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Parent–infant interactions among families with alcoholic fathers

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Abstract

The purpose of this study was to examine the relationship between fathers' alcoholism and the quality of parent–infant interactions during free play. A related goal was to study the potential mediating or moderating role of comorbid parental psychopathology, such as depression and antisocial behavior, difficult infant temperament, and parental aggression. The sample consisted of 204 families with 12-month-old infants (104 alcoholic and 100 control families), recruited from New York State birth records. Results indicated that fathers' alcoholism was associated with a number of other risk factors (depression, antisocial behavior, and family aggression). Fathers' alcoholism was also associated with more negative father–infant interactions as indicated by lower paternal sensitivity, positive affect, verbalizations, higher negative affect, and lower infant responsiveness among alcoholic fathers. As expected, fathers' depression mediated the relationship between fathers' alcoholism and sensitivity, while maternal depression mediated the association between maternal alcohol problems and maternal sensitivity. Parents' psychopathology did not moderate the association between alcoholism and parent–infant interactions. The results from the present study suggest that the origins of risk for later maladjustment among children of alcoholic fathers are apparent as early as infancy and highlight the role of comorbid parental risk factors.

The research literature on children of alcoholics clearly suggests that they are at higher risk for a number of maladaptive outcomes during adulthood and adolescence (Chassin, Rogosch, & Barrera, 1991; Johnson, Leonard, & Jacob, 1989; Steinglass, 1987; West & Prinz, 1987). These outcomes include a number of different psychiatric disturbances and substance abuse during adulthood and conduct problems, attentional difficulties, and impulsivity during childhood and adolescence (see Russell, Henderson, & Blume, 1984; West & Prinz, 1987). Other studies have noted the relationship between parental alcoholism and quality of family interactions, with interactions among spouses and adolescent children of alcoholics characterized by lower rates of problem solving and higher rates of negativity (Jacob & Krahn, 1988; Jacob, Krahn, & Leonard, 1989; Jacob & Leonard, 1988). Fewer studies have focused on younger children of alcoholics. Recent reports from the Michigan State University–University of Michigan longitudinal study have suggested that among sons of alcoholic parents, antecedents of later maladjustment are apparent as early as the preschool period (Jansen, Fitzgerald, Ham, & Zucker, 1995; Noll, Zucker, & Greenberg, 1990; Zucker & Fitzgerald, 1991). As noted by Fitzgerald et al. (1993), virtually nothing was known longitudinally about the origins of risk for children of alcoholic fathers during infancy or early childhood.

One significant indicator for high risk may be disturbances in the parent–child relationships (see Zucker & Gomberg, 1986). The study of parent–infant interactions among alcoholic families is important for several reasons. First, several studies with older children of alcoholics have suggested that these families are characterized by negative parenting behavior and chaotic

home environments (see Jacob & Leonard, 1988; Zucker & Gomberg, 1986; Whipple, Fitzgerald, & Zucker, 1995), and these conditions may be present earlier as well. Second, the majority of nonorganic disorders in infancy are considered to be “relational” (i.e., attributable to problems in the parent–infant relationship and factors that impact this relationship; Cicchetti, 1989, p. 389). Thus, negative parent–infant interactions may be early indicators of later maladaptation (Belsky, 1984; Cicchetti & Aber, 1986; Field, 1992; Snyder & Huntley, 1990; Windle & Searles, 1990). Third, if indeed alcoholic families are characterized by negative interactions as early as infancy, the trajectory to later risk may be modified by targeting these families for parenting interventions. Greater knowledge about factors that may influence these interactions may also help with the design of preventive interventions targeting these indices of heightened risk.

It has been suggested that early developmental outcomes among offspring of alcoholics are most likely determined by a complex and dynamic interplay of multiple factors (see Sher, 1991). Accordingly, parent–infant interactions among alcoholic families may vary as a function of several comorbid disorders and associated family characteristics. Primary among these factors are antisocial behavior, depression, and family aggression. Antisocial behavior is of importance, not only because of the link with alcoholism and potential to influence parenting, but also because of possible genetic linkages to infant temperament (see Jansen et al., 1995; Tarter, Alterman, & Edwards, 1985; Windle, 1991). Taken together, both parental antisocial behavior and infant temperament may be significant influences on parent–infant interactions (Feldman, Greenbaum, Mayes, & Erlich, 1997; Van den Boom, 1994), although studies linking negative temperament to interactions are by no means consistent (Bates, Olson, Pettit, & Bayles, 1982; Vaughn, Taraldson, Crichton, & Egeland, 1981). Similarly, maternal depression is known to be a significant risk factor for poor mother–infant interactions and subsequent child outcomes. Studies have demonstrated that depressed mothers have lower levels of involvement, and are less verbally and emotionally responsive toward their infants (Rosenblum, Mazet, Benony, 1997; Jameson, Gelfand, Kulcsar, & Teti, 1997; Martinez, Malphurs, Field, & Pickens, 1996). Their infants are in turn likely to demonstrate lower positive affect and higher irritability (Martinez et al., 1996; Murray, Fiori–Cowley, Hooper, & Cooper, 1996) and interact more negatively with their mothers as well as strangers as early as 3 months of age (Field, 1992). However, little is known about the potential impact of fathers’ depression on the family and on father–infant interactions.

In addition to comorbid parental psychopathology, alcoholic families are frequently characterized by high levels of aggression or family violence (see Zucker & Gomberg, 1986). Several studies have underlined the influence of the marital relationship in general and marital or partner aggression in particular on parenting and child outcomes (Gordis, Margolin, & John, 1997; Jouriles, Norwood, McDonald, Vincent, & Mahoney, 1996; Margolin & John, 1997). For instance, in a study of 8- to 11-year old children, the impact of marital aggression on child adjustment was mediated through parenting for both boys and girls (Margolin & John, 1997). A second study indicated that exposure to physical aggression between parents during the previous year was associated with higher child withdrawal, anxiety, and distraction during a family discussion task (Gordis et al., 1997). Marital or partner aggression has also been directly associated with higher externalizing problems among children (Jouriles et al., 1996).

