sibling aggression as well

(Jouriles, Barling, & O'Leary, 1987).

The effects of exposure to various forms of family conflict are profound on children by elevating children's stress, fear, and feelings of helplessness, often resulting in behavioral and emotional disturbances (Abidin, Jenkins, & McGaughey, 1992; O'Keefe, 1994). Children are sensitive to conflict and discord in the family even when it is nonviolent, and children's perceptions of level of conflict in the home are more predictive of children's psychological adjustment than are parents' reports of conflict (McCloskey, Figueredo, & Koss, 1995). Certainly this area deserves continued study.

Stability in Risk Indicators

The results of the current study indicate that chronicity of risk is associated with physical aggression by parents. Risk fluidity mattered little in predicting parental aggression. Does this mean that one can predict parental physical aggression by identifying a young child as problematic or a family conflicted at one point in time? Not necessarily. Roughly half of the children identified with problems at preschool age will continue on a path toward externalizing problems, but the other half will improve with development (Campbell, 1997). Similarly, many families typically experience periods of conflicted interactions based on transitions and change (Emery, 1992), but are able to function without resorting to physical aggression. Such conflict and externalizing behaviors may be age-appropriate and short-lived manifestations of stress. According to the data presented here, these temporary periods of increased family stress are not likely to predict physically aggressive parenting.

The factors that account for such different pathways to aggression or

nonaggression may be parenting and the family environment. Some parents may skillfully help some hard-to-manage children, while others may exacerbate conflict and fuel noncompliance. For example, fathers with fewer intellectual resources may exacerbate conflict instead of helping to resolve it productively. Variations in parental warmth, support, and appropriate control may also be major factors in determining the outcomes of early externalizing behavior (see Campbell, 1997). In addition, aspects of the family environment, such as marital distress and other challenges, may impact outcome. These environmental factors may directly affect the child, because they create a climate of tension and conflict in the home. They may also have indirect effects on the child due to their disruptive effect on parenting (Campbell, 1997).

The impact of the chronicity of risk factors may be further intensified by the interconnected nature of such components within the family system. That is, conflict within the family, child externalizing problems, and parental aggression can all be considered both a cause and a product within the larger family system. Many studies have highlighted the systemic nature of family conflict and aggression, in that the behavior of all participants effects the balance in multiple levels of the family ecosystem (Emery, 1992).[6] As parents and children are two separate but connected elements of the

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Although reciprocal influences in the parent-child interaction are acknowledged, there are presumed to be asymmetries in the amount of influence that child, parent, or environmental characteristics can exert (Mash & Johnston, 1990): other longitudinal studies have determined that family discord *preceded* children's externalizing behaviors, and that reductions in family discord are associated with reductions in children's acting-out behaviors (Rutter, 1994). Increased conflict in the home results in the perception of increased child difficulties, as mothers and fathers from conflicted homes display a general tendency to rate their children more negatively than parents from low-conflict

larger family system, so too are individual parents independent contributors to the family environment.

Differences between Fathers and Mothers

One unanticipated but significant finding of the current study was gender differences in the role of risk indicators and physical aggression. Other studies have also discovered differences between parents' views of their children and the parenting role. Baker and Heller (1996) found that mothers and fathers did not differ in actual perceived level of child behavior problems, although both *believed* that mothers saw more problems. Moreover, mothers experienced increased stress and a need for help with both moderate and high child externalizing behaviors, whereas fathers were not elevated on these measures unless the child's externalizing behaviors were very high. This difference between mothers' and fathers' perceptions of child difficulty may be explained in part by the fact that fathers have been found to spend more time with their male children, and act toward children in more gender stereotyped ways than do mothers, and thus might be more accepting of externalizing behaviors (Baker & Heller, 1996). [7]

The current study builds upon these findings by indicating the role of child externalizing behavior in fathers' parenting stress in two dimensions: [1] levels of child externalizing behavior are indeed important in predicting fathers' physical aggression, but

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homes (Smith, Berthelsen, & O'Connor, 1997).

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Perry and colleagues (1983) also found that fathers from abusive households differed from their non-abusive controls in their perceptions of greater family conflict and inaccuracy in their expectations for their children, while maternal abusiveness was related to her lower-self esteem and greater anxiety.

that [2] particularly high levels of child externalizing behavior may be subsumed into fathers' rating of the broader family context. Thus, fathers are affected by sons' externalizing behaviors, especially if they are particularly high. If behavior problems are sufficiently high, fathers experience greater stress levels and include such problematic behavior in a global rating of family system negativity and coercion.

A different picture emerges for mothers: while fathers' aggression was mainly predicted by overall conflict in the home, mothers' physical aggression was dependent on her ratings of child difficulty. This finding is not surprising given mothers' greater sensitivity to sons' externalizing behaviors. It could be that the level of externalizing behaviors reported in this study are sufficient to increase the likelihood of maternal aggression, while insufficient to serve as the primary cause of paternal aggression.

The importance of mothers' perceptions of child difficulty has been established in the literature. Abidin, Jenkins, and McGaughey (1992) report that mothers are more likely than fathers to rate sons higher on behaviors associated with conduct disorder. In turn, other studies (Dadds, et al., 1992) have found that mothers–but not fathers–of high externalizers display more aversive behavior to their children than non-behaviorally troubled children, and that mothers of high externalizers experience higher levels of stress and feelings of depression than do fathers (Baker & Heller, 1996). This differential response to children is especially important given that mothers' characteristics, rather than fathers', are more closely associated with boys' future problem behaviors (Abidin, Jenkins, & McGaughey, 1992).

Another interesting finding is that mothers' physical aggression is predicted from

fathers' risk factors, while paternal physical aggression is not predicted from mothers' risk factors. Several explanations regarding gender and social role differences may account for this finding. Firstly, it may indicate that fathers in this sample are unaffected by or insensitive to the level of stress experienced by their female partners. Mothers may be more "tuned in" to and affected by the risk indicators in her husband's life, indicating a spillover effect whereby paternal factors affect maternal parenting styles. This may be especially notable in families where mothers hold greater responsibility for discipline, so that high levels of paternal and maternal stress are channeled through her to the child. Because women carry the major burden of child care, and are socially expected to do so, mothers as a group may be more psychologically involved in the role of parent (Crnic & Acevedo, 1995).

Other studies (Baker & Heller, 1996) have found that although mothers and fathers both acknowledged their children's behavioral difficulties, fathers were much less likely to assume personal responsibility for those problems. Thus, greater maternal reactivity to child externalizing behavior may be due to "traditional" social forces influencing parental roles.

Relatedly, there may exist a discrepancy in power between men and women in this sample, where mother "follows the lead" set by father and acts aggressively against her child based on fathers' perception of their circumstances, rather than her own. Mothers in high-conflict homes have reported that they were undermined in their parenting by their partner, and that they would change their parenting practices according to the presence or absence of their partner (Smith, Berthelsen, & O'Connor, 1997). Thus mothers may be

physically aggressive based on *fathers'* view of the need for such discipline. Alternatively, mothers may try to protect their children from being the target of their partner's temper or violence by excessively controlling or suppressing those aspects of their child which might irritate or provoke their partner (e.g., externalizing behaviors). The fact that maternal physical aggression is better predicted by fathers' risk indicators than her own indicates that the relationship between mothers and parental physical aggression may be mediated by fathers' stress levels.

In general, mothers' behaviors may indicate a better and more sensitive marker for family problems than fathers' behaviors. Fathers' reports of conflict in the home, as well as his perceptions of difficulty with children's behavior, should be examined not only in their own right, but also for the impact that such factors may have on mothers' parenting. Regardless of which parent may be targeted for intervention due to concern of physical maltreatment, his or her partner's individual risk indicators should be addressed and included both in research and in treatment.

Summary

Based on the findings presented above, it is affirmed that parental physical aggression is an outcome associated with the parent's attempt to cope with multiple aversive factors in his or her family environment (i.e., high levels of family conflict and child externalizing behaviors) that are constant across developmental periods. Thus, results from this study in general support the notion that consistent, daily life stressors have a greater impact on parenting behaviors than do major life events.

Moreover, it is especially important to note that variables specifically related to

the parenting and family roles, rather than individual or community level factors, are the greater predictors of parental physical aggression. Although it is unclear to what extent child characteristics contribute to the etiology of parental physical aggression, the results of this study add to the growing body of data that implicates certain child behaviors in the escalation of parent-child conflict. In addition, these results also focus our attention on family-level interchanges, rather than individual parent characteristics, as factors influencing parental aggression. This may aid in removing stigmas and negative assumptions that are associated with certain individual parental risk factors, such as substance use and depression.

The findings of the current study reveal that aggressive parents feel that child noncompliance and family conflict are stable features of their family context. In sum, high aggression families consistently experience more opportunities to discipline their children, are more likely to respond with punitive techniques, and are characterized by mutually aversive interchanges among family members.

Implications

Examination of the relationships among parental risk indicators across time and between parental risk factors and physical aggression offers valuable evidence about risk markers for physically aggressive parenting. The results of this examination also indicate the need to address [1] the effects of aggressive parenting on children, [2] critical points of intervention, and [3] future directions for parenting research.

Risk Markers for Parental Aggression

Current knowledge of what constitutes "risk" for parental physical aggression is updated with the findings presented in this study. Despite the many variables that have been associated with child maltreatment, including parental psychopathology, socioeconomic status, and substance abuse, only conflict within the family and child externalizing behaviors were implicated in predicting parental physical aggression. While these risk indicators have been previously considered in relation to child maltreatment, a study that examines family conflict and child externalizing behavior over long periods of time has not existed in the literature. In addition, the predictive power of perceived conflict and child problem behavior, relative to other known risk indicators, has not been previously explored.

Cross-sectional studies that have examined risk indicators for aggressive parenting may present a misinformed view of what is relevant. For example, maltreatment studies that point to parental depression or substance use as causal agents may in fact be missing the larger picture of what predicts parental physical aggression. It seems that factors closest to the parenting context (i.e., conflict at home and child behavior), not to the individual parent (i.e., depression, alcohol consumption) per se, nor to broader community elements (i.e., socioeconomic status), are most relevant when considering physical aggression from parent to child.

Effects of Parental Aggression on Children

Aggressive parents may be teaching their children that aggressive behavior is appropriate. Parental aggressiveness has been associated with a range of negative

developmental outcomes including delayed impulse control and lowered social competence, impaired psychological adjustment, aggression, delinquency, and physical child abuse, reduced responsiveness to the pain of others, and aggression in offspring several generations removed (Campbell, 1997; Doumas, Margolin, & John, 1994; Holden, Coleman, & Schmidt, 1995; McCord, 1988).

