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The Additive and Interactive Effects of Parenting and Temperament in Predicting Adjustment Problems of Children of Divorce

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Investigated the interaction between parenting and temperament in predicting adjustment problems in children of divorce. The study utilized a sample of 231 mothers and children, 9 to 12 years old, who had experienced divorce within the previous 2 years. Both mothers' and children's reports on parenting, temperament, and adjustment variables were obtained and combined to create cross-reporter measures of the variables. Parenting and temperament were directly and independently related to outcomes consistent with an additive model of their effects. Significant interactions indicated that parental rejection was more strongly related to adjustment problems for children low in positive emotionality, and inconsistent discipline was more strongly related to adjustment problems for children high in impulsivity. These findings suggest that children who are high in impulsivity may be at greater risk for developing problems, whereas positive emotionality may operate as a protective factor, decreasing the risk of adjustment problems in response to negative parenting.

Parenting is a key socialization factor that consistently predicts children's behavioral and emotional problems (see Frick, 1994; Loeber & Stouthamer-Loeber, 1986). The affective nature of the parent–child relationship and type of parental control are frequently identified as two important dimensions of parenting (e.g., Grusec, 1997) and are consistently found to influence children's adjustment (e.g., Loeber & Stouthamer-Loeber, 1986; Maccoby & Martin, 1983). However, increasingly, transactional relations between children and their socialization experiences are evoked to better understand psychological adjustment (e.g., Reiss & Price, 1996). In a transactional model, not only would parenting be expected to impact children's adjustment, but child characteristics are viewed as affecting parenting and adjustment as well. Thus, parenting may have varying effects on children with different individual characteristics.

This study investigated the protective or exacerbating effects of temperament on the relation between parenting and adjustment problems in children of divorce. The focus was on two negative parenting variables representing the dimensions of warmth and control, parental rejection (lack of warmth) and inconsistent discipline, which are consistently associated with adjustment problems in general, as well as in divorce samples (e.g., Hetherington & Camara, 1984; Peterson & Zill, 1986). Temperament was studied because there is increasing interest in transactions between temperament and socialization experiences (Reiss & Price, 1996) and attention to tailoring parenting programs to address temperament differences in children (e.g., Sheeber & Johnson, 1994). This study investigated whether the relation between children's adjustment and maternal rejection and inconsistent discipline would depend on children's temperament.

Temperament is generally defined as the physiological basis for affective arousal, expression, and regulation components of personality (Goldsmith et al., 1987). This study investigated dimensions reflecting Rothbart's (1989) theoretical model of temperament in which temperament is viewed as individual differences in reactivity and self-regulation. Rothbart proposed two independent reactive systems that result in the arousal of negative and positive affect. Negative emotionality involves individual differences in arousal of fear, frustration, and sensitivity to negative environmental cues, whereas positive emotionality involves smiling, laughter, pleasure, and sensitivity to positive environmental cues (Gray, 1991; Rothbart, 1989). Self-regulation includes processes that modulate reactivity, facilitating or inhibiting the affective response, includ-

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ing attention, impulsivity, and inhibition (Goldsmith & Rothbart, 1991). The dimensions of negative and positive emotionality and impulsivity were selected for this study because, theoretically, these characteristics might condition the relation between parenting and children's adjustment problems, and they are correlated with adjustment problems (Rothbart & Bates, 1998).

In a transactional model, the development of adjustment problems comes about through a combination of socialization experiences and the temperament of children exposed to those experiences. That is, children's individual differences in sensitivity to punishment or reward, their emotional reactions to parenting behaviors, and their ability to regulate emotional and behavioral reactions may result in parenting behaviors having varied impact on children. It is plausible that children who respond to the environment with high negative emotional arousal or who are impulsive may be more adversely affected by negative parenting behaviors. Such children may experience heightened levels of negative affect, be more sensitive to negative cues from parents, or be less able to self-regulate, which when combined with rejection or inconsistent discipline, may increase the likelihood of adjustment problems. On the other hand, children who generally maintain a positive affective response to the environment may be protected from the negative effects of these parenting behaviors as they may maintain more positive feelings about themselves and their environment despite negative or unpredictable experiences. Models that take into account both the additive and interactive effects of parenting and temperament on children's adjustment have been advocated (Sanson & Rothbart, 1995). Thus, it is proposed that, although parenting and temperament are expected to directly predict children's adjustment problems, for some children, the effect of negative parenting will be exacerbated (i.e., children high in negative emotionality and impulsivity), whereas for others it will be buffered (i.e., children high in positive emotionality), depending on children's temperament.

Although many researchers have proposed that children's adjustment is predicted by an interaction between parenting and temperament (e.g., Lerner & Lerner, 1994), few studies have tested this interaction directly. Maziade et al. (1985) found that children with difficult temperament are more likely to develop behavior problems under adverse family conditions, which included unclear family rules, low consensus between parents, and parental inconsistency. In another study, children with difficult temperament had only a slightly raised incidence of adjustment problems relative to others. However, when difficult temperament occurred together with a poor mother–child relationship, the level of risk for problems increased substantially (Sanson, Oberklaid, Pedlow, & Prior, 1991). Although the difficult temperament construct has proven useful in predicting children's adjustment, it combines emotionality and self-regulation components of temperament that may interact differentially with parenting. Investigations of Temperament × Parenting interactions using specific dimensions of temperament are needed (Sanson & Rothbart, 1995).