To date, only one study has examined family interactions during infancy as a function of fathers’ heavy drinking (Eiden & Leonard, 1996). The results of this study indicated that having a heavy-drinking partner was associated with lower maternal sensitivity during mother–infant interactions among 12- to 24-month old infants. Further, among mothers with light-drinking partners, those with higher marital satisfaction and lower depression were the most sensitive during interactions with their infants. Thus, family context and maternal psychopathology were significantly associated with maternal sensitivity only when fathers were not heavy drinking.

However, this study had several drawbacks. First, fathers were not diagnosed as alcoholics but were defined as heavy drinking on the basis of average daily alcohol consumption. Second, the age range of the infants was wide, given the extent of developmental changes in the first 2 years of life. Third, sample size was limited to 55 mother–infant dyads with only 23 families in the heavy-drinking father group. Lastly, the study did not include father–infant dyads. Thus, the impact of fathers' alcoholism on the quality of father–infant interaction remains uninvestigated to this date.

The purpose of the present study was to investigate the relationship between paternal alcoholism, associated psychopathology and aggression, infant temperament, and parent–infant interactions. It was hypothesized that fathers' alcoholism would be associated with lower parental sensitivity and higher negative affect. Infants of alcoholic fathers would in turn display lower responsiveness and higher negative affect during interactions. It was expected that parental depression, antisocial behavior, aggression, and difficult infant temperament would be associated with the quality of parent–infant interactions as well, and that they would mediate the relationship between fathers' alcoholism and interactions. We also explored the possibility that parents' psychopathology, parents' aggression, or infant temperament may interact with fathers' alcoholism to predict quality of interactions. We tentatively hypothesized that parental psychopathology, parental aggression, or difficult infant temperament may exacerbate the possibility of negative parent–infant interactions among alcoholic families.

Method

Participants

The participants were 204 families with 12-month-old infants who were recruited for an ongoing longitudinal study of parenting and infant development. Families were classified as being in one of two major groups: the control group, consisting of parents with no or few current alcohol problems ($n = 100$), and the father alcoholic group ($n = 104$). Within the father alcoholic group, 85 mothers were light drinking or abstaining and 19 mothers were heavy drinking or had current alcohol problems. The majority of the mothers in the study were Caucasian (94%), about 5% were African American, and 1% were Hispanic or Native American. Similarly, the majority of fathers were Caucasian (89%), a few were African American (7%), and the rest were Hispanic or Native American (4%). Although parental education ranged from less than high school degree to master's degree, about half the mothers (57%) and fathers (55%) had received some post-high-school education or had a college degree. Annual family income ranged from \$4,000 to \$95,000 ($M = \$41,824$, $SD = 19,423$). All of the mothers were residing with the father of the infant in the study at the time of recruitment. Most of the parents were married to each other (88%), about 11% had never been married, and 1% were divorced or separated and living with a new partner. Mothers' age ranged from 19 to 41 years ($M = 30.43$, $SD = 4.58$) and fathers' age ranged from 21 to 58 years ($M = 32.94$, $SD = 6.06$). About 61% of the mothers and 91% of the fathers were working outside the home. Mothers' work hours ranged from 5 to 72 hr per week ($M = 16.63$, $SD = 16.38$ hr) and fathers' work hours ranged from 4 to 84 hr a week ($M = 40.71$, $SD = 16.65$ hr). A few of the families were on welfare (Aid to Families with Dependent Children, 6%), and about 4% of the fathers were receiving unemployment compensation. Parity ranged from one to five with the majority of families having one to two children including the target child (68%). About 18% of the infants in the study were only children. Thus, the majority of the families were middle-income, Caucasian families with one to two children in the household.

Procedure

The names and addresses of these families were obtained from the New York State birth records for Erie County. These birth records were preselected to exclude families with premature

(gestational age of 35 weeks or lower) or low birth weight infants (birth weight of less than 2500 grams); maternal age of less than 18 years or greater than 40 years at the time of the infant's birth; plural births (e.g., twins); and infants with congenital anomalies, palsies, or drug withdrawal symptoms. Introductory letters were sent to a large number of families ($n = 9457$) who met the above-mentioned basic eligibility criteria. Each letter included a form that all families were asked to complete and return (average response rate = 25%). Of these, about 2285 replies (96%) indicated an interest in the study. Only a handful of the replies ($n = 97$, or 4%) indicated lack of interest. Respondents were compared to the overall population with respect to information collected on the birth records. These analyses indicated a slight tendency for infants of responders to have higher Apgar scores ($M = 8.94$ vs. 8.97), higher birth weight ($M = 3460$ vs. 3516), and higher number of prenatal visits ($M = 10.31$ vs. 10.50). Responders were also more likely to be Caucasian (88% of total births vs. 91% of responders), have higher educational levels, and have a female infant. These differences were significant given the very large sample size, even though the size of the differences was minimal. Parents who indicated an interest in the study were screened by telephone with regard to sociodemographics and further eligibility criteria. Initial inclusion criteria consisted of both parents cohabiting since the infants' birth, infant being the youngest child in the family, mother was not pregnant at recruitment, no mother–infant separations for over a week, parents were the primary caregivers, and the infant did not have any major medical problems. These criteria were important to control because each of these has the potential to markedly alter parent–infant interactions. Additional inclusion criteria were utilized to minimize the possibility that any observed infant behaviors could be the result of prenatal exposure to drugs or heavy alcohol use. These additional criteria were that there could be no maternal drug use during pregnancy or the past year except for mild marijuana use (no more than twice during pregnancy), mother's average daily ethanol consumption was .50 oz or less (one drink a day), and she did not engage in binge drinking (five or more drinks per occasion) during pregnancy. During the phone screen mothers were administered the Family History Research Diagnostic Criteria (RDC) for alcoholism with regard to their partners' drinking (Andreasson, Rice, Endicott, Reich, & Coryell, 1986) and fathers' were screened with regard to their alcohol use, problems, and treatment.