McCord (1988) found that children reared by aggressive parents were more expressive in general, including being frequently annoyed and showing warmth toward intimate partners, suggesting an absence of inhibition in children raised in aggressive homes. As adults, these children were more likely to feel that expressive (including injurious) behavior is normal and often justified. Aggression and externalizing behaviors are especially stable in males (Crockenberg & Lourie, 1996; Doumas, Margolin, & John, 1994).

Studies suggest that there is both a direct effect of harsh discipline on aggression in the home and an indirect effect on aggression with peers through a hostile attributional bias: parents' power assertion is a strong predictor of children's power assertion with peers and peer rejection (Campbell, 1997; Patterson, Dishion, & Bank, 1984; Rutter, 1994; Strassberg, Dodge, Bates, & Pettit, 1992). Mothers' and fathers' use of coercion with their children correlated both concurrently at age 2 and longitudinally with children's self-reported conflict strategies with peers and parent-rated adjustment and social competence at age 6 (Crockenberg & Lourie, 1996). Specifically, parents' use of aggression is related to more negative behavior with and social rejection by peers, indicating the long-term deleterious effects of aggressive parenting on both peer relations

and adult criminality (Strassberg, et al., 1992).

Family conflict itself is a strong predictor of child externalizing problems. Living in a home characterized by high levels of conflict is stressful for children and increases their aggression: between 9 and 25% of the variance in children's externalizing disorders is typically accounted for by conflict within the home (see Cummings, 1994). Children report feelings of anger, sadness, or fear in response to family "background anger," and in some contexts also report feelings of guilt, shame, and worry (Cummings, 1994).

Similar to child externalizing behaviors, a conflicted home environment has negative effects on child-parent and peer relationships (Cummings, 1994). Cummings' (1994) review of the literature reveals that general levels of conflict are better predictors of disturbances in the mother-child relationship than certain maternal characteristics (e.g., depression). Moreover, there is evidence that sensitization to destructive conflict occurs, resulting in the child's greater reactivity over time. The evidence of children's increased vulnerability to family conflict as children get older draws attention to the need for early intervention.

Physical punishment from parents–most notably in the form of spanking–has been and continues to be widely practiced among parents (Holden, Coleman, & Schmidt, 1995). Yet spanking, especially frequent spanking, is a humiliating technique that may diminish problem-solving capacities among children (Hyman, 1995). Society *can* function without resorting to the use of corporal punishment on their children. Currently, Sweden, Finland, Denmark, Poland, Norway, and Austria ban the use of corporal punishment on children. Government sanctions against corporal punishment in the home

have not led to governmental micromanagement of home discipline or arrests for spanking, as opponents allege would happen in America (Hyman, 1995). Hyman (1995) points out that these sanctions do set the moral tone for a country and result in far fewer spankings and perhaps lower levels of child abuse.

Intervention. Efforts to reduce parental reliance of physical aggression are crucial, given its association to multiple negative outcomes in children. Parent-training programs show evidence of improvement on measures of family well-being following intervention (Donenberg & Baker, 1993). An important caveat is the need to focus on more effective, rather than simply more, parental discipline. Studies consistently show that parents of high externalizers tend to be more punitive than are parents of low-externalizers, and utilizing more extreme punishment, such that many researchers feel that such excessive punishment *causes* the externalizing behavior in children (see Patterson, Dishion, & Bank, 1984). In cases of high externalizers, the reaction to aggressive punishment is very likely to be that of accelerating his/her ongoing coercive behavior. Parent use of "time-out" or withdrawal of privileges has been shown both to suppress the ongoing aggression and also weaken the stimulus-response; parents trained in the use of these family management skills have produced significant reductions in observed externalizing behaviors, and the effects have been shown to persist for at least 12 months (Patterson, Dishion, & Bank, 1984).

In cases where reports of conflict and child behavior problems come to attention, interveners should not assume that the difficulties experienced by these families are transitional. Attention should be focused on early identification of and intervention for

children with high levels of externalizing behaviors, preferably before elementary school begins and these behaviors become more ingrained in the child's repertoire. In addition, when planning family-based early intervention programs, it is important to understand how mothers and fathers may see and react to their children's behavior differently. Early intervention is critical in that sequelae of adverse experiences in early childhood may be less than those associated with the same experiences in middle childhood (Rutter, 1994).

In addition, parent-training programs could be broadened to include a greater emphasis on parents' stress and coping. Lowering family stress may enhance and maintain changes in child behavior following interventions, as high parental stress can interfere with carrying out a behavior management program (Donenberg & Baker, 1993). Program components should focus on long-term support for child- and family-related stress.

Future Directions

This study leaves room for future examination of the role of parental competence in predicting aggression toward children. Competence has been shown to be a powerful moderator between child-related stressors and child abuse potential, and its relationships to parental depression and alcohol consumption, as well as child behavior and family conflict, deserves attention. Other variables that play a role in the etiology of parental aggression, such as parental and child personal resources and the parent-child relationship, must be included in future research in order to begin to understand the etiology and maintenance of aggressive behavior in the family system.

Another important area for continued study is the role of cognitive appraisal in

parents' perceptions of child behavior. Researchers believe that parents prone to physical abuse suffer from a lack of information integration, such that they maintain explanations of their child's behavior that are consistent with their own rigidly held cognitive distortions and biases, which are associated with the use of power-assertive behaviors. These physically aggressive parents engage in more automatic processing of child-related data in ambiguous and stressful situations (Ammerman, 1991; Milner, 1993).

In addition, the study of risk factors with the inclusion of sibling measures may reveal essential nuances in the role of parental physical aggression. Rutter (1994) notes that, for most outcomes, family influences that impinge differentially on children within the same family tend to make a greater impact than family influences that impinge on the family as a whole to a roughly equal degree. It would be helpful to determine the extent to which each child in the family is subject to parental physical aggression.

Strengths & Limitations

There are several points that must be considered when placing the results of this study in a larger research context. Strengths of the research design are presented in the following paragraphs.

First, parental aggression is examined in a sample of initially intact community families who have not been identified by treatment or clinical status. The participants in this study were not originally selected on the basis of parenting practices. This unselected sample provides an opportunity to investigate these relations as they occur in a sample more representative of the general population than is afforded by the use of samples selected based on child protective services or child abuse prevention programs. This

community sample allows for a more realistic assessment of parenting practices and the occurrence of parental physical aggression, and greater generalizability of the findings. However, the trade off for such increased generalizability is the low base rate of parental physical aggression among parents, which makes the discovery of theoretical connections more difficult.

Second, information on aggression is gathered from both husband and wife whenever possible to broaden the perspective and increase the reliability of data. Previous studies of parenting practices have often neglected to assess the role of the father in families. Here, the parents are considered as individuals, rather than as a couple, so that there is no mix of perpetrator/nonperpetrator risk indicators. The results of this study emphasize that a lack of information about fathers' risk indicators may leave out critical details of both his parenting practices as well as what is affecting mothers' parenting.

Third, an expanded definition of parental aggression, rather than physical abuse, is used, which includes spanking. It is the author's view that attention to these "less severe" forms of physical aggression from parents to children offers a greater band of knowledge about negative parenting practices that are more common than physical abuse. Recent research that examines spanking has focused public attention on the long-term negative consequences associated with this common parenting discipline practice, including low self esteem, greater disobedience, and antisocial behavior ("Spanking," 1997).

Fourth, data are analyzed separately for mothers and fathers to determine the differential effects of aggression by gender. Such a strategy revealed important

differences in the roles that fathers' versus mothers' risk factors and aggression play in parenting.

Several limitations of the reported study are related to restrictions based on the sample and/or the dataset. First, the distribution of physical aggression scores were highly J-shaped. Such a distribution required the use of percentile ranking before conducting regression analyses to reduce potential bias produced by several outlying cases. In this case, the strategy is more conservative and less likely to result in Type I errors. However, the impact of such outliers may be valuable information lost, and further research is suggested to test the significance of such a skewed distribution. In increasing the understanding of dimensions of family stress, it is imperative to consider the nature of the samples on which studies are based, and the degree to which findings are sensitive to these samples. The following limitations are based on this consideration.

A second limitation is that several of the highest risk families that are part of the larger (MSU-UM Family) Study were not included in this sample due to the selection process. That is, these families completed a shortened version of the Conflict Tactics Scale, the measure used to create the outcome variable of physical aggression, and information provided by them could not be used. The benefits and costs of the exclusion of such cases are that the distribution of physical aggression may more realistically resemble the population making the results generalizable, but that key relationships between indicators of higher-risk families and physical aggression may remain undiscovered.

Third, the parenting practices used to create the outcome measure of physical

aggression were self-reported, and may not realistically represent the amount of physical aggression occurring within homes. It has been posited that people have either a negative or positive reporting bias that is used for both reports of the self and of others, thereby increasing the association between parent and child variables (Doumas, Margolin, & John, 1994). However, self-report data about parenting practices can provide information about the history of relationships beyond that provided by observations of interactions (Strassberg, Dodge, Bates, & Pettit, 1992). Moreover, studies have shown that self-reports of parental aggression and physical punishment are coded reliably and have high internal consistency (Holden, Coleman, & Schmidt, 1995).

Fourth, due to the nature of the sample for the larger (MSU-UM Family) Study, physical aggression could be examined at Wave 3 only. There is evidence that rates of parental physical aggression peak with children who are from three to five years old and then decreases (Ammerman, 1991; Holden, Coleman, & Schmidt, 1995). Therefore, the design of this study may have "missed" families who were highly aggressive in early years of parenting. However, predicting physical aggression when children are older, as was done here, may indicate cases with more serious parental aggression whose past physical aggression remains unknown. In addition, research has shown that abusive dimensions in parent-child relationships can begin at any time (Milner, 1993); thus, longitudinal examination of levels of parental physical aggression, and how such levels related to risk levels over time, should reveal fruitful detail regarding the nature of parental aggression.

Relatedly, younger children tend to score significantly higher on externalizing

behavior scales than older children (O'Keefe, 1994), and there is evidence that parents judge aggressive acts performed by 12-year-olds far more severely than they judge aggressive acts performed by 5-year-olds (Wenger, Berg-Cross, L., & Berg-Cross, G., 1980). Thus parental perception of child aggressiveness may be a key determinant of their choice of "appropriate" punishment, and the age of the child may be the most important factor in determining their response to child aggression. In this broader view, it may be that parents increase their socialization efforts over time, in which case the advanced age of the children examined here is apropos for understanding aggression within families.

Fifth, due to the nature of the sample for the larger (MSU-UM Family) Study, this sample includes only male children. The path of parental physical aggression for boys and for girls may be different, leaving room for future studies to examine the models tested here with female children. Many studies have pointed to boys' and girls' different developmental trajectories for aggression and externalizing behaviors. Specifically, mothers become more negative about aggression in girls and less negative about it in boys between the ages of 4 and 6, and children understand that aggression by girls is more likely to be punished than aggression by boys (Crockenberg & Lourie, 1996; Doumas, Margolin, & John, 1994).