Kochanska (1995) found that gentle discipline deemphasizing power predicted compliance for children who were fearful, whereas a positive parent–child relationship predicted compliance for fearless children. Gentle discipline was thought to be ineffective for eliciting compliance from fearless children as it would not result in an optimal level of fear arousal. In a longitudinal study, poor parental monitoring was more strongly related to aggression for children high as opposed to low in activity level, and harsh discipline was more strongly related to aggression for children who were more as opposed to less fearful (Colder, Lochman, & Wells, 1997). In another study, parental restrictive control and children's resistant temperament assessed early in childhood interacted to predict later externalizing problems. Resistant temperament was more strongly related to externalizing when mothers demonstrated low as opposed to high levels of control (Bates, Pettit, Dodge, & Ridge, 1998). This limited body of research suggests that parenting and temperament operate in conjunction to predict children's adjustment. However, few studies have examined interactions between specific dimensions of parenting and temperament, and those have not included more complete models of parenting (including dimensions of warmth and control) or temperament (including dimensions of emotionality and self-regulation). An aspect of temperament that has been neglected in this research is positive emotionality. Attention to these issues is important because of their potential contribution to theory development and the guidance they can provide for intervention design.

This study explored these relations in a sample of mothers and children who had recently experienced divorce. Divorce increases the likelihood of both negative parenting and adjustment problems, potentially increasing the sensitivity of tests for interaction effects (McClelland & Judd, 1993). Also, approximately 1 million children experience divorce each year (National Center for Health Statistics, 1995), making it one of the most prevalent major life stressors experienced by children. Relative to children in intact families, children in divorced families are at risk for developing adjustment problems including aggression, depression, and anxiety (e.g., Amato & Keith, 1991; Guidubaldi, Cleminshaw, Perry, & Mcloughlin, 1983; Wyman, Cowen, Hightower, & Pedro-Carroll, 1985). However, a meta-analysis indicated that effect sizes tend to be small (median effect size of .14 *SD;* Amato & Keith, 1991), suggesting that divorce does not have harmful

effects on all children. Thus, research that focuses on identifying factors that distinguish children who adjust well to their parents' divorce from those who do not has important implications for prevention and treatment programs (e.g., Grych & Fincham, 1992).

One of the most consistent predictors of adjustment in children of divorce is the relationship between the residential parent and the child (Walsh & Stolberg, 1989). There is evidence that divorce is related to significant declines in the quality of parenting, including poor communication, erratic discipline, and inconsistent warmth and affection (e.g., Hetherington & Camara, 1984; Peterson & Zill, 1986). The quality of the mother–child relationship and discipline strategies are consistently related to children's adjustment after divorce (Hetherington, Stanley-Hagan, & Anderson, 1989; Lutzke, Wolchik, & Braver, 1996; Maccoby, Buchanan, Mnookin, & Dornbusch, 1993; Walsh & Stolberg, 1989). In addition, an intervention aimed at improving parenting skills has demonstrated that an increase in positive aspects of the mother–child relationship and consistent discipline leads to improvements in children's adjustment after divorce (e.g., Wolchik et al., in press; Wolchik et al., 1993).

Temperament has been shown to predict adjustment after divorce as well. Kurdek (1988) reported that emotional intensity correlated with internalizing problems 1 year later, and attention span correlated with later externalizing problems. In another study, task persistence and adaptability predicted lower levels of both internalizing and externalizing problems (Lengua & Sandler, 1996). Using nurses' ratings of temperament during the first 2 years of life, Hetherington (1989) found that temperament predicted later postdivorce behavior problems. However, the effects of temperament were dependent on maternal personality and stress. Under conditions of high stress or unstable maternal personality, mothers responded more adversely toward children with difficult temperament, whereas when mothers experienced low stress or had stable personalities, there was no difference in their response to difficult or easy children, despite the difficult children emitting more aversive behaviors. Although this study points to the complex transactional processes between parenting and children's temperament, the question of whether children with difficult temperament were more negatively affected by adverse parenting was not tested.

In summary, although both parenting and temperament predict children's adjustment after divorce, researchers have not addressed whether parenting is associated differentially with adjustment problems for children with different temperament characteristics. This study investigated whether the relation of parenting of residential mothers to children's adjustment was moderated by children's temperament. The following hypotheses were investigated.

1. Rejection and inconsistent discipline were expected to be more strongly related to adjustment problems for children high in negative emotionality than those low in negative emotionality. Children high in negative emotionality may experience more negative arousal or be more sensitive to negative cues related to rejection or inconsistent discipline, which may lead to more adjustment problems.

2. Rejection and inconsistent discipline were expected to be less strongly associated with adjustment problems for children high in positive emotionality than those low in positive emotionality. Children high in positive emotionality may be less sensitive to negative environmental cues and may maintain a relatively positive emotional response despite negative parental behaviors.

3. Rejection and inconsistent discipline were expected to be more strongly related to adjustment problems for children low in self-regulation, as measured by high impulsivity, than those low in impulsivity. Impulsive children may be less able to regulate their emotional and behavioral responses and, with the disruption of parental regulation of their emotions and behavior, may be more likely to demonstrate adjustment problems.