Families meeting the basic inclusion criteria were provisionally assigned to one of two groups on the basis of parental screens (control, father alcoholic), and final group status was assigned on the basis of both the phone screen and questionnaires administered after the family began the study. Mothers in the control group scored below 3 on an alcohol screening measure (TWEAK; Chan, Welte, & Russell, 1993), were not heavy drinking (average daily ethanol consumption <1.00 oz), did not acknowledge binge drinking, and did not meet DSM-IV criteria for abuse or dependence. Fathers in the control group did not meet RDC criteria for alcoholism according to maternal report, did not acknowledge having a problem with alcohol, had never been in treatment, and had alcohol-related problems in fewer than two areas in the past year and three areas in his lifetime (according to responses on a screening interview based on the University of Michigan Composite Diagnostic Index, UM-CIDI; Anthony, Warner, & Kessler, 1994). The father alcoholic group consisted of two subgroups: one with partners who had low alcohol problems and the other with partners who had high alcohol problems. A family could be classified in the father alcoholic group by meeting any one of the following three criteria: (a) the father met RDC criteria for alcoholism according to maternal report; (b) he acknowledged having a problem with alcohol or having been in treatment for alcoholism, was currently drinking, and had at least one alcohol-related problem in the past year; or (c) he indicated having alcohol-related problems in three or more areas in the past year or met DSM-IV criteria for abuse or dependence in the past year. The subgroup of alcoholic fathers with light-drinking partners consisted of women who did not have alcohol-related problems (i.e., they met control group criteria). The subgroup of alcoholic fathers with heavy-drinking partners consisted of women who acknowledged alcohol-related problems (TWEAK score of 3 or higher, or met DSM-IV diagnosis for abuse or dependence) or were heavy drinking

(average daily ethanol consumption of 1.00 oz or higher or binge drinking). Approximately 80% of the women in this group met DSM-IV criteria for abuse or dependence.

It should be noted that women who reported drinking moderate to heavy amounts of alcohol during pregnancy (see criteria above) were excluded from the study in order to control for potential fetal alcohol effects. Because we had a large pool of families potentially eligible for the control group, control families were matched to the two other groups with respect to race or ethnicity, maternal education, child gender, parity, and marital status.

Families are asked to visit the Institute at four different infant ages (12, 18, 24, and 36 months), with three visits at each age. Extensive observational assessments with both parents are conducted at each age. The primary focus of the 12- and 18-month visits is on parent–infant interactions and attachment. The major focus of the 24- and 36-month visits is on parenting and toddler self-regulation (behavior problems, empathy, compliance, and internalization of parental rules). Assessments of cognitive and motor development are also conducted at each age. Two weeks before each visit, parents are sent a packet of questionnaires, one for each parent. Both parents were asked to complete the questionnaires independently and return them at the first visit. Families are paid \$850 for participating in all four waves of data collection. Recruitment is ongoing, and this paper focuses on the families who have completed the 12-month questionnaire and interaction data.

Measures

Parental alcohol use—Although parental alcohol abuse and dependence problems were partially assessed from the screening interview, self-report versions with more detailed questions were used to enhance the alcohol data and check for consistent reporting. A self-report instrument based on the UM-CIDI interview (Anthony et al., 1994; Kessler et al., 1994) was used to assess alcohol abuse and dependence. Several questions of the instrument were reworded to inquire as to “how many times” a problem had been experienced, as opposed to whether it happened “very often.” DSM-IV criteria for alcohol abuse and dependence diagnoses for current alcohol problems (in the past year) were used to assign final diagnostic group status. For abuse criteria, recurrent alcohol problems were described as those occurring at least 3–5 times in the past year or 1–2 times in three or more problem areas. This instrument was also used to derive continuous measures of the number of alcohol-related abuse and dependence symptoms in the past year. A quantity–frequency measure of alcohol use adapted from Cahalan, Cisin, and Crossley (1969) was used to obtain a measure of average daily ethanol intake for both parents. Finally, a measure indicating severity of heavy drinking was computed. This 5-item measure assessed the frequency of drinking six or more drinks, getting drunk, blacking out, passing out, and getting sick. Because of different variances, these items were standardized before summing. The internal reliability of this measure was excellent ($\alpha = .85$).

All of the alcohol measures were highly skewed and were transformed using square-root transformations. The resulting alcohol variables for each parent were strongly correlated with each other. Factor analyses were conducted to create composite factors with the three measures of last-year alcohol problems for each parent: number of last-year abuse or dependence problems, severity of heavy drinking, and average daily ethanol intake. The factor analyses yielded a single factor for each parent with high communality values ranging from .82 to .91 for fathers and from .71 to .87 for mothers. Two composite scores were created, representing paternal and maternal last-year alcohol problems. These scores were used in all analyses of continuous alcohol problems.

Parents’ antisocial behavior—A modified version of the Antisocial Behavior Checklist (ASB; Zucker & Noll, 1980) was used in this study. Because of concerns about causing family conflict as a result of parents reading each others responses, items related to sexual antisociality

and those with low population base rates (Zucker, 1995, personal communication) were dropped. This resulted in a 28-item measure of antisocial behavior. Parents were asked to rate their frequency of participation in a variety of aggressive and antisocial activities along a 4-point scale ranging from 1 ("never") to 4 ("often"). The measure has been found to discriminate among groups with major histories of antisocial behavior (e.g., prison inmates, individuals with minor offenses in district court, and university students; Zucker & Noll, 1980), and between alcoholic and nonalcoholic adult males (Fitzgerald, Jones, Maguin, Zucker, & Noll, 1991). Parents' scores on this measure were also associated with maternal reports of child behavior problems among preschool children of alcoholics (Jansen et al., 1995). The original measure has adequate test-retest reliability (.91 over 4 weeks) and internal consistency (coefficient $\alpha = .93$). The antisocial behavior scores for both fathers and mothers were skewed and were transformed using square-root transformations. The internal consistency of the 28-item measure in the current sample was quite high for both parents ($\alpha = .90$ for fathers and .82 for mothers).