Yet the association between exposure to familial aggression and poor child adjustment is exhibited more in boys than girls (Abidin, Jenkins, & McGaughey, 1992; Doumas, Margolin, & John, 1994). Hetherington and colleagues (1982) and Abidin et al. (1992) offer considerable evidence that boys are much more susceptible than girls to

negative outcomes in response to stressful events in the family; these authors suggest that parents are less restrained in the presence of their sons, tending to quarrel and fight more often in their presence than in daughters' presence. Jouriles and LeCompte (1991) also found that marital aggression covaries with higher levels of both mothers' and fathers' aggression toward boys but not toward girls, consistent with the hypothesis that female victims of marital aggression displace some of the anger they feel toward their husbands onto their male children.

However, past literature (Holden, Coleman, & Schmidt, 1995; Wenger, Berg-Cross, L., & Berg-Cross, G., 1980) also indicates that parents do not respond differently to male and female children's aggression, and that there are no significant differences in responses of different sex parents to children's aggression. In addition, O'Keefe (1994) found no gender differences in children's externalizing behaviors based on severity of mother-child aggression. Future research is needed to clarify such discrepant findings.

APPENDICES

Appendix A

Table 9
Variable Means, Standard Deviations, & Range of Predictor Variables
(Total Sample, N=218)

Variable	Mean ($\bar{x}$)	Standard Deviation (σ)	Minimum	Maximum
ASB	13.31	9.28	1	56
BECK1	2.48	2.91	00	14
BECK2	3.06	3.39	00	19
BECK3	3.11	3.51	00	20
CHEXT1	11.82	6.23	00	28
CHEXT2	11.14	6.35	00	30
CHEXT3	10.25	7.27	00	38
CNFLCT1	3.51	2.14	00	9
CNFLCT2	3.50	2.04	00	9
CNFLCT3	3.64	2.20	00	9
EDUC	13.42	1.89	9	20
SES1	317.75	103.78	171	640
SES2	343.93	130.62	162.5	770
SES3	339.46	127.29	177	866
HAM1	17.56	7.80	6.73	48
HAM2	16.42	7.39	8	38
HAM3	15.44	8.01	00	47
QFVR1	1484	3998.83	1	21000
QFVR2	1013.65	3127.02	1	21000
QFVR3	333.93	1528.33	1	18900
IQ	99.47	13.90	62	146
PHYSAGG	5.02	17.87	0	208

Appendix B

Table 10
Means, Standard Deviations & Range of Mothers' Predictor Variables
(N=115)

Variable	Mean ($\bar{x}$)	Standard Deviation (σ)	Minimum	Maximum
ASB	10.27	6.79	1	35
BECK1	2.78	3.29	00	14
BECK2	3.40	3.58	00	19
BECK3	3.39	3.86	00	20
CHEXT1	12.33	6.20	00	28
CHEXT2	12.01	6.47	00	30
CHEXT3	11.01	7.45	00	38
CNFLCT1	3.81	1.94	00	8
CNFLCT2	3.72	1.94	00	9
CNFLCT3	3.85	2.12	00	9
EDUC	13.17	1.82	9	19
SES1	317.13	103.11	171	640
SES2	344.30	133.37	162.5	770
SES3	339.10	127.29	177	866
HAM1	19.03	8.34	8	48
HAM2	17.65	7.68	8	38
HAM3	16.76	8.69	00	47
QFVR1	580.08	2067.73	1	15750
QFVR2	785.98	3150.5	1	21000
QFVR3	300.24	1837.25	1	18900
IQ	95.96	13.32	62	135
Δ BECK	4.27	3.82	00	19
Δ HAM	12.85	8.85	00	39
Δ QFVR	1461.42	4890.80	0	31475.0

(Table 10, con't)

Variable	Mean ($\bar{x}$)	Standard Deviation (σ)	Minimum	Maximum
Δ CH EXT	8.65	5.15	00	22.06
Δ CONFLC	2.34	1.69	00	8
Δ SES	116.53	126.54	00	798
PHYSAGG	7.29	24.19	0	208

Appendix C

Table 11
Means, Standard Deviations & Range of Fathers' Predictor Variables
(N=103)

Variable	Mean ($\bar{x}$)	Standard Deviation (σ)	Minimum	Maximum
ASB	16.16	10.36	2	56
BECK1	2.11	2.34	00	11
BECK2	2.61	3.16	00	13
BECK3	2.63	2.86	00	13
CHEXT1	10.98	6.03	1	27
CHEXT2	10.09	6.08	00	30
CHEXT3	9.33	7.05	00	37
CNFLCT1	3.15	2.30	00	9
CNFLCT2	3.25	2.13	00	8
CNFLCT3	3.42	2.28	00	9
EDUC	13.80	1.92	11	20
SES1	322.44	105.62	171	640
SES2	347.30	129.86	162.5	770
SES3	343.65	129.55	177	866
HAM1	15.43	6.35	6.73	41
HAM2	14.73	6.66	8	38
HAM3	13.80	6.77	8	36
QFVR1	2540.84	5331.35	1	21000
QFVR2	1271.42	3160.25	1	21000
QFVR3	365.83	1102.03	1	9220.1
IQ	103.45	13.73	76	146
Δ BECK	3.34	3.65	00	23
Δ HAM	11.10	8.31	1	41
Δ QFVR	3068.80	5694.99	00	24370

(Table 11, con't)

Variable	Mean ($\bar{x}$)	Standard Deviation (σ)	Minimum	Maximum
Δ CH EXT	7.83	5.71	00	30
Δ CONFLC	2.48	2.01	00	11
Δ SES	109.17	103.80	00	496
PHYSAGG	2.39	3.46	0	18

Appendix D

Table 12

Correlations among Fathers' Change Variables, Background Characteristics & Physical Aggression

	Phys. Aggr	Δ Depression	Δ Worst-ever Depression	Δ Alcohol Consumption	Δ Child Externalizing	Δ Conflict	Δ SES	ASB	Educ	IQ
Phys Aggr	1.00									
Δ Current Dep.	.038	1.00								
Δ Worst ever Dep	-.189	.038	1.00							
Δ Alc Conspn	.093	.093	.095	1.00						
Δ Child Extnl	.103	.126	.187	.042	1.00					
Δ Conflict	.021	.126	.236*	.100	.155	1.00				
Δ SES	.027	.008	.004	-.093	.080	-.102	1.00			
ASB	-.071	.156	.156	.275**	.054	.097	-.120	1.00		
Educ	.051	.067	-.109	-.122	-.028	-.107	.208*	-.323***	1.00	
IQ	-.127	.059	-.094	-.194*	.026	-.168	.029	-.032	.433***	1.00

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix E

Table 13

Correlations among Mothers' Change Variables, Background Characteristics & Physical Aggression

	Phys Aggr	Δ Current Depr	Δ Worst-ever Depr	Δ Alc Conspn	Δ Child Extnl	Δ Conflict	Δ SES	ASB	Educ	IQ
Phys Aggr	1.00									
Δ Current Dep.	.064	1.00								
Δ Worst ever Dep	.144	.203*	1.00							
Δ Alc Conspn	.135	.133	.097	1.00						
Δ Child Extnl	.064	.048	.069	.042	1.00					
Δ Conflict	-.014	-.052	-.090	-.191 *	.072	1.00				
Δ SES	-.036	.024	.087	-.097	.190*	-.017	1.00			
ASB	-.062	.161	.229*	.256**	.093	.037	-.059	1.00		
Educ	-.062	-.050	-.168	-.090	-.089	.099	.190 *	-.300***	1.00	
IQ	-.062	.040	-.052	-.083	-.017	.104	.200 *	-.186*	.562***	1.00

* $p < .05$ ** $p < .01$ *** $p < .001$

Appendix F

Table 14

Summary of Hierarchical Regression Analysis for Physical Aggression Regressed onto Stable Background Characteristics and Predictor Variables

		Fathers			Mothers		
Step	**Variable**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
1	IQ	-.18	.03	n/a	.01	.01	n/a
	Antisociality	-.04			.11		
	Education	.11			-.03		
2	IQ	-.19	.07	.04	.00	.03	.02
	Antisociality	.00			.08		
	Education	.11			-.01		
	Change in Depression:						
	Current	-.03			.03		
	Worst	-.19			.12		
3	IQ	-.20	.07	.00	.00	.04	.01
	Antisociality	-.01			.06		
	Education	.11			-.01		
	Change in Depression:						
	Current	-.05			.02		
	Worst	-.22*			.12		
	Change in Alcohol Consumption	.01			..11		
4	IQ	-.20	.09	.02	.00	.04	.00
	Antisociality	-.01			.05		
	Education	.12			-.01		
	Change in Depression:						
	Current	-.05			.02		
	Worst	-.22*			.11		
	Change in Alcohol Consumption	.01			.11		
	Change in Child Externalizing	.16			.05		
5	IQ	-.19	.09	.00	.00	.04	.00
	Antisociality	-.01			.05		
	Education	.12			-.01		
	Change in Depression:						
	Current	-.05			.02		
	Worst	-.23*			.12		
	Change in Alcohol Consumption	.01			.11		
	Change in Child Externalizing	.15			.04		
	Change in Conflict	.04			.01		

(Table 14, con't)

Step	Variable	β	R^2	ΔR^2	β	R^2	ΔR^2
6	IQ	-.19	.09	.00	.00	.04	.00
	Antisociality	-.01			.05		
	Education	.12			-.01		
	Change in Depression:						
	Current	-.05			.02		
	Worst	-.23*			.11		
	Change in Alcohol Consumption	.01			.11		
	Change in Child Externalizing	.15			.04		
	Change in Conflict	.04			.02		
	Change in SES	.00			.04		

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Appendix G

Table 15

Summary of Regression Analyses for Physical Aggression Regressed onto Change Variables Separately

Model/Variable(s)	Fathers		Mothers	
	β	R^2	β	R^2
Change in Depression:		.04		.02
Current	- .03		.04	
Worst	- .19		14	
Change in Alcohol Consumption	.02	.00	.13	.02
Change in Child Externalizing Behaviors	.10	.01	.06	.00
Change in Conflict in Family Environment	.02	.00	- .01	.00
Change in SES	.03	.00	- .04	.00

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Appendix H

Table 16
Summary of Hierarchical Regression Analysis for Physical Aggression Regressed onto Predictor Variables