Method

Participants

Recruitment and Eligibility

Participants were 231 mothers and children, 9 to 12 years old, who were involved in a larger experimental trial of a preventive intervention for children of divorce. The larger sample consisted of 240 mothers and children who met eligibility criteria and were randomly assigned to one of the intervention conditions.[1] Court records served as the primary method of recruitment, accounting for 83% of the sample. Twelve percent of the families responded to newspaper ads, 2% responded to television or radio ads, and 3% were obtained through referrals. Families were screened to satisfy inclusion criteria that parents had been divorced for 2 years or less; mothers were not remarried, were not planning to remarry within the next 5 months, and did not have a live-in partner; children lived with their mothers at least half of the time; the interviewed child's

[1]Because the sample is drawn from an intervention sample, concerns about its representativeness can be raised. To address this issue, we recruited those who refused to participate in the intervention trial for an interview study, and 63% of refusers completed the interview. Although the two groups did not differ on a wide range of demographic variables, acceptors reported significantly higher incomes, more education, and fewer children than refusers. In addition, acceptors scored significantly higher on maternal report of child internalizing and externalizing problems and maternal report of rejection.

custody status was not expected to change over the next 5 months; the family was not planning to move a great distance within the next 5 months; both mother and child were fluent in English; the child was not learning disabled or mentally handicapped; the mother or target child was not concurrently receiving counseling by a mental health professional; and at least one child in the home was between 9 and 12 years old. In families in which there was more than one child in this age range, one child was randomly selected for participation. To participate in the study it was required that children who were previously diagnosed with attention deficit hyperactivity disorder (ADHD) be medicated to ensure their ability to participate appropriately in the child component of the intervention. One family was eliminated based on this criterion. Five children who participated in the study were diagnosed as having ADHD and were medicated.[2] Families were excluded from the study if the target child demonstrated significant adjustment problems at pretest (i.e., obtained a score on the Children's Depression Inventory [CDI; Kovacs, 1981] within the clinical range, ≥ 18, or scored in the 97th percentile on the Child Behavior Checklist [CBCL; Achenbach & Edelbrock, 1983] Externalizing scale) because such cases were not deemed appropriate for a preventive intervention.[3] Complete data on the variables in this study were available for 231 families (i.e., 9 families did not complete the temperament measures).

Sample Characteristics

The average age of the children was 10.3 years (*SD* = 1.1); 50.2% were girls. The average time since the divorce was 1.1 years (*SD* = 0.5). The average time since physical separation for the families was 2.3 years (*SD* = 1.3), with a range of 1 month to 12 years. The majority of the mothers were Caucasian (89%); 7% were Hispanic, 1% were African American, 1% were Asian or Pacific Islander, and 2% were families of other racial or ethnic background. The average age of the mothers was 37.4 years (*SD* = 4.8). The modal level of mothers' education was the completion of some college, and mothers' median annual income fell between $20,000 and $25,000. In 62% of the families, the mother had sole legal custody of the children, whereas 36% of the families had joint legal custody (i.e., both parents retained legal authority to make decisions concerning the child), and 2% of the families had split custody arrangements (i.e., siblings were in the legal custody of different parents). In terms of living arrangements, all children lived with their mothers at least 50% of the time. The average child spent 3.2 weekday evenings per month with their fathers (*SD* = 4.3, range = 0 to 30); 80% of the children spent 4 or fewer weekday evenings per month with their fathers. The average child spent 3.1 weekend days per month with their father (*SD* = 2.2, range = 0 to 12); 80% spent 4 or fewer weekend days per month with their fathers. The average number of contact hours per month, including sleeping hours, between fathers and children was 47.2 (*SD* = 65.1, range = 0 to 360); 80% spent 60 hours or fewer per month with their fathers.[4]

Procedure

This study utilized data from the first wave of interviews (pretest). All measures were collected prior to families being assigned to intervention conditions and the start of the intervention. Posttest and follow-up interviews were also conducted. Pretest data were used in this study because the intervention included a parenting training component; thus, changes in parenting over time due to the intervention were expected. The first interview occurred in the family's home. After confidentiality was explained, mothers signed informed consent forms, and children signed assent forms. The assent forms indicated that children's responses would not be shared with their mothers unless there was concern about child safety (i.e., high levels of depression, suicidal ideation, or child abuse). Mothers and children were interviewed by separate trained, professional interviewers in separate rooms to ensure the privacy of their responses. All measures, except temperament measures, were administered during the structured interviews with interviewers reading scripted instructions and all items on the questionnaires to the participants. Mothers' ratings of children's temperament were administered in a paper-and-pencil questionnaire, which the mothers were given during the

[2]Diagnoses of ADHD were not assessed or provided as part of this study. Information about types and dosage of medications is not available. The impact of this criterion on the results of this study is expected to be minimal because there were so few children who were diagnosed with ADHD.

[3]Temperament measures were not collected from children who were eliminated from the study as a result of scoring in the clinical range on the depression and conduct problems measures. Complete mother-report temperament data were available, and analyses using only mother report were conducted using this more complete sample. The pattern of results was largely similar; thus, the elimination of children who scored in the clinical range on the adjustment problem measures did not appear to markedly impact the results.

[4]The inclusion criterion that children live with their mothers at least 50% of the time was based on two considerations: (a) The primary study was an evaluation of a parenting program for mothers, thus mothers needed to have ample opportunity to practice the program skills with their children, and (b) to make generalizations to the population of divorced families, we did not restrict the sample to children who spent even more time in their mother's care, as most children of divorce have substantial contact with their fathers. Paternal variables were not collected because the focus of the study was on evaluating the effect of the parenting program on mothers' attitudes and behavior.

home interview and returned by mail or at the time of a second pretest interview. Approximately 2 weeks after the home interview, families were interviewed a second time at the research center, at which time children reported on their own temperament in a structured interview. Families received $45 compensation for participating in the interviews and $10 for returning the paper-and-pencil questionnaire.

Measures

Mother and child reports were obtained on all measures and were combined by standardizing scale scores for each reporter and summing across reporter to create cross-reporter composites of all constructs. Measures were combined to reduce the effects of bias and shared method variance on the results and to reduce the number of statistical tests, thereby reducing the likelihood of chance significance.