Parents' depression—Both maternal and paternal depressive symptomatology was assessed by the Center for Epidemiological Studies Depression Inventory (CESD; Radloff, 1977). This is a widely used measure of depression among the general population with high internal consistency (Radloff, 1977) and strong test-retest reliability (Boyd, Weissman, Thompson, & Myers, 1982; Ensel, 1982). The depression scores for both parents were skewed and were transformed using square-root transformations. The internal consistency of this scale for the current sample ranged from .87 for fathers to .90 for mothers.

Parents' aggression—Two measures of verbal and physical aggression were used in this study. Mother and father reports of physical aggression were obtained from a modified version of the Conflict Tactics Scale (CTS; Straus, 1979). The items focusing on moderate (e.g., push, grab, or shove) to severe (e.g., hit with a fist) physical aggression, but not the very severe items (e.g., burnt or scalded, use of weapons) were used in this study. Parents were asked to report on the frequency of their own and their partners aggression toward each other on a 7-item scale. Two composite physical aggression scores, one for each parent, were created by taking the maximum of each parent and the partners' reports of aggression. The resulting scores were highly skewed and were transformed using square-root transformations. Verbal aggression was measured by a modified version of the Index of Spouse Abuse scale (ISA; Hudson & McIntosh, 1981). Only the verbal aggression items were used from the original scale. Parents were asked to report on the frequency of their partners' verbal aggression toward them on the resulting 15-item measure along a 5-point scale ranging from "never" to "frequently." A composite verbal aggression measure was created by summing the items and transforming the summed score. Factor analyses were conducted to create a composite measure of aggression reflecting both verbal and physical aggression. The factor analyses yielded a single factor for each parent with high factor loadings ranging from .86 for fathers' aggression toward mother to .85 for mothers' aggression toward father. Two composite scores were created representing overall paternal and maternal aggression. The internal consistencies of these two measures were quite high ($\alpha = .92$ for maternal aggression and $\alpha = .91$ for paternal aggression).

Infant temperament—Mother and father reports of infant temperament were obtained by the Infant Characteristics Questionnaire (ICQ; Bates, Freeland, & Lounsbury, 1979). The scale yields four factors: Fussy-Difficult, Unadaptable, Dull, and Unpredictable (Bates et al., 1979). The Fussy-Difficult factor has been found to be the most stable from 13 to 24 months and most highly correlated with other temperament scales. Internal consistency of this scale in this study was .82 for mothers and .79 for fathers. Thus, mother and father reports on the infant Fussy-Difficult scale were used in all further analyses.

Parent–infant interactions—Parents were asked to interact with their infants as they normally would at home for 5 min in a room filled with toys. These free-play interactions were coded using a collection of global 5-point rating scales developed by Clark, Musick, Scott, and Klehr (1980) with higher scores indicating more positive affect or behavior. These scales have been found to be applicable for children ranging in age from 2 months to 5 years (Clark et al., 1980).

All the scale points were clearly defined and appear to be directly related to the underlying construct. Clark (1986) found these scales to differentiate between psychiatrically ill and well mothers in terms of affective involvement, responsivity, and predictability in interactions with children, with psychiatrically ill mothers obtaining lower ratings on all these scales. Also, Eiden and Leonard (1996) found maternal sensitivity as coded by a portion of these scales to be associated with fathers' heavy drinking. Further, these scales have been found to differentiate more secure from less secure infants and preschoolers (Teti, Nakagawa, Das, & Wirth, 1991) and to be associated with maternal working models of attachment (using the Adult Attachment Interview) and child security (Eiden, Teti, & Corns, 1995).

The original collection of scales consisted of 29 scales measuring parental behavior and 27 scales measuring child behavior. One parent scale (structures and mediates environment) and two child behavior scales (compliance and motoric competence) were dropped from coding on an a priori basis because we anticipated these behaviors to be less relevant during free play and because motoric competence was being measured in a separate paradigm. Initial analyses of the remaining items indicated that several had low variability. These consisted of six parent scales (anxious mood, hypomanic mood, contingent responsivity to child negative behavior, evidence for behavioral disturbances, mirroring, and creativity) and nine child scales (attentional abilities, persistence, consolability, focus on parents' emotional state, visual contact, child initiations, quality of exploratory play, hyperactivity, and communicative competence). These scales were dropped from further analyses. The resulting 22 items for parent behavior and 16 items for child behavior were used in two separate factor analyses. These analyses yielded three scales for parenting behavior (negative affect, positive affect or involvement, sensitivity) and four scales for child behavior (negative affect, positive affect, responsiveness, passivity). Two parental scales (amount and quality of verbalizations) did not load uniformly on one of the three parental factors for mothers and fathers. However, because studies with older children of alcoholics had reported a general language deprivation among families with alcoholic fathers, these two highly correlated scales were combined into one composite scale reflecting parents' verbalizations ($\alpha = .67$ for mothers and $.62$ for fathers). The factor loadings for the remaining scales are presented in Table 1. Based on these factor analyses, three composite parenting scales and four composite child scales were created for mother–infant and father–infant interactions. The internal consistencies for these composite scales were quite high, ranging from $.83$ to $.94$ for mother–infant interaction scales and from $.77$ to $.90$ for fathers. Because we had no specific hypotheses regarding child passivity, the scale representing child passivity was not used in further analyses.