		Fathers			Mothers		
Step	**Variable**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
1	Change in Depression:			n/a			n/a
	Current	- .03	.04		.04	.02	
	Worst	- .19			.14		
2	Change in Depression:						
	Current	- .03	.04	.00	.02	.04	.02
	Worst	- .19			.13		
	Change in Alcohol Consumption	.04			.12		
3	Change in Depression:						
	Current	- .05	.06	.02	.02	.04	.00
	Worst	- .29*			.13		
	Change in Alcohol Consumption	.04			.12		
	Change in Child Externalizing	.15			.05		
4	Change in Depression:						
	Current	- .06	.06	.00	.02	.04	.00
	Worst	- .23*			.13		
	Change in Alcohol Consumption	.03			.12		
	Change in Child Externalizing	.14			.05		
	Change in Conflict	.06			.02		
5	Change in Depression:						
	Current	- .06	.06	.00	.02	.04	.00
	Worst	- .23*			.12		
	Change in Alcohol Consumption	.04			.12		
	Change in Child Externalizing	.14			.04		
	Change in Conflict	.06			.02		
	Change in SES	.03			.03		

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Appendix I

Table 17

Summary of Hierarchical Regression Analysis for Physical Aggression Regressed onto Predictor Variables and Stable Background Characteristics

		Fathers			Mothers		
Step	**Variable**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
1	Change in Depression:		.04	n/a		.02	n/a
	Current	-.03			.04		
	Worst	- .19			.14		
2	Change in Depression:		.04	.00		.04	.02
	Current	- .04			.02		
	Worst	- .19			.13		
	Change in Alcohol Consumption	.04			.12		
3	Change in Depression:		.06	.02		.04	.00
	Current	-.05			.02		
	Worst	- .22*			.13		
	Change in Alcohol Consumption	.04			.12		
	Change in Child Externalizing Behaviors	.15			.05		
4	Change in Depression:		.06	.00		.04	.00
	Current	- .06			.02		
	Worst	- .23*			.13		
	Change in Alcohol Consumption	.03			.12		
	Change in Child Externalizing Behaviors	.14			.05		
	Change in Conflict	.06			.02		
5	Change in Depression:		.06	.00		.04	.00
	Current	- .06			.02		
	Worst	- .23*			.12		
	Change in Alcohol Consumption	.04			.12		
	Change in Child Externalizing Behaviors	.14			.04		
	Change in Conflict	.06			.02		
	Change in SES	.03			.03		
6	Change in Depression:		.09	.03		.04	.00
	Current	- .06			.02		
	Worst	- .23*			.11		
	Change in Alcohol Consumption	.01			.11		
	Change in Child Externalizing Behaviors	.15			.04		
	Change in Conflict	.04			.02		
	Change in SES	.00			.04		
	IQ	- .19			.00		
	Antisociality	-.01			.05		
	Education	.12			- .01		

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Appendix J

Table 18

Summary of Regression Analyses for Physical Aggression Regressed onto Concurrent Variables Separately

	Fathers		Mothers	
Model/Variable(s)	β	R^2	β	R^2
Concurrent Depression:		.00		.02
Current	- .02		.12	
Worst	- .01		.03	
Concurrent Alcohol Consumption	.13	.02	.05	.00
Concurrent Child Externalizing Behaviors	.23*	.05*	.33***	.11***
Concurrent Conflict in Family Environment	.34***	.12***	.22*	.05*
Concurrent SES	.01	.00	.01	.00

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Appendix K

Table 19

Summary of Hierarchical Regression Analysis for Physical Aggression Regressed onto Concurrent Predictor Variables

		Fathers			Mothers		
Step	**Variable**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
1	Concurrent Depression:						
	Current	-.02	.00	n/a	.12	.02	n/a
	Worst	-.01			.03		
2	Concurrent Depression:						
	Current	-.02	.02	.02	.12	.02	.00
	Worst	-.02			.02		
	Concurrent Alcohol Consumption	.14			.01		
3	Concurrent Depression:						
	Current	-.02	.07	.05	.09	.12**	.10
	Worst	-.09			-.11		
	Concurrent Alcohol Consumption	.11			.04		
	Concurrent Child Externalizing Behavior	.25*			.35***		
4	Concurrent Depression:						
	Current	-.07	.15**	.08	.06	.13**	.01
	Worst	-.06			-.10		
	Concurrent Alcohol Consumption	.13			.04		
	Concurrent Child Externalizing Behavior	.11			.32**		
	Concurrent Conflict	.31*			.10		
5	Concurrent Depression:						
	Current	-.07	.15**	.00	.06	.14**	.01
	Worst	-.05			-.09		
	Concurrent Alcohol Consumption	.13			.04		
	Concurrent Child Externalizing Behavior	.11			.33**		
	Concurrent Conflict	.31**			.11		
	Concurrent SES	.01			.08		

Trimmed Models

Fathers				Mothers		
	β	**R^2**	**Step**		**β**	**R^2**
Concurrent Conflict	.34***	.12***	1	Concurrent Conflict	.11	.12***
				Concurrent Child Externalizing Behavior	.29**	
			2	Concurrent Child Externalizing Behavior	.33***	.11***

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Appendix L

Table 20 **Summary of Hierarchical Regression Analysis (Series H) for Physical Aggression Regressed onto Concurrent Predictor Variables and Stable Background Characteristics** * $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

		Fathers			Mothers		
Step	**Variable**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
1	Concurrent Depression:		.00	n/a		.02	n/a
	Current	-.02			.12		
	Worst	-.01			.03		
2	Concurrent Depression:		.02	.02		.02	.00
	Current	-.02			.12		
	Worst	-.02			.02		
	Concurrent Alcohol Consumption	.14			.01		
3	Concurrent Depression:		.07	.05		.12**	.14
	Current	-.02			.09		
	Worst	-.09			-.11		
	Concurrent Alcohol Consumption	.11			.04		
	Concurrent Child Externalizing Behavior	.25*			.35***		
4	Concurrent Depression:		.15**	.08		.12**	.00
	Current	-.07			.06		
	Worst	-.06			-.11		
	Concurrent Alcohol Consumption	.13			.04		
	Concurrent Child Externalizing Behavior	.11			.32**		
	Concurrent Conflict	.31**			.10		
5	Concurrent Depression:		.15**	.00		.14**	.02
	Current	-.07			.06		
	Worst	-.05			-.09		
	Concurrent Alcohol Consumption	.13			.04		
	Concurrent Child Externalizing Behavior	.11			.33**		
	Concurrent Conflict	.31**			.11		
	Concurrent SES	.01			.08		
6	Concurrent Depression:		.21**	.05		.15**	.01
	Current	-.09			.06		
	Worst	-.01			-.13		
	Concurrent Alcohol Consumption	.15			.04		
	Concurrent Child Externalizing Behavior	.05			.32**		
	Concurrent Conflict	.39***			.13		
	Concurrent SES	-.01			.16		
	IQ	-.25*			-.03		
	Antisociality	-.11			.08		
	Education	.09			-.08		

Table 20 (con't)

Trimmed Models

Fathers			Mothers		
	β	R^2		β	R^2
Concurrent Conflict IQ	.38*** - .19*	.15***	Concurrent Child Ext Beh	.33***	.11***

Appendix M

Table 21

Means, Medians, Ranges & Missing Cases for Original Sample

Variable	*Mean*	*Median*	*Range*	*Valid N*	*Missing N*
Physical Aggression	5.00	1.00	208.00	219	0
Antisociality	13.24	11.00	55.00	217	2
Education	13.42	13.00	11.00	219	0
IQ	99.60	99.00	84.00	194	25
Worst-ever Depression 1	17.614	16.00	40.00	215	4
Current Depression 1	2.47	2.00	14.00	213	6
Alcohol Consumption 1	1444.41	90.00	20999.00	215	4
Child Externalizing 1	11.91	12.00	28.00	210	9
Conflict 1	3.51	3.00	9.00	213	6
SES 1	317.47	292.00	469.00	219	0
Worst-ever Depression 2	16.12	14.00	30.00	195	24
Current Depression 2	3.06	2.00	19.00	195	24
Alcohol Consumption 2	1042.05	60.00	20999.00	192	27
Child Externalizing 2	11.05	10.00	30.00	198	21
Conflict 2	3.48	3.00	9.00	191	28
SES 2	346.01	310.50	607.50	197	22
Worst-ever Depression 3	15.43	12.50	47.00	218	1
Current Depression 3	3.10	2.00	20.00	219	0
Alcohol Consumption 3	288.20	3.00	18899.00	211	8
Child Externalizing 3	10.16	8.50	38.00	206	13
Conflict 3	3.64	3.00	9.00	214	5
SES 3	344.53	316.50	689.00	201	18

Appendix N

Table 22
Original Dataset without Estimation of Missing Values (N=219)

Variable	*Time 1*		*Time 2*		*Time 3*	
	No. of Cases Missing	***% Missing***	***No. of Cases Missing***	***% Missing***	***No. of Cases Missing***	***% Missing***
Antisociality	1	.5	n/a		n/a	
IQ	24	11.0	n/a		n/a	
Education	0	0	n/a		n/a	
Current Depression	5	2.3	23	10.6	0	0
Worst-ever Depression	4	1.8	23	10.6	1	.5
Alcohol Consumption	3	1.4	26	11.9	8	3.7
Child Difficulty	8	3.7	20	9.2	13	6.0
Conflict	5	2.3	27	12.4	5	2.3
Socioeconomic Status	0	0	21	9.6	18	8.3

	Missing Values by Case(s)					
Variable	*No. Of Cases Missing 67% of data*	*% of Total*	*No. Of Cases Missing 33% of data*	*% of Total*	*No. Of Cases Missing 0% data*	*% of Total*
Current Depression	1	.5	28	12.8	190	86.8
Worst-ever Depression	1	.5	27	12.3	191	87.2
Alcohol Consumption	3	1.4	33	15.1	183	83.6
Child Externalizing Behavior	4	1.8	35	16.0	180	82.2
Conflict	3	1.4	33	15.1	183	83.6
SES	4	1.8	32	14.6	183	83.6

Appendix O

Revised Data Analyses

Analyses were re-run to compare effects of changes in the distribution of subjects into risk groups. In the initial dataset, all subjects were divided into risk groups based on both their (DSM-III-R) [a] Lifetime Alcohol Diagnosis score and [b] score on the Antisocial Behavior Scale (ASB). Lifetime Alcohol Diagnoses were given to families based on the fathers' diagnosis at Time 1. The ASB was administered to both fathers and mothers at Time 1, with different cut-off scores for each sex indicating high versus low antisociality (Fathers' ASB $\leq$ 24, mothers' ASB $\leq$ 18). Based on these two measures, subjects were assigned into High Risk (high ASB alcoholic), Medium Risk (low ASB alcoholic), and Low Risk (non-alcoholic) groups (separately for male subjects and female subjects). From these risk groups, estimation for missing data was completed as described in the Methods sections, and analyses were run.