Predictors

Parenting. Participants reported on the Rejection and Inconsistent Discipline subscales of the revised Child Report of Parenting Behavior Inventory (CRPBI; Schaefer 1965; Teleki, Powell, & Doddler, 1982). The CRPBI was originally developed as a child-report measure of children's perception of their parents. The items were reworded for mother report. Participants respond using a 3-point scale to indicate whether each item is 0 (*not like*), 1 (*somewhat like*), or 2 (*like*) the mother. In a previous sample of children of divorce, internal consistencies as measured by coefficient alpha for the Rejection and Inconsistent Discipline subscales were .88 and .69, respectively (Wolchik et al., 1993). In this study, alphas for mother-report Rejection and Inconsistent Discipline were .80 and .82, respectively; alphas for child-report Rejection and Inconsistent Discipline were .87 and .74, respectively. Mother- and child-report Rejection and Inconsistent Discipline were correlated .18 and .14, respectively. The weighted alphas for the composite scales combined across reporter were .85 and .78 for Rejection and Inconsistent Discipline, respectively.

Temperament: Emotionality and regulation. A problem that arises in studies of temperament–adjustment relations is the potential overlap in measures. In a previous study using the sample used here, steps were taken to minimize overlap between measures of the temperament dimensions of negative and positive emotionality and impulsivity and adjustment measures of depression and conduct problems by eliminating items that were identified on a conceptual or empirical basis as overlapping the constructs. The revised measures demonstrated acceptable validity and reliability (Lengua, West, & Sandler, 1998). These "uncontaminated" measures of temperament and adjustment problems were used in this study.

The emotionality dimension of emotionality, activity, and sociability (EAS; Buss & Plomin, 1984) was used to measure negative emotionality. The scale assesses the frequency of negative emotions (e.g., anger, fear), the intensity of the response, and the threshold of the response (e.g., "I frequently get distressed," and "I get troubled by everyday events"). An average internal consistency reliability of the three EAS dimensions of .83 and a 1-week test–retest correlation of .72 for emotionality have been reported (Buss & Plomin, 1984). Four mother-report items and two child-report items were eliminated because of overlap with adjustment problem measures. In this study, the alphas were .69 and .70 for mother and child report, respectively. Mother and child report negative emotionality were correlated .27, and the weighted alpha for the composite scale combined across reporter was .70.

Positive emotionality was assessed using the seven-item Positive Mood scale of the Dimensions of Temperament Survey–Revised (DOTS–R; Windle & Lerner, 1986), which assesses the frequency of smiling and laughter and general cheerful or happy mood (e.g., "My child laughs and smiles at a lot of things," and "My child's mood is generally cheerful"). An alpha of .80 has been reported for a sample of elementary school children (Windle & Lerner, 1986). In the study reported here, alphas were .90 and .79 for mother and child report, respectively. Mother- and child-report positive emotionality were correlated .24, and the weighted alpha for the composite scale combined across reporter was .85.

Impulsivity was measured using the 13-item Impulsivity subscale of the Child Behavior Questionnaire (Goldsmith & Rothbart, 1991), which measures the speed of response initiation (e.g., "Usually rushes into an activity without thinking about it," and "Sometimes interrupts others when they are speaking"). An alpha of .78 has been reported (Goldsmith & Rothbart, 1991). The scale was reworded for children's self-report. Six mother-report and 7 child-report items were eliminated due to overlap with adjustment measures. In this sample, alphas were .76 and .72 for mother and child report, respectively. Mother- and child-report impulsivity were correlated .13, and the alpha for the composite scale combined across reporter was .74.

Children's Adjustment Problems

Measures were selected to assess mother and child report on parallel constructs of children's adjustment problems. Also, as mentioned earlier, the measures were revised to minimize overlap with the temperament measures.

Depression. Child report on the 27-item CDI (Kovacs, 1981) was obtained. Alphas for the scale have ranged from .71 (Kovacs, 1981) to .94 (Saylor, Finch, Spirito, & Bennett, 1984). Scores on the CDI have been shown to discriminate clinically depressed and nondepressed psychiatric patients (Saylor et al., 1984). In this study, one item was eliminated as a result of overlap with the temperament measures, and the alpha was .83. Mother report of child depression was assessed using items from the CBCL (Achenbach & Edelbrock, 1983). A measure of children's depression (19 items) was constructed using items rated by experts in clinical psychology as assessing the construct (Gersten, Beals, West, & Sandler, 1987). Scores were the sum of the items. An alpha of .82 was reported in a sample of children of divorce (Sandler, 1992). One item was eliminated due to overlap with temperament measures, and the alpha was .81. Mother- and child-report depression were correlated .35. The weighted alpha for the composite scale combined across reporter was .82.

Conduct problems. Child-report conduct problems were measured using the Delinquent and Aggressive Behavior subscales (28 items) of the Youth Self-Report (YSR; Achenbach & Edelbrock, 1983). The YSR has been found to discriminate clinic-referred and nonreferred adolescents, and 1-week test–retest reliabilities of .72 and .79 for the Delinquent and Aggressive Behavior subscales, respectively, were reported (Achenbach & Edelbrock, 1983). In this study, four items were eliminated as a result of overlap with temperament measures, and alpha was .86. Mother-report conduct problems were assessed using items from the CBCL (Achenbach & Edelbrock, 1983). A measure of conduct problems (23 items) was constructed with no items overlapping the depression measure using items rated by experts in clinical psychology as assessing the construct (Gersten et al., 1987). Scores were the sum of the items. An alpha of .88 was reported for this scale (Sandler, 1992). Three conduct problem items were eliminated due to overlap with temperament measures. In this study, alpha was .87. Mother- and child-report conduct problems were correlated .29, and the weighted alpha for the composite scale combined across reporter was .87.