Two female coders rated parental behavior. The coding of maternal and paternal behavior was alternated between the two coders so that the coder who coded one parent did not code the other parent. Both coders were trained on the Clark scales by the first author and were unaware of group membership and of all other data. The interrater reliability was fairly high, ranging from $r = .89$ to $r = .95$ (Pearson correlations) for each of these seven composite scales.

Results

Analyses of variance was used to examine group differences on variables like family income, parental education, parental age, number of work hours, and parity. This analysis indicated

significant effects of group status on fathers' education, $F(1, 203) = 11.81, p < .01$, and maternal age, $F(1, 203) = 5.25, p < .05$. Alcoholic fathers were less educated ($M = 14.59$ and 13.33 , $SD = 2.75$ and 1.99 , for control and alcoholic groups respectively) and had younger partners ($M = 31.52$ and 30.05 , $SD = 4.55$ and 4.22 , for control and alcoholic groups respectively). Fathers' education was also correlated with fathers' parenting behavior during father–infant interactions ($r = .18, p < .01$, for sensitivity and positive affect, $r = .15, p < .05$, for negative affect; $r = .21, p < .01$, for verbalizations). Maternal age was associated with all the maternal parenting behaviors (maternal sensitivity and verbalizations, $r = .19, p < .01$; positive affect, $r = .15, p < .05$; and negative affect, $r = .18, p < .05$). Fathers with higher education and mothers who were older were generally more positive during interactions with their infants. Thus, fathers' education was used as a covariate in all analyses involving father–infant interactions. Maternal age was used as a covariate in analyses involving mother–infant interactions.

Possible child gender differences on parent–infant interaction ratings were examined using multivariate analyses of variance for father–infant and mother–infant interactions separately. These analyses yielded no gender differences on the quality of parent–infant interactions. Next, 2 (gender) $\times$ 2 (alcohol group status) analyses of variance were conducted to examine potential interaction effects of gender with parental alcohol group status on parent–infant interactions. No significant interactions were obtained. Thus, all further analyses were conducted with the combined data for both boys and girls.

Fathers' alcoholism, psychopathology, aggression, and infant temperament

Multivariate analysis of variance were used to examine group differences in paternal and maternal psychopathology and aggression. This analysis yielded a significant multivariate effect of fathers' alcoholism on parents' psychopathology and aggression toward partner, $F(6, 196) = 9.68, p < .001$. Univariate analyses indicated that alcoholic fathers were more antisocial and depressed and showed higher levels of aggression toward their partners and that mothers with alcoholic partners were more antisocial, more depressed, and also exhibited higher levels of aggression toward their partners.¹ Multivariate analyses of variance were also used to examine associations between group status and mother and father reports of infant temperament. These analyses yielded a nonsignificant multivariate effect of fathers' alcoholism on infant temperament. However, there was a marginal univariate effect of group status on father reports of infant temperament. Alcoholic fathers tended to view their infants as being more difficult (see Table 2).

Parental alcoholism and parent–infant interactions

Group differences in the quality of parent–infant interactions were examined using multivariate analyses of covariance with the seven composite parent–infant interaction scales for each parent as the dependent variables, after controlling for fathers' education. These analyses yielded a significant multivariate effect of fathers' alcoholism on the quality of father–infant interactions, $F(7, 195) = 2.67, p < .05$. As shown in Table 3, univariate analyses indicated that fathers in the alcoholic group exhibited significantly lower sensitivity, positive and negative affect and had lower verbalization scores during free-play interactions with their infants.² Further, infants of alcoholic fathers were significantly less responsive toward them. Contrary to our hypothesis, no significant group differences were obtained on the quality of mother–infant interactions.

¹Initial analysis indicated no significant differences between light- and heavy-drinking mothers with alcoholic partners except for mothers' antisocial behavior. Simple contrasts indicated that light-drinking mothers with alcoholic partners were less antisocial compared to heavy-drinking mothers with alcoholic partners ($M = 36.81, SD = 5.26$; $M = 41.37, SD = 8.75$, for the two groups).

²In general, when the continuous measure of fathers' alcohol problems were used in all analyses, similar results were obtained.

Maternal alcohol problems

Because of lack of adequate sample size to examine group differences in parent–infant interactions as a function of maternal alcohol problems, we conducted several exploratory analyses with the continuous measure of maternal alcohol problems in the last year. Partial correlations controlling for maternal age indicated significant associations between maternal alcohol problems and maternal sensitivity ($r = -.18, p < .05$). Mothers with higher current alcohol problems were less sensitive in their interactions with their infants.

Parental psychopathology, aggression, infant temperament, and parent–infant interactions

Correlational analyses were used to examine the associations between parental psychopathology, aggression, infant temperament, and parent–infant interactions (see Table 4). These analyses indicated significant associations between paternal psychopathology and aggression and paternal behavior during interactions with their infants. More specifically, higher depression, antisocial behavior, and aggression toward the partner among fathers was associated with lower father sensitivity. Further, fathers who were more antisocial and aggressive toward their partners displayed lower positive affect or involvement toward their infants, and fathers who were more aggressive also had a lower amount and quality of verbalizations. No associations were obtained with child behavior during father–infant interactions.

Mother–infant interactions were in general associated with aggression and maternal depression. Mothers who were more depressed were less sensitive ($r = -.17, p < .05$) and displayed lower positive affect ($r = -.15, p < .05$) during interactions with their infants. Further, mothers who displayed higher aggression toward their partners and experienced higher aggression from partners displayed lower positive affect during interactions ($r = -.14$ and $-.16$ for maternal and paternal aggression, respectively, $p < .05$).

Infant temperament was generally unrelated to parental or child behavior with a few exceptions. Maternal report of difficult infant temperament was associated with lower child positive affect during father–infant interactions. Similarly, father reports of infant difficult temperament was associated with lower maternal positive affect during mother–infant interactions ($r = -.14, p < .05$).