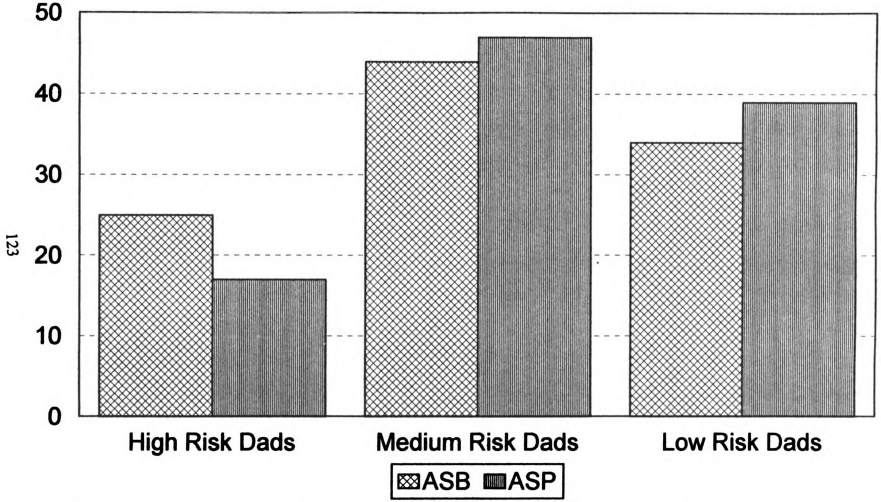
For the sake of comparison, the process described above was repeated with one difference: risk groups were reformulated based on subjects' (DSM-III-R) [a] Lifetime Alcohol Diagnosis score and [b] diagnosis of Antisocial Personality Disorder (ASPD). Both Lifetime Alcohol Diagnoses and ASPD Diagnoses were given to families based on the fathers' data at Time 1. Data re-estimation based on these new groups followed, and the same hypotheses were tested with this revised dataset. The revised distribution of subjects into risk groups is presented in the following table, and displayed graphically in Figures 4 and 5.

Distribution of Sample into Risk Groups								
	Original Dataset (groups based on ASB)				**Revised Dataset** (groups based on ASPD)			
	Fathers *N = 103*		*Mothers* *N = 115*		*Fathers* *N = 103*		*Mothers* *N = 115*	
	Freq	*%*	*Freq*	*%*	*Freq*	*%*	*Freq*	*%*
High Risk	25	**24.3**	16	**13.9**	17	**16.5**	19	**16.5**
Medium Risk	44	**42.7**	19	**16.5**	47	**45.6**	50	**43.5**
Low Risk	34	**33.0**	80	**69.6**	39	**37.9**	46	**40.0**

The distribution of subjects into risk groups changed due to the revised strategy (based on ASPD diagnoses). For fathers, subjects' assignment into risk groups became more conservative: High Risk membership dropped by 7.8% (N=8), Medium Risk membership grew by 2.9% (N=3), and Low Risk membership grew by 4.9% (N=5). For mothers, however, the revised risk groups resulted in more subjects' placement into higher categories: High Risk mothers increased by 2.6% (N=3), Medium Risk mothers increased by 27.0% (N=31), and Low Risk mothers decreased by 30.4% (N=35).

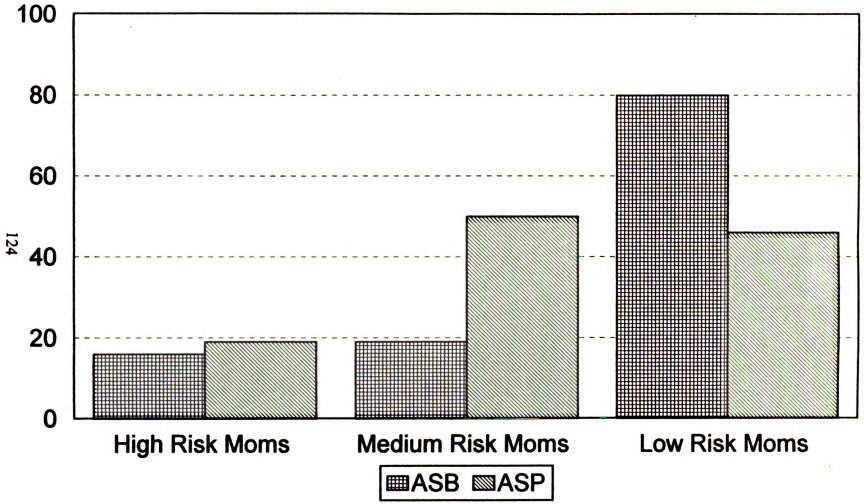
Distribution of Sampling Groups into Risk Groups

Subjects for the larger study, the MSU-UM Family Study, were recruited in several ways: alcoholics were enlisted through the court system and within the community, and matched non-alcoholic control subjects were recruited through door-to-door canvassing. The distribution of these three types of sample groups into risk groups changed from the original to the revised dataset (Figures 6 & 7).



Change in N: High risk 25 to 17; Med risk 44 to 47; Low risk 34 to 39

Figure 4: Fathers' Risk Group Distribution



Change in N: High risk 16 to 19; Med risk 19 to 50; Low risk 80 to 46

Figure 5: Mothers' Risk Group Distribution

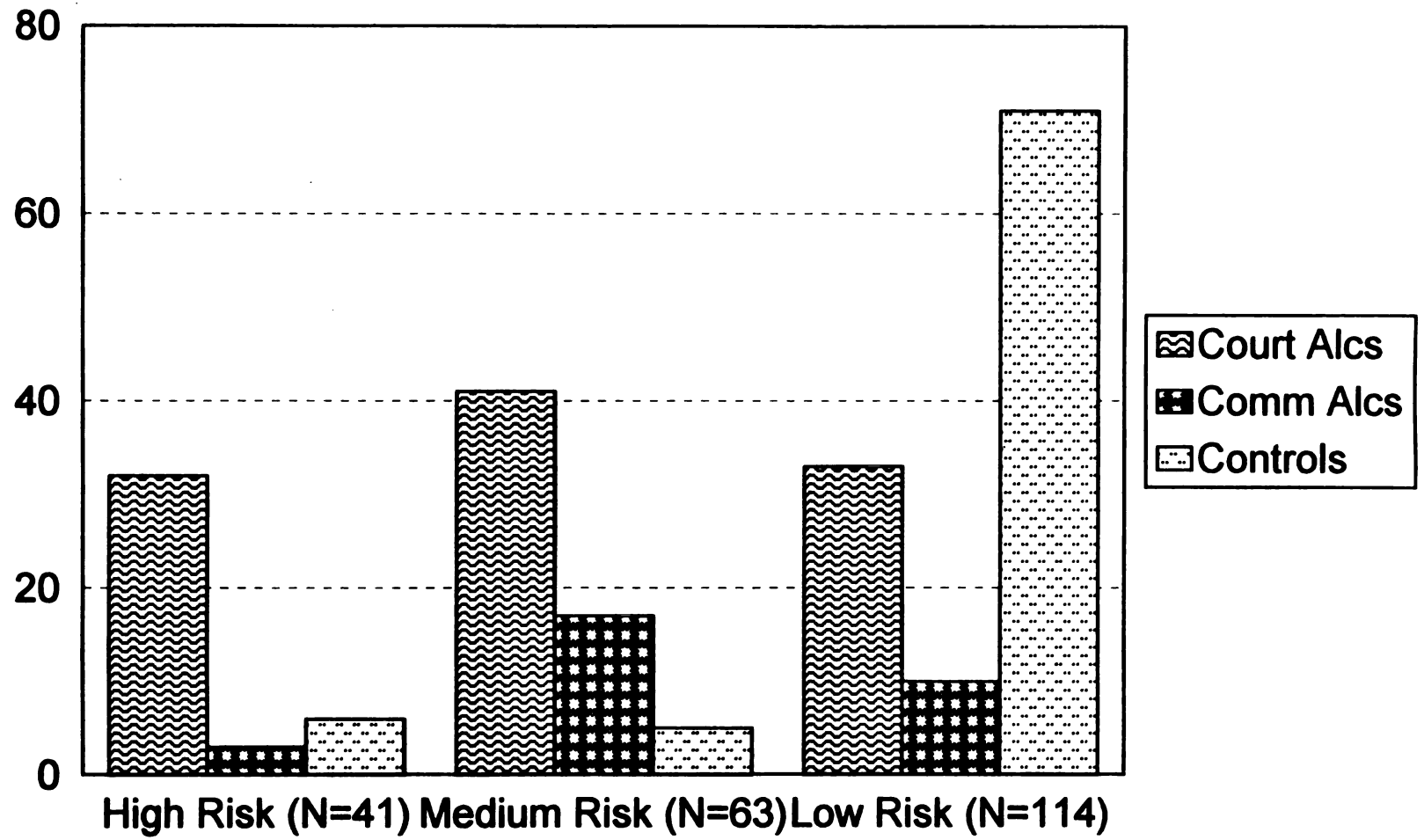


Figure 6: Distribution of Sampling Groups into Risk Categories (Original)