Results

Preliminary Analyses

Regression diagnostics were conducted prior to the test of the hypotheses. First, the presence of outliers and influential cases was assessed using the leverage, studentized deleted residual, DFFits, and DFBetas statistics (Bollen & Jackman, 1990). Two cases were identified as influential outliers. Regression analyses were conducted, dropping these cases to assess the degree to which the findings were influenced by their presence. No changes occurred in the pattern of significant effects. Because of the consistency in the results, the outliers were retained in all subsequent analyses. Next, checks on assumptions of multiple regression were conducted. Least-squares regression assumes normality in the distribution of variables. In this study, absolute values of skewness ranged from 0.08 to 0.97. Absolute values of kurtosis ranged from 0.23 to 0.83. These values do not represent major deviations from normal distributions. Also, multicollinearity among the predictors was assessed using the variance inflation factor (VIF) statistic. In this sample, the VIFs ranged from 1.02 to 1.98, all within acceptable ranges.

The correlations among the variables are presented in Table 1. The temperament dimensions were moderately correlated with each other (r = –.42 for negative and positive emotionality; r = .48 for negative emotionality and impulsivity; r = –.20 for positive emotionality and impulsivity). The parenting (r = .69) and adjustment dimensions (r = .60) were moderately correlated. These correlations suggest that the variables within the domain (i.e., temperament, parenting, and adjustment problems) were correlated but not redundant.

Table 1. *Intercorrelation among variables included in the study*

	1	2	3	4	5	6	7	8	9	10
1. Age	—									
2. Sex[a]	.08	—								
3. Time Since Separation[b]	.02	.06	—							
4. Negative Emotionality	.08	.11	–.03	—						
5. Positive Emotionality	.00	–.28**	–.04	–.42**	—					
6. Impulsivity	.13	.21**	.07	.48**	–.20*	—				
7. Rejection	.00	.04	.04	.36**	–.32**	.26**	—			
8. Inconsistency	.03	.08	.01	.32**	–.28**	.27**	.69**	—		
9. Depression	.01	.12	.06	.57**	–.57**	.37**	.45**	.42**	—	
10. Conduct Problems	.04	.30**	.05	.48**	–.43**	.54**	.51**	.51**	.60**	—

Note: N = 231.
[a]Sex is coded girls = 1, boys = 2. [b]Variable is the number of months since parental separation.
*p < .05. **p < .01, two-tailed significance test.

Table 2. *Standardized regression coefficients resulting from hierarchical regression analyses testing interactions between parenting and temperament*

	Depression				Conduct Problems			
Predictors	***B***	***SE B***	β	ΔR^2	***B***	***SE B***	β	ΔR^2
Step 1								
Child Age	–.00	.10	–.00	.02	.02	.09	.01	.09
Child Sex	.40	.22	.12		.96	.20	.30***	
Time Since Separation	.00	.01	.05		.00	.01	.04	
Step 2								
Rejection	.36	.08	.33***	.23	.34	.07	.33***	.30
Inconsistency	.20	.09	.19*		.29	.07	.27***	
Step 3								
Negative Emotionality	.29	.06	.28***	.27	.11	.06	.11	.16
Positive Emotionality	–.38	.06	–.37***		–.16	.05	–.16**	
Impulsivity	.12	.06	.11		.35	.06	.32***	
Step 4[a]								
Negative Emotionality								
× Rejection	.07	.04	.10*	.01	.03	.04	.04	.00
× Inconsistency	–.01	.04	–.01		–.01	.04	–.02	
Positive Emotionality								
× Rejection	–.10	.04	–.16**	.02	–.09	.04	–.14*	.02
× Inconsistency	–.01	.05	–.01		.01	.04	.02	
Impulsivity								
× Rejection	–.04	.04	–.06	.02	.03	.04	.05	.02
× Inconsistency	.13	.05	.16**		.08	.04	.12*	

Note: Sex is coded girls = 1, boys = 2.
[a]Interactions entered in pairs by temperament.
*$p < .10$. **$p < .05$. ***$p < .01$.

Tests of the Research Questions

The hypotheses were examined using multiple regression analyses to test the interactive effects of the three temperament variables (negative emotionality, positive emotionality, impulsivity) with the two parenting variables (rejection, inconsistent discipline) in predicting the two criterion variables (depression, conduct problems). Each predictor variable was initially centered (converted into deviation score form) to minimize multicollinearity, and interaction terms were formed as the product of the two centered predictors (Aiken & West, 1991). Following the recommendations of Aiken and West (1991) and Cohen and Cohen (1983), we used a hierarchical order of entry of the predictor variables in which covariates were entered first, then the main effects of the predictor variables, followed by interaction terms. Interaction terms were entered in pairs of each temperament dimension with the two parenting dimensions in order to reduce the likelihood of both interactions being significant simply as a result of the shared temperament component of the interaction. The order in which the sets of predictors were entered into the regression equation was: (a) age, sex, and time since parental separation; (b) the two parenting variables (rejection, inconsistency); (c) the three temperament variables (negative and positive emotionality, impulsivity); and (d) both Temperament × Parenting product terms for each temperament dimension (i.e., Negative Emotionality × Rejection and Negative Emotionality × Inconsistency; Positive Emotionality × Rejection and Positive Emotionality × Inconsistency; Impulsivity × Rejection and Impulsivity × Inconsistency). This order of entry allows assessment of the significance of the interaction effects over and above the combined (additive) effects of all the predictors and the independent effects of each pair of interaction terms, providing a more conservative test of each interaction and allowing a test of an additive model of the direct and interactive effects of parenting and temperament. The significant interactions were probed using the techniques outlined by Aiken and West (1991). In this procedure, the effects of parenting variables on outcome variables are estimated at 1 *SD* below the mean (low), at the mean (medium), and 1 *SD* above the mean (high) on the temperament variables.