Mediational analyses

It was hypothesized that the impact of paternal alcoholism on the quality of parent–infant interactions would be mediated by parental psychopathology or aggression. Mediator analyses were conducted following guidelines by Baron and Kenny (1986). All four of fathers' parenting behavior variables met criteria for being mediators—namely, the predictor variable (fathers' alcoholism) and the mediators (psychopathology or aggression) must be associated, and both the predictor and the mediators must be associated with the criterion (e.g., fathers' sensitivity). The first set of analyses focused on fathers' sensitivity as the criterion variable. Fathers' sensitivity was associated with fathers' alcoholism and fathers' depression and antisocial behavior, as well as fathers' aggression (see Tables 3 and 4). In order to examine whether fathers' depression, antisocial behavior, and aggression mediated the relationship between paternal alcoholism and sensitivity, hierarchical multiple regression analyses were conducted, controlling for fathers' education and infant responsivity. However, because of collinearity among predictors, the mediators when entered together did not account for a significant amount of variance after entering fathers' education and group status. Thus, following Hoyle and Kenny (in press), separate regression analyses were conducted with each of the three mediators (fathers' depression, aggression, and antisocial behavior), followed by final regression analysis with only the significant predictors. These analyses indicated that fathers' antisocial behavior did not account for significant variance after fathers' education and alcohol group status were

in the equation. Thus, fathers' antisocial behavior was not considered as a mediator in the final analysis. Fathers' education was entered in the first step, followed by infant responsivity in the second step, fathers' alcohol group status in the third step, and the mediator variables (aggression and depression) in the last step. This model accounted for 24% of the variance in fathers' sensitivity. The test of whether the relationship between fathers' alcoholism and sensitivity declined when the mediators were included in the model was accomplished by multiplying the predictor–mediator and mediator–criterion coefficients and testing the difference of the product from zero using the standard error formula provided by Baron and Kenny (1986). This test indicated that there was a significant reduction in the association between fathers' alcoholism and sensitivity when fathers' depression was tested as the mediator. Although the inclusion of fathers' aggression reduced the association between alcoholism and sensitivity, the reduction was not significantly different from zero. Thus, fathers' aggression was only a partial mediator of the association between alcoholism and sensitivity (see Table 5).

Similar analyses were conducted with fathers' positive and negative affect and fathers' verbalizations. However, for each of the three parenting behaviors, fathers' psychopathology or aggression did not account for additional variance after fathers' education, infant responsiveness, and fathers' alcohol group status were entered in the equation. Thus, no mediational models could be tested for these parenting behaviors. None of the child behavior scales met criteria for mediation. Similar analyses were conducted to examine the mediation of the relationship between maternal alcohol problems and maternal sensitivity by maternal depression (see Table 5). Mothers' age was entered in the first step, followed by infant responsiveness to mother in order to control for these variables. Maternal alcohol problem score was entered next followed by maternal depression. As indicated in Table 5, there was no reduction in the association between maternal alcohol problems and maternal sensitivity when maternal depression was in the equation. Thus, maternal alcohol problems and maternal depression had independent associations with maternal sensitivity.

Moderator analyses

It was hypothesized that parental psychopathology, aggression, or infant temperament may moderate the impact of fathers' alcoholism on parent–infant interactions. More specifically, we expected that fathers' comorbid psychopathology and aggression may exacerbate the risk for poor father–infant interactions among alcoholic families. We also hypothesized that maternal psychopathology and family aggression may exacerbate the risk for poor mother–infant interactions among alcoholic families. Accordingly, two sets of regression analyses were conducted, one predicting mother–infant interaction variables and the other predicting father–infant interaction variables. The main effects were entered first, followed by interaction terms. No significant interaction effects were obtained.³

Predictors of child responsiveness: Exploratory analyses

Exploratory analyses were conducted examining potential predictors of infant responsiveness using two hierarchical regression analyses, one predicting infant responsiveness to father and the other predicting infant responsiveness to mother. For infant responsiveness to father, fathers' parenting behavior was entered in the first step, followed by fathers' alcoholism, psychopathology, and aggression in the second step, mothers' psychopathology and aggression in the third step, and maternal parenting behavior in the last step. Similarly, for infant responsiveness to mother, mothers' parenting behavior was entered in the first step, followed by

³Exploratory analyses were conducted testing the potential interaction of maternal psychopathology and fathers' alcohol group status on fathers' behavior and on child behavior with father. These analyses indicated that mothers' antisocial behavior and depression interacted with fathers' alcoholism to predict fathers' negative affect and infant responsiveness with father.

maternal psychopathology and aggression, fathers' alcoholism, psychopathology, and aggression in the third step, followed by fathers' parenting behavior. The final step with all the predictors explained 26% of variance in infant responsivity to fathers with fathers sensitivity and mothers' negative affect as the significant predictors (see Table 6). Similarly, in the model predicting infant responsivity to father, the final step with all the predictors accounted for 32% of variance, with maternal sensitivity and mothers' positive affect as the significant predictors (see Table 7).

Discussion

Theoretical explanations of the impact of alcoholism on the development of psychosocial problems in among the children of the alcoholics have argued that one of the major pathways to dysfunction is through disrupted parenting (Jacob & Leonard, 1994). While not disputing the possible roles of genetic factors and fetal exposure to alcohol, this approach suggests that parental alcoholism interferes with the adoption of the sensitive, nurturing role required of a parent. For the alcoholic parent, this interference may be the direct consequence of alcoholism or the result of the comorbid psychopathologies and associated behaviors that often accompany alcoholism. For the nonalcoholic parent, this interference may also be the result of associated psychopathologies or may reflect the impact of the stresses resulting from an alcoholic partner. In either case, we hypothesized that alcoholic families would be characterized by less sensitive and more negative parenting, and that this association would be mediated primarily by comorbid parental psychopathology or aggression.