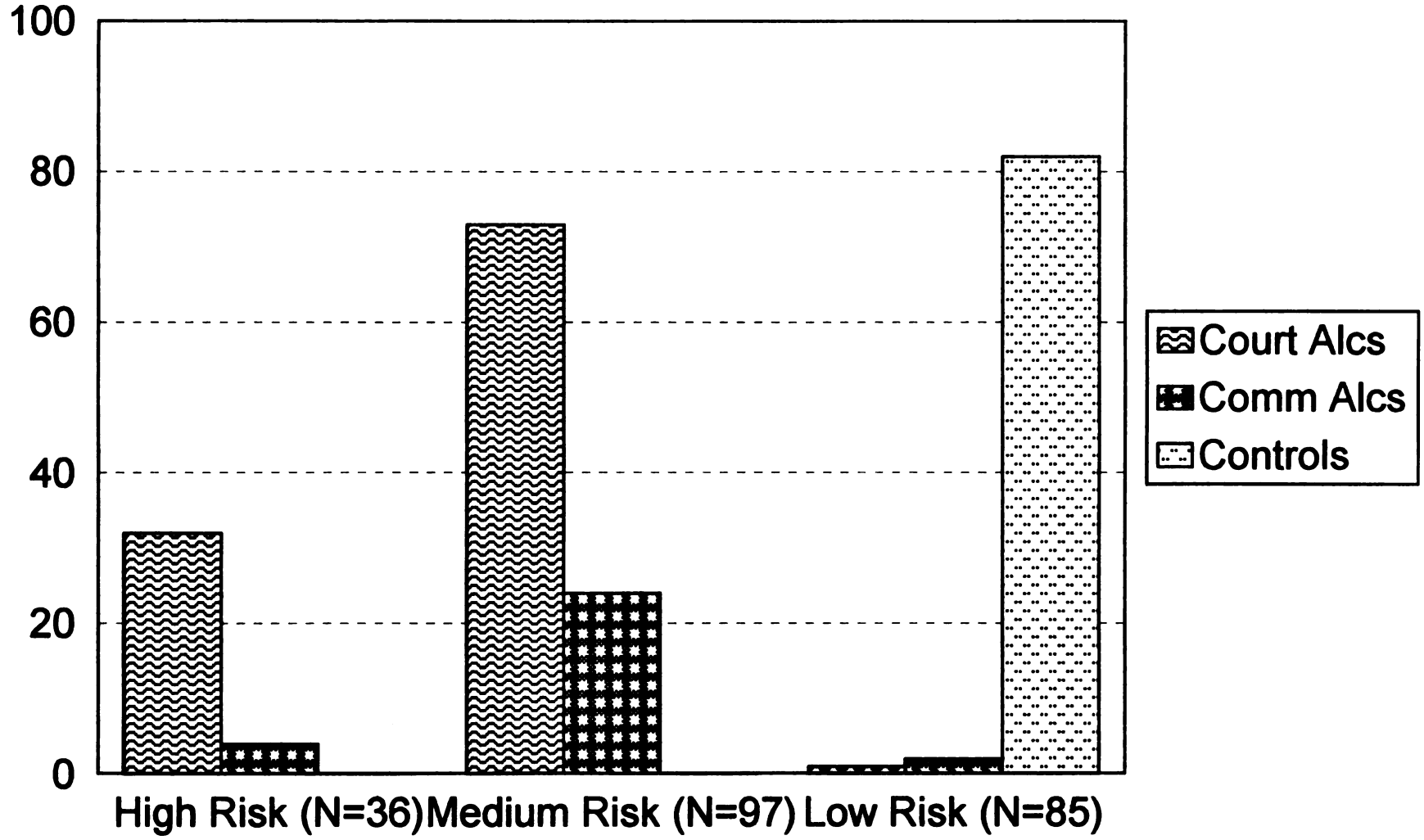


Figure 7: Distribution of Sampling Groups into Risk Categories (Revised)

Correlations

Correlations among stress components are presented in Tables A1 (Revised correlations among fathers' stress components), A2 (Revised correlations among mothers' stress components), and A3 (Revised correlations between fathers' and mothers' variables)[1]. Patterns in the revised correlation matrices strongly resemble the original correlational matrices.

Similarly, revised correlations among Concurrent and Change variables changed little from original correlations. The exceptions: for fathers, Concurrent Perception of Child Difficulty no longer correlated with his physical aggression; for mothers, Concurrent level of SES is more weakly related to Concurrent level of Worst-ever Depression and Concurrent Conflict (the last correlation became nonsignificant). Correlations among Concurrent stress components and parental physical aggression are presented in Tables A4 and A5 (fathers' and mothers' variables, respectively.

RM-MANOVA

Hypotheses 1 and 2 predicted differences between high- and low-aggression parents and their levels of stress components. In both the original and the revised analyses, differences were not found between high- and low-aggression groups for depression, alcohol consumption, and socioeconomic status, while there were differences

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[1] Please note that revised tables (based on ASPD-formed risk groups) are numbered to correspond to the original tables. An "A" in front of the table number indicates results based on "revised group" data.

Table A1

Correlations among Fathers' Stress Components & Stable Characteristics

	Beck1	Beck2	Beck3	Ham1	Ham2	Ham3	QFVR1	QFVR2	QFVR3	ChExt1	ChExt2	ChExt3	Conf1	Conf2	Conf3	Ses1	Ses2	Ses3	Asb	Educ	IQ
B1	1																				
B2	.59 ***	1																			
B3	.65 ***	.63 ***	1																		
H1	.37 **	.28 **	.31 **	1																	
H2	.41 **	.27 **	.41 **	.52 ***	1																
H3	.45 **	.13	.42 **	.23 *	.34 ***	1															
Q1	.06	.14	.17	.15	.18	.03	1														
Q2	.07	.20 *	.15	.03	.09	-.020	.58 ***	1													
Q3	.10	.04	.06	.10	.21	.08	.31 **	.14	1												
E1	.29 **	.23 *	.28 **	.22 *	.26 **	.16 *	.24 *	.22 *	.05	1											
E2	.25 *	.15	.22 *	.15	.18	.12	.12	.19	.07	.66 ***	1										

(Table A1, con't)

	Beck1	Beck2	Beck3	Ham1	Ham2	Ham3	QFVR1	QFVR2	QFVR3	ChExt1	ChExt2	ChExt3	Conf1	Conf2	Conf3	Ses1	Ses2	Ses3	Asb	Educ	IQ
E3	.18	-.03	.15	.10	.05	.31 **	.12	.13	.15	.46 ***	.66 ***	1									
C1	.35 **	.10	.26 **	.25 **	.17	.16	.07	-.11	-.07	.33 ***	.36 ***	.26 **	1								
C2	.13	.15	.13	.10	.15	-.07	-.04	-.09	-.01	.21 *	.41 ***	.23 **	.68 ***	1							
C3	.20 *	.06	.17	.07	.13	.08	.04	-.13	-.02	.32 ***	.47 ***	.41 ***	.71 ***	.74 ***	1						
S1	-.20 *	-.15	-.17	-.20 *	-.14	-.02	-.08	-.19	-.04	-.27 **	-.16	-.10	-.09	-.02	.01	1					
S2	-.16	-.12	-.18	-.24 *	-.27 **	-.12	-.12	-.09	-.04	-.18	-.09	.06	-.07	-.06	-.04	.73 ***	1				
S3	-.24 *	-.15	-.22 *	-.26 **	-.25	-.10	-.12	-.14	.01	-.20 *	-.10	-.02	-.09	-.07	-.06	.73 ***	.85 ***	1			
Asb	.20 *	.08	.19	.37 **	.30 **	.07	.30 **	.21 *	.13	.37 **	.23 *	.10	.27 **	.23 *	.16	-.34 ***	-.24 **	-.25 *	1		
Educ	-.12	-.01	-.14	-.27 **	-.25 *	-.11	-.10	-.06	-.05	-.14	-.13	-.04	.07	.05	.04	.54 ***	.56 ***	.59 ***	-.36 ***	1	
IQ	.02	-.00	-.14	.01	-.04	.01	-.19	-.12	.01	-.16	-.05	-.12	.21 *	.18	.17	.27 **	.25 *	.26 **	-.04	.43 ***	1

* $p < .05$ ** $p < .01$ *** $p < .001$

Table A2

Correlations among Mothers' Risk Indicators & Stable Characteristics

	Beck1	Beck2	Beck3	Ham1	Ham2	Ham3	QFVR1	QFVR2	QFVR3	ChExt1	ChExt2	ChExt3	Conf1	Conf2	Conf3	Ses1	Ses2	Ses3	Asb	educ	IQ
B1	1																				
B2	.65 ***	1																			
B3	.50 ***	.60 ***	1																		
H1	.46 ***	.29 ***	.26 **	1																	
H2	.40 ***	.31 ***	.27 **	.42 ***	1																
H3	.50 ***	.46 ***	.49 ***	.52 ***	.55 ***	1															
Q1	-.04	-.08	.01	.09	.16	.02	1														
Q2	.01	.10	.01	.15	.14	-.00	.82 ***	1													
Q3	.29 **	.43 ***	.29 **	.25 **	.16	.27 **	.02	.05	1												
E1	.10	.34 ***	.20 *	.22 *	.34 ***	.30 ***	.15	.19 *	.20 *	1											
E2	.16	.33 ***	.21 *	.18	.30 ***	.32 ***	.19 *	.29 **	.10	.60 ***	1										

(Table A2, con't)

	Beck1	Beck2	Beck3	Ham1	Ham2	Ham3	QFVR1	QFVR2	QFVR3	ChExt1	ChExt2	ChExt3	Conf1	Conf2	Conf3	Ses1	Ses2	Ses3	Asb	educ	IQ
E3	.13	.32 ***	.26 **	.23 *	-.29 **	.40 ***	.15	.29 **	.01	.45 ***	.72 ***	1									
C1	.41 ***	.32 ***	.38 ***	.24 **	.37 ***	.38 ***	.16	.22 **	.13	.25 **	.23 *	.21 *	1								
C2	.31 ***	.25 **	.24 **	.20 *	.29 ***	.20 *	.22 *	.26 **	.11	.27 **	.38 ***	.34 ***	.69 ***	1							
C3	.29 **	.34 ***	.36 ***	.15	.22 *	.26 **	.21 *	-.17	.13	.19 *	.31 ***	.38 ***	.61 ***	.69 ***	1						
S1	-.07	-.10	-.08	-.21	-.26 **	-.11	-.16	-.16	.00	-.21 *	-.18	-.20 *	-.06	-.00	-.17	1					
S2	-.05	-.04	-.06	-.22 *	-.24 **	-.16	-.16	-.14	.05	-.12	-.10	-.12	-.02	.01	-.06	.70 ***	1				
S3	-.15	-.15	-.14	-.27 **	-.41 ***	-.22 *	-.13	.19 *	-.05	-.26 **	-.16	-.19 *	-.14	-.11	-.18	.74 ***	.79 ***	1			
Asb	.23*	.11	.26 **	.31 ***	.41 ***	.42 ***	.33 ***	-.10	.16	.36 ***	.20 *	.21 *	.25 **	.16	.18	-.28 **	-.27 **	-.31 ***	1		
Educ	-.17	-.08	-.02	-.23 *	-.28 **	-.16	-.09	-.10	.03	-.05	-.14	-.17	.02	.05	.07	.51 ***	.54 ***	.56 ***	-.30 ***	1	
IQ	-.009	.028	.10	-.10	-.18	-.01	-.06	-.10	.01	-.06	-.09	-.10	.10	.05	.14	.42 ***	.42 ***	.42 ***	-.19 *	.56 ***	1