The results are presented in Table 2 and Figures 1 through 4.[5] Both parenting and temperament had direct effects on children's adjustment problems. Rejection

[5]When predictor variables are highly correlated, moderator effects may be spurious, resulting when a quadratic trend better characterizes the structural relation between the predictors and criteria (Lubinski & Humphreys, 1990). It is recommended that the quadratic term for each variable in the interaction be entered simultaneously with the interaction term to assess which function form best characterizes the higher order relation between the predictor and criteria. Thus, in this study, regressions were conducted in which the quadratic parenting and temperament terms were entered simultaneously with the Parenting × Temperament interactions. All significant Parenting × Temperament interactions remained significant.

and inconsistent discipline were related significantly to both depression and conduct problems. Negative emotionality significantly predicted depression, whereas impulsivity significantly predicted conduct problems. Positive emotionality predicted lower levels of both depression and conduct problems. These results suggest that temperament has an additive effect over parenting in predicting children's adjustment problems.

There were a total of 4 out of 12 significant interactions. Positive emotionality interacted with rejection to predict both depression and conduct problems such that rejection was more strongly related to adjustment problems for children who were low in positive emotionality than for those who were moderate or high in positive emotionality (see Figures 1 and 2). Impulsivity moderated the relation between inconsistent discipline and both depression and conduct problems such that inconsistent discipline was more strongly related to adjustment problems for children high in impulsivity than for children moderate or low in impulsivity (see Figures 3 and 4).

Discussion

The questions investigated in this study begin to address the complex interplay between child temperament and parenting in predicting children's adjustment. Using a cross-sectional design, this study tested hypotheses that parenting and temperament would have both additive and interactive effects on children's adjustment in a sample of children who had experienced parental divorce. Consistent with past research, maternal rejection, inconsistent discipline, and child temperament were directly related to children's adjustment problems. In addition, significant interactions between some of the parenting and temperament dimensions indicate that children differ in risk for developing adjustment problems in the presence of poor-quality parenting. The results provided support for the hypotheses that inconsistent discipline would have a stronger relation to children's adjustment problems for children high in impulsivity and rejection would have less of an association with adjustment problems for children high in positive emotionality.

Direct Effects of Parenting and Temperament

Consistent with previous findings, parenting was directly related to children's depression and conduct problems (Loeber & Stouthamer-Loeber, 1986; Maccoby & Martin, 1983). Parental rejection may lead to insecurity or low self-esteem in children, and inconsistent discipline might result in inconsistent behavioral contingencies, an unpredictable environment, and a reduced sense of control, which in turn might increase the likelihood of adjustment problems. Temperament was also directly associated with adjustment problems

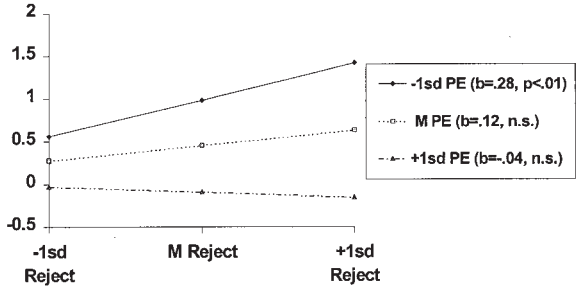

Figure 1. Interactions between positive emotionality and parental rejection predicting depression. Simple slopes are unstandardized regression coefficients.

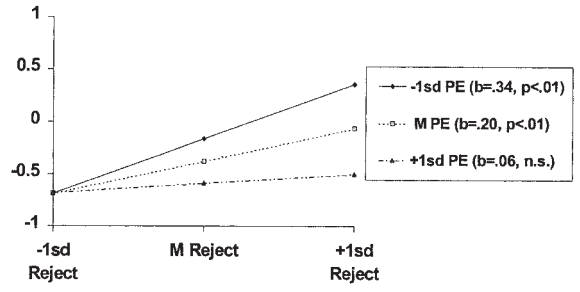

Figure 2. Interactions between positive emotionality and parental rejection predicting conduct problems. Simple slopes are unstandardized regression coefficients.

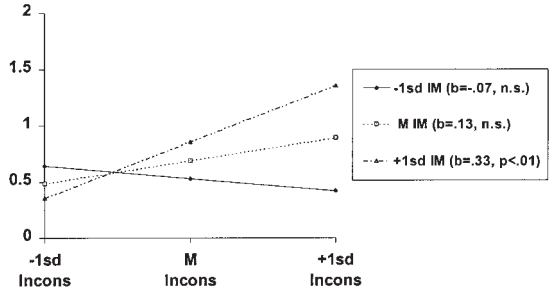

Figure 3. Interactions between impulsivity and inconsistent discipline predicting depression. Simple slopes are unstandardized regression coefficients.