The results of the present study were supportive of several aspects of this model but failed to find support for other aspects. In particular, the results indicated that alcoholic fathers displayed lower sensitivity and higher negative affect in their interactions with their infants than did nonalcoholic fathers. Further, parenting behavior predicted infant responsivity to both parents. This finding supports several lines of research on older children of alcoholics suggesting that one pathway to later risk within this high-risk population may be through negative parenting (see Zucker & Gomberg, 1986), but extends the importance of this finding to infancy. The results also demonstrated that several risk factors associated with paternal alcoholism like paternal depression, antisocial behavior, and aggression were associated with lower paternal sensitivity. Moreover, among these risk factors, parental depression mediated the relationship between parental alcohol problems and sensitivity, while fathers' aggression was a partial mediator of this association. The findings with regard to paternal depression highlight the need to examine fathers' psychopathology in studies of infant development. Future studies linking problematic father–infant interactions to subsequent infant functioning among families with depressed and alcoholic fathers are needed in order to examine potential long-term consequences of fathers' depression.

Both maternal alcohol problems and maternal depression had independent associations with maternal sensitivity. The association between maternal depression and lower maternal sensitivity replicates previous findings about the negative effects of maternal depression on parenting (see Jameson et al., 1997). The association between maternal alcohol problems and maternal sensitivity suggest the need to examine potential negative consequences of maternal postnatal alcohol problems on parenting and subsequent infant behavior. However, these results need to be viewed with caution given the small number of problem-drinking mothers in this sample.

Although maternal alcohol problems were associated with maternal sensitivity, our hypothesis regarding the association between paternal alcoholism and maternal sensitivity was not supported. This was contrary to our earlier study reporting lower sensitivity among women with heavy-drinking partners, which included mothers of 12- to 24-month- old infants (Eiden

& Leonard, 1996). One possible explanation for the different results may be the wider age range in the earlier study. Perhaps the impact of paternal alcoholism on maternal parenting behavior does not emerge until later in infancy. It may be that the impact of paternal alcoholism on mothers' behavior toward the infant is cumulative in nature, and begins to emerge as parenting demands increase. Indeed, a few studies on high-risk samples have suggested that maladjustment in the parent-child relationship may increase between 12 and 18 months among high-risk families (e.g., Lyons-Ruth, Repacholi, McLeod, & Silva, 1992). Clearly, this points to the need to examine this issue longitudinally, a task that we will address in the current study once the data from the 18-month follow-up has been collected. The outcome of such a follow-up should provide knowledge about the developmental period at which the impact of fathers' alcoholism on maternal parenting becomes evident, and this should help in the design of prevention or intervention efforts to improve parent-infant interactions in this high-risk population.

Fathers' alcoholism was not a significant predictor of infant responsivity with fathers after controlling for fathers' parenting behavior. Infant responsivity to both parents varied as a function of the immediate context of the interaction (i.e., the parenting behavior of that parent). Moreover, for infant responsivity to fathers, while paternal sensitivity in the immediate context of the interaction was the strongest predictor, mothers' negative affect influenced infants' behavior as well. Thus, mothers' negative affect seemed to be representing a general negative orientation in behavior that influenced infant behavior even outside the immediate context of interaction with their fathers. Although there was a marginal association between mothers' negative affect and antisocial behavior, mothers' negative affect during free-play interactions was unrelated to other psychopathology or to mothers' alcohol problems.

Although less central to the premise of this study, we hypothesized that fussy or difficult temperament would be associated with paternal alcoholism and would be a significant predictor of more negative parent-infant interactions. Problematic temperamental characteristics have been hypothesized to be a key causal factor in the development of alcoholism and related psychopathologies among children of alcoholics (Tarter & Vanyukov, 1997; Zucker, Ellis, Bingham, & Fitzgerald, 1996). This suggestion has been empirically validated by several researchers focusing on preschool and adolescent children of alcoholics, although the definition of problematic temperament specific to maladjustment within this population has never been clearly articulated (see Zucker et al., 1995). No existing studies have examined the relations between parental alcoholism and problematic temperament during infancy. The present results suggest that alcoholic fathers tend to report their infants as being more fussy or difficult compared to those in the control group. However, the differences were only marginally significant. Moreover, there were no group differences in maternal reports of infant temperament. Further, although maternal reports of infant temperament were associated with lower infant positive affect during interactions with father, few relationships emerged between difficult or fussy temperament and parent-infant interactions. This association needs to be examined further using observational measures of infant temperament and more specific dimensions of infant temperament with potential causal linkages to conduct problems (e.g., high activity level; see Zucker et al., 1995).

There are several limitations of this study that should be considered. First, while deriving our sample from birth records has important advantages over newspaper- or clinic-based samples, there also limitations. The response rate to our open letter of recruitment was slightly above 25%. This raises the possibility that respondents to our recruitment may have been a biased group. Our comparison of respondents with the entire population of birth records suggested that the bias was small with respect to the variables that we could examine. However, there could have been more significant biases in variables that we could not assess. Second, this study utilized self-report data with respect to parental alcohol problems and psychopathology.

Finally, the results reported here are based on cross-sectional data. Hence, no causal inferences can be reached about the role of parental alcoholism or psychopathology in predicting parent–infant interactions. Data from this ongoing study will hopefully enable us to examine how parental alcoholism and associated family functioning variables predict parent–infant interactions at later ages as well as child outcomes at 18, 24, and 36 months. Negative father–infant interactions at 12 months of age may lead to a trajectory of problematic father–infant relationships, especially given continuity in alcoholism and comorbid risk factors. Thus, it is reasonable to expect that paternal alcoholism and comorbid risk factors will lead to continued disruptions in parent–infant interactions and poor child outcomes at later ages.