* $p < .05$ ** $p < .01$ *** $p < .001$

Table A3

Correlations between Fathers' & Mothers' Variables

Mothers' ▼		Fathers' Current Depression			Fathers' Worst-ever Depression			Fathers' Alcohol Consumption			Fathers' Perception of Child Difficulty			Fathers' Conflict Rating			Fathers' SES			Asb	Educ	IQ
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	Stable Background		
Current Depression	1	.40 ***	.31 **	.28 **	.06	.02	.29 **	-.11	-.06	-.06	.01	.13	.01	.19	.20 *	.17	-.01	-.07	-.15	.12	-.12	.08
	2	.32 ***	.14	.27 **	.05	.03	.17	.08	.21 *	-.14	.14	.23 *	.17	.29 **	.21 *	.26 *	-.11	-.11	-.19	.13	-.12	.11
	3	.19	.03	.17	.06	.02	.28 **	-.09	-.05	-.07	-.03	.07	.10	.24 *	.13	.23 *	-.07	-.11	-.15	.11	-.14	-.00
Worst-ever Depression	1	.18	.16	.13	.25 *	.07	.00	-.07	-.08	-.07	.04	-.02	-.09	.18	.12	.15	-.16	-.20 *	-.24 *	.10	-.12	.20
	2	.32 **	.14	.27 **	.26 *	.49 **	.28 **	.06	-.06	-.08	.18	.16	.13	.29 **	.21 *	.26 **	-.20	-.27 **	-.38 **	.24 *	-.15	-.04
	3	.19	.03	.17	.01	.18	.41 **	-.01	-.07	.06	.13	.16	.21 *	.24 *	.13	.23 *	-.06	-.12	-.20 *	.09	-.08	.00
Alcohol Consumption	1	.13	-.01	.18	.05	-.05	.04	.20 *	.09	.09	.23 *	.12	.03	.21 *	.04	.13	-.15	-.17	-.12	.20 *	-.08	-.05
	2	.04	-.03	.14	.07	-.06	-.01	.29 **	.19	.08	.17	.12	.06	.09	.00	.07	-.13	-.14	-.11	.29 **	-.11	.01
	3	-.02	.00	-.07	-.01	.09	-.07	-.03	-.03	.02	.14	.12	-.05	-.07	-.01	.12	.01	-.01	-.05	-.10	-.11	.06

(Table A3, con't)

ChildDifficulty	1	.18	.07	.03	-.05	.04	.06	.15	.14	.03	.48 ***	.35 ***	.33 ***	.06	.11	.24 *	-.22 *	-.18	-.27 **	.27 **	-.20	-.08
	2	.05	.03	.02	-.08	-.04	.11	.20	.24 *	-.02	.28 **	.38 ***	.33 ***	.13	.15	.25 *	-.14	-.06	-.12	.15	-.10	-.03
	3	.12	.05	.16	-.03	-.05	.25 *	.20 *	.19	.01	.19 *	.38 ***	.58 ***	.21 *	.19	.32 **	-.17	-6	-.16	.10	-.13	-.07
Conflict	1	.21 *	.10	.27 **	-.09	.01	.10	.03	-23 *	-.07	.15	.06	.06	.49 ***	.38 ***	.50 ***	-.07	-.09	-.15	.22 *	.01	-.02
	2	.19	.11	.12	-.02	-.01	.05	.06	-.14	-.09	.15	.20 *	.10	.46 ***	.39 ***	.48 ***	.00	-.06	-.13	.24 *	.05	.06
	3	.18	.05	.14	-.04	-.09	.19	.10	-.03	-.10	.09	.12	.20 *	.39 ***	.30 ***	.48 ***	-.18	-.15	-.20	.23 *	-.01	.07
SES	1	-.21 *	-.14	-.14	-.16	-.12	-.01	-.09	-.20 *	-.04	-.27 **	-.16	-.10	-.09	-.03	-.01	1.00 ***	.73 ***	.72 ***	-.31 ***	.53 ***	.26 **
	2	-.17	-.11	-.18	-.23 *	-.23 **	-.12	-.13	-.10	-.05	-.18	-.09	.06	-.08	-.08	-.06	.73 ***	.99 ***	.82 ***	-.22 *	.55 ***	.24 *
	3	-.26 *	-.15	-.23 *	-.25 *	-.25 *	-.11	-.13	-.15	.01	-.21 *	-.10	-.03	-.11	-.08	-.09	.72 ***	.84 ***	1.0 ***	-.23 *	.58 ***	.26 *
Asb		.09	-.01	.11	.06	.15	.17	.07	-.08	-.05	.27 **	.18	.17	.14	.09	.22 *	-.25 *	-.28 **	-.26 **	.28 **	-.34 ***	-.17
Educ		-.23 *	-.19	-.25 *	-.14	-.08	-.17	-.09	-.11	.05	-.15	-.06	.07	-.10	-.00	-.01	.48 ***	.51 ***	.53 ***	-.09	.51 ***	.26 **
IQ		-.07	-.08	.03	-.25 *	-.18	-.02	-.16	-.15	-.08	-.16	-.09	-.03	-.03	-.10	.07	.41 ***	.37 ***	.41 ***	-.25 *	.44 ***	.23 *

* $p < .05$ ** $p < .01$ *** $p < .001$
X axis = Fathers' variables Y axis = Mothers' variables

Table A4

Correlations between Fathers' Concurrent Variables & Physical Aggression

	Phys Aggr	Current Dep	Current Worst Dep	Current Alc	Current Child Diff	Current Conflict	Current SES	ASB	Educ	IQ
Phys Aggr	1.00									
Current Level of Dep	-.10	1.00								
Level Worst Dep	-.06	.42 ***	1.00							
Current Alc Consn	.08	.06	.08	1.00						
Current Child Diff	.16	.15	.31 **	.15	1.00					
Current Conflict	.26 **	.17	.08	-.02	.41 ***	1.00				
Current SES	.07	-.22 *	-.10	.01	-.02	-.60	1.00			
ASB	-.07	.19	.07	.13	.10	.16	-.25 **	1.00		
Educ	.05	-.16	-.11	-.05	-.04	.04	.59 ***	-.36 ***	1.00	
IQ	-.13	-.14	.01	.01	-.12	.17	.26 **	-.04	.43 ***	1.00

* $p < .05$ ** $p < .01$ *** $p < .001$

Table A5

Correlations between Mothers' Concurrent Variables & Physical Aggression

	Phys Aggr	Current Level	Level Worst	Current Alc	Current Child Diff	Current Conflict	Current SES	ASB	Educ	IQ
Phys Aggr	1.00									
Current Dep	.14	1.00								
Level Worst Dep	.09	.49 ***	1.00							
Current Alc Consn	.05	.27 **	.27 **	1.00						
Current Child Diff	.33 **	.26 **	.40 ***	.01	1.00					
Current Conflict	.22 *	.36 ***	.26 **	.13	.38 ***	1.00				
Current SES	.02	-.14	-.22 *	-.05	-.19 *	-.18	1.00			
ASB	.12	.26 **	.42 ***	.16	.21 *	.18	-.31 **	1.00		
Educ	-.06	-.02	-.16	.03	-.17	.07	.56 ***	-.30 **	1.00	
IQ	-.03	.10	-.01	.01	-.10	.14	.42 ***	-.19 *	.56 ***	1.00

* $p < .05$ ** $p < .01$ *** $p < .001$

Table A6

Repeated Measures Multivariate Analysis of Variance for High- and Low-Aggression Parents

Within-Subjects				
	Multivariate F			
Variable	Parent Sex x Group x Time	Group x Time	Parent Sex x Time	Time
Current Depression	.02	.60	.05	6.56**
Worst-ever Depression	.63	.40	.09	7.16**
Alcohol Consumption	.96	.76	8.44***	13.33***
Child Externalizing Behaviors	.33	4.02*	.53	6.53***
Family Conflict	4.79**	.53	.68	1.34
SES	.51	.20	.01	11.47***

Between-Subjects								
Variable	Sex of Parent		Group (High/Low Aggression)		Sex of Parent X Group		Within + Residual Error	
	df	F	df	F	df	F	df	F
Current Depression	1	3.23	1	2.35	1	2.32	214	(22.82)
Worst-ever Depression	1	12.15***	1	.49	1	2.04	214	(110.02)
Alcohol Consumption	1	6.78**	1	.33	1	.14	214	(14855011)
Child Ext Behaviors	1	3.47	1	15.08***	1	.07	214	(89.53)
Conflict	1	3.26	1	19.24***	1	.05	214	(9.84)
SES	1	.01	1	.50	1	.10	214	(37115.59)
Antisocial Behavior	1	27.72***	1	.00	1	1.54	214	(76.27)
Education	1	4.33*	1	.01	1	.11	214	(3.55)
IQ	1	15.66***	1	.48	1	.16	214	(181.45)

for child externalizing behaviors and conflict in the family (i.e., high-aggression parents reported consistently higher levels of child difficulty and conflict relative to low-aggression parent). The results of the revised Repeated Measures Multivariate Analysis of Variance are presented in Table A6.

Hierarchical Regression Analyses

Proximal-to-Distal Model with Change Predictors.

The first set of regressions examined the prediction of parental physical aggression from each change stress component independently (Table A15) and within the proximal-to-distal model for change stress components (Table A16). These results of these analyses did not change from the original: neither series significantly predicted parental physical aggression

Next, regression was used to test the proximal-to-distal model of change stress components with the inclusion of stable background characteristics first (Table A14) and last (Table A17). Neither of these new analyses changed from the previous results: the proximal-to-distal change model did not predict parental physical aggression. One minor alteration: for fathers, change in worst-ever depression became a significant variable after changes in child externalizing behaviors was added to the model, rather than after change in alcohol consumption was added to the model. This alteration did not affect the substantive results of the analyses.

Proximal-to-Distal Model with Concurrent Predictors

Regressions were rerun on Concurrent Variables to predict parental physical aggression. The first set of regressions examined the prediction of parental physical

Table A15

Summary of Regression Analyses for Physical Aggression Regressed onto Change Variables Separately

Model/Variable(s)	Fathers		Mothers	
	β	R^2	β	R^2
Change in Depression: Current Worst	 -.037 -.188	.04	 .040 .134	.02
Change in Alcohol Consumption	.010	.000	.141	.020
Change in Child Externalizing Behaviors	.111	.012	.065	.004
Change in Conflict in Family Environment	.021	.000	-.016	.000
Change in SES	.026	.001	.033	.001

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table A16

Summary of Hierarchical Regression Analysis for Physical Aggression Regressed onto Change Predictor Variables

		Fathers			Mothers		
Step	**Variable**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
1	Change in Depression:			n/a			n/a
	Current	- .037	.04		.040	.02	
	Worst	- .188			.134		
2	Change in Depression:						
	Current	- .040	.04	.00	.025	.04	.02
	Worst	- .191			.125		
	Change in Alcohol Consumption	.030			.126		
3	Change in Depression:						
	Current	- .057	.06	.02	.023	.04	.00
	Worst	- .218*			.122		
	Change in Alcohol Consumption	.030			.124		
	Change in Child Externalizing	.156			.051		
4	Change in Depression:						
	Current	- .063	.06	.00	.024	.04	.00
	Worst	- .229*			.123		
	Change in Alcohol Consumption	.026			.128		
	Change in Child Externalizing	.150			.049		
	Change in Conflict	.056			.018		
5	Change in Depression:						
	Current	- .063	.06	.00	.023	.04	.00
	Worst	- .229*			.121		
	Change in Alcohol Consumption	.029			.131		
	Change in Child Externalizing	.148			.044		
	Change in Conflict	.058			.019		
	Change in SES	.025			.029		

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table A14

Summary of Hierarchical Regression Analysis for Physical Aggression Regressed onto Stable Background Characteristics and Change Predictor Variables