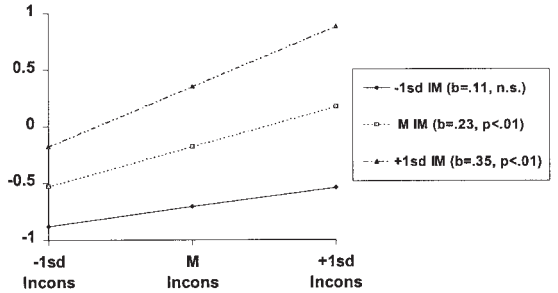

Figure 4. Interactions between impulsivity and inconsistent discipline predicting conduct problems. Simple slopes are unstandardized regression coefficients.

as in previous studies (Rothbart & Bates, 1998). Numerous mechanisms are posited for the association between temperament and adjustment problems. For example, temperament may operate as a diathesis, predisposing an individual to develop adjustment problems under conditions of stress. Temperament may also shape an individual's environment or experiences by influencing the settings one chooses or by biasing information processing (Rothbart & Bates, 1998).

It is important to note that the effect of each of the temperament variables is a unique effect, controlling for the parenting variables. These findings are consistent with previous findings that both parenting and temperament independently predict children's adjustment in divorce samples (e.g., Hetherington, 1989; Kurdek, 1988), as well as in nondivorce samples (e.g., Bates et al., 1998; Colder et al., 1997; Smith & Prior, 1995). The variables appear to have additive effects in predicting children's symptoms following divorce, highlighting the importance of taking both parenting behaviors and child characteristics into account when predicting children's adjustment (Sanson & Rothbart, 1995).

Although there are main effects of the parenting and temperament variables, the presence of significant interaction effects suggests that some of the effects of the parenting variables may depend on child temperament characteristics. However, numerous nonsignificant interaction effects suggest that the direct, additive effects of parenting and temperament on adjustment problems may be more salient than interaction effects in predicting children's adjustment problems.

Parenting and Temperament Interactions

Investigation of interaction effects can help differentiate the children most strongly affected by negative parenting, which may help improve the prediction of children's adjustment problems and the identification of children at greatest risk for developing adjustment problems. Six interactions between the three temperament and two parenting dimensions were proposed and tested using cross-reporter measures of the constructs. The use of measures that combined both mother and child report of the constructs minimized the likelihood that the significant interactions were simply due to shared method variance.

Positive emotionality moderated the relations between rejection and both depression and conduct problems. Rejection was more strongly related to adjustment problems for children who were low in positive emotionality than those high in positive emotionality. Positive emotionality appears to operate as a protective factor, buffering the impact of maternal rejection. Children high in positive emotionality may be better able to focus on positive aspects of their environment and to maintain positive affect in the presence of parental rejection, which may result in greater self-esteem or satisfaction with their life. In addition, children high in positive emotionality may have more positive interactions or supportive relationships with others that might further mitigate the impact of parental rejection. Several studies have shown that positive temperament dimensions such as approach, adaptability, and attention control predict lower adjustment problems or positive adjustment (e.g., Eisenberg et al., 1997; Rubin, Coplan, Fox, & Calkins, 1995; Wertlieb, Weigel, Springer, & Feldstein, 1987) and interact with other risk factors (e.g., Werner & Smith, 1982; Wertlieb et al., 1987). For example, activity level and social responsiveness or approach discriminated resilient versus nonresilient children in a sample of children exposed to multiple risk factors (Werner & Smith, 1982). Because this is the first study to document protective effects of positive emotionality in interaction with parenting, replication of these findings is important. If the protective effects are replicated, future research should examine the mechanisms that explain this protective effect.

Impulsivity interacted with inconsistent discipline to predict both depression and conduct problems. As expected, inconsistent discipline was more strongly related to adjustment problems for children who were high in impulsivity. Impulsive children may be more vulnerable to the effects of parental inconsistency in enforcing limits because, unlike less impulsive children, they have difficulty regulating their emotions and behaviors on their own. For impulsive children, parental control may play a particularly important role in facilitating self-regulation, without which impulsive children may be at greater risk for developing conduct problems. In addition, the interaction of impulsivity and inconsistent discipline also predicted depression such that inconsistent discipline was more strongly related to depression for children high in impulsivity. Impulsivity generally has not been found to be directly related to depression, but rather has been identified as a specific predictor of externalizing problems (cf. Rothbart & Bates, 1998). It is possible that for highly impulsive children inconsistent parenting is related to greater difficulty with behavioral regulation or compliance, which may in turn lead to more aversive interactions with others. Highly impulsive children may engender more negative interactions with parents, teachers, peers, and their environment, which can lead to low self-esteem, withdrawal from social interactions, and depression.

None of the Parenting × Negative Emotionality interactions were significant. Thus, although negative emotionality uniquely predicted depression, it did not appear to exacerbate the effects of rejection or inconsistent discipline on children's adjustment problems. Negative emotionality has been identified as a general risk factor for adjustment problems in children

(Rothbart & Bates, 1998) and appears to predict adjustment problems independently of negative parenting. This pattern of results may have been related to the use of a general negative affect measure in this study. It is possible that specific dimensions of negative emotionality would interact differently with parenting, thus masking the presence of effects for a general dimension. For example, the measure of general negative emotionality used in this study includes dimensions of fear and frustration. Interactions between children's fearfulness and parental rejection may be more likely to predict depression, whereas the frustration dimension may interact with rejection and inconsistent discipline to predict conduct problems. There was a trend toward significance in the interaction between negative emotionality and rejection in predicting depression that lends support to this possibility. With more specific measures, interactions between dimensions of negative emotionality and parenting might emerge. Such specificity in the prediction of adjustment problems should be explored in the future.

The Parenting × Temperament interactions accounted for 2% of the variance beyond that accounted for by the direct effects of these variables. This effect size is consistent with reviews of studies of interactive effects in personality and applied psychology (Champoux & Peters, 1987; Chaplin, 1991, 1997). This small magnitude of effect is to be expected for two reasons. First, the predicted form of the interaction is ordinal rather than crossover; that is, the strength but not the direction of the relation between parenting and adjustment is modified by temperament. Second, the reliability of the product term will be less than or equal to the less reliable of the two first-order predictors (Aiken & West, 1991). Consequently, the magnitude of the observed effect size of the interaction can be expected to be an underestimate of the true effect size. In addition, the estimation of interaction effects in regression uses the full range of the variables being investigated, whereas in other approaches, cases are often selected from the extremes of the distributions of continuous variables, increasing the observed effect size (McClelland & Judd, 1993).

The findings of this study are consistent with findings of the few previous studies investigating temperament and parenting interactions. In general, those studies have shown that difficult temperament increased the likelihood that children would develop adjustment problems in the presence of negative parenting (e.g., Maziade et al., 1985; Sanson et al., 1991). This study differs from these others in its attention to the relation between specific dimensions of both temperament and parenting. Difficult temperament is a combination of dimensions such as negative emotionality and poor self-regulation. Negative emotionality and impulsivity operated differently in this study, and in future research hypothesized interactions between specific dimensions of temperament and parenting should be investigated further. In addition, this study investigated the moderating effects of positive emotionality, with initial evidence that it operates as a protective factor.

The moderating effects of temperament may apply to other risk or protective factors as well. For example, Wertlieb et al. (1987) found that temperament dimensions of distractibility, threshold, and approach moderated the relation between stressful life events and adjustment problems in children. Another study investigated the interaction between temperament and coping, finding that the coping efforts of children high in adaptability and flexibility were more effective in reducing anxiety than the coping efforts of children low in adaptability and flexibility (Lengua & Sandler, 1996). Further tests of the interactions between temperament and risk or protective factors may increase our understanding of which children are most vulnerable or resilient in high-risk situations.

Limitations and Future Directions

There were a number of limitations of this study. The reliance on questionnaire measures increases the likelihood of method bias or confound among the measures. For example, children with particular temperament characteristics or adjustment problems may rate parents differently. This is partially addressed by combining measures across reporters, such that bias alone cannot account for the results. However, the results would be further strengthened by the inclusion of other reporters, such as fathers or teachers, and laboratory or observational measures of the constructs. The cross-sectional nature of the study also raises concerns that the same behaviors underlie reports of the dimensions. Efforts to reduce overlap between the temperament and adjustment measures were taken in a previous study (Lengua et al., 1998), and those uncontaminated measures were used in this study. In addition, the findings point to the complexity of the relations investigated. Particularly in a cross-sectional study such as this, it is not possible to determine the direction of effects among the variables. It is possible that parental rejection and inconsistent discipline exacerbate the effects of children's emotionality and impulsivity on adjustment problems, or that children's adjustment problems lead them to be more emotional or impulsive and result in greater rejection and inconsistency from parents. Thus, longitudinal research is needed to disentangle the associations among parenting, temperament, and adjustment problems. Also, generalizability of the current findings is limited to children of divorce. The proposed Temperament × Parenting interactions may be similar in other high-risk samples, and may also reflect general processes in normative development. Thus, Tempera-

ment × Parenting interactions should be investigated in other high-risk and normative samples to explore the generalizability of these results. Finally, the important roles fathers play in children's lives is increasingly recognized, and future investigations of the interactions between fathering and temperament are needed.

Summary and Implications

The results of this study indicate that parenting and temperament operate together to predict children's adjustment problems. Parenting and temperament variables had independent direct relations to children's adjustment, which is consistent with an additive model of their effects. In addition, the interaction between parenting and temperament was tested. There was support for some of the proposed interactions between temperament and parenting adding prediction over and above the direct effects of parenting and temperament. Positive emotionality moderated the relation between rejection and adjustment problems, and impulsivity moderated the relation between inconsistent discipline and adjustment problems. Temperament appears to mitigate or exacerbate the effects of negative parenting. These interactions must be interpreted in the context of the unique direct effects of the predictors that were consistent with findings from previous studies. Taken together, these results suggest that children's temperament and parents' rejection and inconsistent discipline together predict children's adjustment, but that there are individual differences in children's vulnerability to the influence of negative parenting.

These results may have important implications for understanding children's adjustment to divorce. First, one task of prevention researchers is to identify those children who are at greatest risk of developing adjustment problems (e.g., Lorion, Price, & Eaton, 1989). The results of this study suggest that parenting and temperament can predict children who are at risk for developing adjustment problems. Also, aspects of temperament that may render children more or less vulnerable to the effects of stressful conditions can be used to identify a subset of children who may be particularly at risk for developing adjustment problems following divorce. With further research, such information might be useful in making decisions about which children would most likely benefit from targeted preventive interventions. Evidence suggests that the children who benefit most from prevention programs are those demonstrating the greatest level of risk (e.g., Wolchik et al., 1993). Thus, targeting those children for intervention may increase the cost-effectiveness of preventive efforts.

In addition, the results of this study provide information that may be useful in planning interventions. Postdivorce parenting interventions can include attention to children's temperament. There is evidence that temperament-focused parenting interventions that include information about individual temperament differences and behavior management techniques that can complement children's behavioral style are effective in improving parent–child relationships and parents' sense of parenting competence (e.g., Sheeber & Johnson, 1994). Future research should assess the benefits of incorporating such information into existing parenting programs. Interventions can be tailored for individual parents, particularly to enhance parenting skills for difficult-to-manage children.

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