		Fathers			Mothers		
Step	**Variable**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
1	IQ	-.178	.03	n/a	.008	.01	n/a
	Antisociality	-.036			.109		
	Education	.115			-.026		
2	IQ	-.193	.07	.04	-.003	.03	.02
	Antisociality	-.001			.081		
	Education	.115			-.008		
	Change in Depression:						
	Current	-.033			.020		
	Worst	-.193			.114		
3	IQ	-.192	.07	.00	.004	.04	.01
	Antisociality	-.002			.055		
	Education	.115			-.009		
	Change in Depression:						
	Current	-.034			.020		
	Worst	-.194			.113		
	Change in Alcohol Consumption	.005			.113		
4	IQ	-.199	.09	.02	.001	.04	.00
	Antisociality	-.003			.052		
	Education	.122			-.005		
	Change in Depression:						
	Current	-.052			.018		
	Worst	-.222*			.112		
	Change in Alcohol Consumption	.004			.112		
	Change in Child Externalizing	.164			.046		
5	IQ	-.194	.10	.01	.000	.04	.00
	Antisociality	-.004			.050		
	Education	.122			-.006		
	Change in Depression:						
	Current	-.056			.019		
	Worst	-.229*			.113		
	Change in Alcohol Consumption	.003			.115		
	Change in Child Externalizing	.160			.045		
	Change in Conflict	.036			.013		

(Table A14, con't)

Step	Variable	β	R^2	ΔR^2	β	R^2	ΔR^2
6	IQ	-.194	.10	.01	-.004	.04	.00
	Antisociality	-.004			.050		
	Education	.122			-.011		
	Change in Depression:						
	Current	-.056			.019		
	Worst	-.228*			.109		
	Change in Alcohol Consumption	.003			.119		
	Change in Child Externalizing	.160			.038		
	Change in Conflict	.036			.016		
	Change in SES	-.001			.035		

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table A17

Summary of Hierarchical Regression Analysis for Physical Aggression Regressed onto Change Predictor Variables & Stable Background Characteristics

		Fathers			Mothers		
Step	**Variable**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
1	Change in Depression:		.04	n/a		.02	n/a
	Current	-.037			.040		
	Worst	-.188			.134		
2	Change in Depression:		.04	.00		.04	.02
	Current	-.040			.025		
	Worst	-.191			.125		
	Change in Alcohol Consumption	.030			.126		
3	Change in Depression:		.06	.02		.04	.00
	Current	-.057			.023		
	Worst	-.218*			.122		
	Change in Alcohol Consumption	.030			.124		
	Change in Child Externalizing Behaviors	.156			.051		
4	Change in Depression:		.06	.00		.04	.00
	Current	-.062			.024		
	Worst	-.229*			.123		
	Change in Alcohol Consumption	.026			.128		
	Change in Child Externalizing Behaviors	.150			.049		
	Change in Conflict	.056			.018		
5	Change in Depression:		.06	.00		.04	.00
	Current	-.063			.023		
	Worst	-.229*			.121		
	Change in Alcohol Consumption	.029			.131		
	Change in Child Externalizing Behaviors	.148			.044		
	Change in Conflict	.058			.019		
	Change in SES	.025			.029		
6	Change in Depression:		.10	.04		.04	.00
	Current	-.056			.019		
	Worst	-.228*			.109		
	Change in Alcohol Consumption	.003			.119		
	Change in Child Externalizing Behaviors	.160			.038		
	Change in Conflict	.038			.016		
	Change in SES	-.001			.035		
	IQ	-.194			-.004		
	Antisociality	-.004			.050		
	Education	.122			-.011		

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table A18

Summary of Regression Analyses for Physical Aggression Regressed onto Concurrent Variables Separately

	Fathers		Mothers	
Model/Variable(s)	β	R^2	β	R^2
Concurrent Depression: Current Worst	 -.015 -.015	.00	 .125 .024	.02
Concurrent Alcohol Consumption	.170	.03	.048	.00
Concurrent Child Externalizing Behaviors	.228*	.05*	.330***	.11***
Concurrent Conflict in Family Environment	.341***	.12***	.217*	.05*
Concurrent SES	.014	.00	.015	.00

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table A19

Summary of Hierarchical Regression Analysis for Physical Aggression Regressed onto Concurrent Predictor Variables

		Fathers			Mothers		
Step	**Variable**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
1	Concurrent Depression:						
	Current	-.015	.00	n/a	.124	.02	n/a
	Worst	-.015			.024		
2	Concurrent Depression:						
	Current	-.022	.03	.02	.123	.02	.00
	Worst	-.026			.022		
	Concurrent Alcohol Consumption	.174			.009		
3	Concurrent Depression:						
	Current	-.026	.08	.05	.087	.12**	.10
	Worst	-.095			-.113		
	Concurrent Alcohol Consumption	.144			.051		
	Concurrent Child Externalizing Behavior	.239*			.353***		
4	Concurrent Depression:						
	Current	-.076	.16**	.08	.061	.13**	.01
	Worst	-.059			-.112		
	Concurrent Alcohol Consumption	.172			.045		
	Concurrent Child Externalizing Behavior	.098			.323**		
	Concurrent Conflict	.321**			.095		
5	Concurrent Depression:						
	Current	-.074	.16**	.00	.063	.14**	.01
	Worst	-.058			-.098		
	Concurrent Alcohol Consumption	.172			.044		
	Concurrent Child Externalizing Behavior	.098			.330**		
	Concurrent Conflict	.322**			.104		
	Concurrent SES	.012			.085		

Trimmed Models

Fathers				Mothers		
	β	**R^2**	**Step**		**β**	**R^2**
Concurrent Conflict	.341***	.116***	1	Concurrent Child Externalizing Behavior	.331***	.109***

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

aggression from each Concurrent Stress Component independently (Table A18) and within the proximal-to-distal model for Concurrent Stress Components (Table A19). The results of these analyses did not change from the original:

- For both mothers and fathers, physical aggression was significantly predicted independently by concurrent levels of child externalizing behaviors and conflict in the home.
- The concurrent stress component model significantly predicted physical aggression for both parents. For mothers, higher levels of concurrent child externalizing behaviors predicted higher levels of parental physical aggression. For fathers, higher levels of concurrent conflict predicted higher levels of paternal physical aggression.

Next, regression was used to test the proximal-to-distal model of Concurrent Stress Components with the inclusion of stable background characteristics first (Table A7) and last (Table A20). For both fathers and mothers, these models significantly predicted parental physical aggression in the original and the revised analyses. For mothers, the results did not change.

Thus, changes in risk groups (High, moderate, and low) based on ASP did not change results from the original findings, based on risk groups formulated from the ASB. Revised tables follow.

Table A7

Summary of Hierarchical Regression Analysis for Physical Aggression Regressed onto Stable Background Characteristics & Concurrent Predictor Variables

		Fathers			Mothers		
Step	**Variable**	**β**	**R^2**	**ΔR^2**	**β**	**R^2**	**ΔR^2**
1	IQ	-.178	.031	n/a	.008	.01	n/a
	Antisociality	-.036			.109		
	Education	.115			-.026		
2	IQ	-.181	.032	.001	-.010	.03	.02
	Antisociality	-.032			.081		
	Education	.114			-.025		
	Concurrent Depression:						
	Current	-.024			.123		
	Worst	.007			-.014		
3	IQ	-.181	.052	.02	-.010	.03	.00
	Antisociality	-.049			.080		
	Education	.105			-.026		
	Concurrent Depression:						
	Current	-.025			.122		
	Worst	-.001			-.015		
	Concurrent Alcohol Consumption	.143			.007		
4	IQ	-.141	.098	.046	.015	.13*	.10
	Antisociality	-.074			.076		
	Education	.080			-.003		
	Concurrent Depression:						
	Current	-.021			.081		
	Worst	-.073			-.140		
	Concurrent Alcohol Consumption	.120			.048		
	Concurrent Child Externalizing Behavior	.232*			.351***		
5	IQ	-.247*	.212**	.114	.004	.13*	.02
	Antisociality	-.115			.067		
	Education	.084			-.012		
	Concurrent Depression:						
	Current	-.091			.059		
	Worst	-.016			-.138		
	Concurrent Alcohol Consumption	.148			.043		
	Concurrent Child Externalizing Behavior	.048			.319**		
	Concurrent Conflict	.396***			.093		

(Table A7, con't)

6	IQ Antisociality Education Concurrent Depression: Current Worst Concurrent Alcohol Consumption Concurrent Child Externalizing Behavior Concurrent Conflict Concurrent SES	-.247* -.115 .088 -.092 -.016 .148 .048 .396*** -.006	.212**	.00	-.023 .080 -.082 .066 -.130 .044 .315** .126 .162	.15*	.02

Trimmed Models

Fathers			**Mothers**		
	β	**R^2**		**β**	**R^2**
IQ Concurrent Conflict	-.193* .375***	.152***	Concurrent Child Externalizing Behavior	.331***	.109***

(* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$)

Table A20

Means, Standard Deviations, & Range of Values for Mothers and Fathers								
	Mothers (Valid N = 115)				Fathers (Valid N = 103)			
Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Physical Aggression	7.29	24.19	0	208	2.50	3.62	0	18
ASB	10.27	6.79	1	35	16.71	10.47	2	56
Education	13.17	1.82	9	19	13.7	1.93	10	20
IQ	95.96	13.32	62	135	103.4	13.54	76	146
Beck1	2.77	3.29	0	14	2.13	2.36	0	11
Beck2	3.41	3.56	0	19	2.68	3.13	0	13
Beck3	3.39	3.86	0	20	2.8	3.06	0	13
Ham1	19.04	8.34	8	48	15.98	6.84	6.8	41
Ham2	17.64	7.69	8	38	15.11	6.92	8	38
Ham3	16.78	8.71	0	47	13.97	6.92	8	36
QFV-R1	584.58	2068.64	1	15750	2468.9	5209.94	1	21000
QFV-R2	79.011	3149.16	1	21000	1234.12	3100.27	1	21000
QFV-R3	262.16	1843.80	1	18900	316.38	1122.97	1	8706.29
CBCL1	12.37	6.20	0	28	11.29	6.26	1	27
CBCL2	12.02	6.53	0	30	10.14	6.08	0	30
CBCL3	11.06	7.48	0	38	9.35	7.01	0	37
FES1	3.81	1.94	0	8	3.17	2.3	0	9
FES2	3.71	1.95	0	9	3.25	2.13	0	8
FES3	3.85	2.12	0	9	3.39	2.28	0	9
SES1	317.13	103.11	171	640	318.43	105.03	171	640
SES2	344.97	133.60	162.5	770	343.78	128.09	162.5	770
SES3	339.27	127.61	177	866	339.91	127.92	177	866

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