In conclusion, the results of the present study suggest that the origins of risk for later maladjustment among children of alcoholic fathers are apparent as early as 12 months of age. Further, father's comorbid psychopathology mediated the association between alcoholism and fathers' parenting behavior. While maternal psychopathology contributed to risk for negative interactions, it did not appear to exacerbate the association between alcoholism and parent–infant interactions. These results have several implications for the prevention of problem behaviors among children of alcoholics. First, heightened risk for later problems is apparent in the form of fathers' parenting behavior as early as 12 months of age, though the extent that fathers' parenting behaviors will predict later problems is uncertain. This is a critical area for further research. Second, this risk appears to be mediated through the depressive symptoms and aggressive behavior of the father. It is important to recognize that this does not necessarily negate the importance of the father alcoholism, because the alcoholism may be a causal factor in the development of depression and aggression. Nonetheless, it stresses the importance of targeting the multiproblem nature of alcoholism in intervention work in order to have a long-term impact on parenting behavior.

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Table 1
Factor loadings for mother–infant and father–infant interactions

Variables	Mother	Father	Child–Mother	Child–Father
Negative Affect				
Angry/Hostile Voice	.90	.91		
Warm/Kind Voice	.72	.70		
Expressed Neg Affect	.86	.90	.86	.91
Angry/Hostile Mood	.88	.84		
Disapproval/Criticism	.83	.89		
Irritable/Angry Mood			.89	.92
Emotional Lability			.83	.83
Assertion/Aggression			.62	.74
Impulsivity			.74	.91
Self-Regulation			.89	.91
Positive Affect				
Flat Voice	.63	.75		
Expressed Pos Affect	.65	.72		
Depressed Mood	.72	.80		
Animated Mood	.79	.84		
Enjoyment/Pleasure	.62	.80		
Social Initiative	.76	.69		
Parental Involvement	.69	.77		
Expressed Pos Affect			.84	.86
Happy/Cheer Mood			.78	.81
Sober/Serious Mood			.78	.79
Sensitivity				
Visual Contact	.62	.66		
Responsivity to +Bhr	.75	.56		
Read Chld's Cues	.83	.87		
Flexibility/Rigidity	.83	.78		
Intrusiveness	.87	.81		
Consistency/Predict	.82	.84		
Responsiveness				
Child Responsiveness			.88	.83
Avoiding/Resistant			.86	.92
Passivity				
Apathetic/Withdrawn			.83	.77
Anxious/Fear Mood			.65	.54
Alertness/Interest			.84	.76
Robustness			.84	.81
Passivity/Lethargy			.81	.84

Table 2
Means and standard deviations for parental alcohol problems and psychopathology by group status

Variables	Control		Father Alcoholic		F Value	p Value
	M	SD	M	SD		
Fathers' Antisocial Behavior	36.07	6.46	43.46	9.81	48.57	.000
Fathers' Depression	6.41	6.33	9.00	7.64	8.54	.004
Fathers' Aggression	2.36	1.98	3.38	2.10	12.64	.000
Fathers' Rating-Infant Temp.	28.57	5.23	30.12	6.56	3.48	.06
Mothers' Antisocial Behavior	34.17	4.48	37.64	6.25	22.55	.000
Mothers' Depression	7.34	6.43	9.75	7.70	5.42	.02
Mothers' Aggression	2.61	1.83	3.82	2.04	19.64	.000
Mothers' Rating-Infant Temp.	28.21	6.57	29.29	7.07	1.26	ns

Note: Means presented here are for nontransformed scores; analyses were conducted with transformed scores.

Table 3
Means and standard deviations for father–infant interaction variables by group status (controlling for fathers’ education)

Variables	Control		Alcoholic		F Value	p Value
	Mean	SD	Mean	SD		
Father						
Sensitivity	3.67	.84	3.34	.90	7.23	.008
Positive Affect	3.82	.86	3.51	.78	7.47	.007
Negative Affect	4.45	.50	4.29	.63	3.97	.048
Verbalizations	3.37	.97	2.99	.83	8.84	.003
Child						
Responsiveness	4.05	.81	3.82	.96	4.08	.045
Positive Affect	3.21	1.09	3.40	.95	1.94	NS
Negative Affect	4.40	.67	4.37	.75	.10	NS

Note: High scores are positive and low scores are negative for all scales. Thus, a high score on negative affect indicates a low negative affect, and a high score on positive affect indicates a high positive affect.

Table 4
Correlations of father–infant interaction variables with parental psychopathology, aggression, and infant temperament

Variables	Fathers' Depression	Fathers' Antisocial Behavior	Fathers' Aggression	Father–Infant Temperament	Mother–Infant Temperament
Father					
Sensitivity	-.18**	-.14*	-.21**	.02	.02
Positive Affect	-.12	-.16*	-.21**	-.02	.06
Negative Affect	-.04	-.19**	-.19**	-.02	.02
Verbalizations	-.12	-.14*	-.13	-.09	.00
Child					
Responsiveness	.02	-.02	-.11	.11	-.06
Positive Affect	.04	.09	-.02	-.01	-.14*
Negative Affect	-.03	.07	-.09	.02	-.03

Note: High scores are positive and low scores are negative on all interaction scales. Low scores on fathers' depression, antisocial behavior, and aggression indicate low levels of these problems. High scores on the infant temperament measures indicate more difficult temperament.

* $p < .05$.

** $p < .01$.

Table 5
Regression analyses: Prediction of parental sensitivity during parent–infant interactions

Predictor Variables	Standardized Regression Coefficient						
	R ²	R ² Inc.	ΔF	Step 1	Step 2	Step 3	Step 4
Fathers' Sensitivity							
1. Fathers' Education	.03	.03	7.05**	.18**	.14*	.12	.11
2. Infant Responsiveness	.19	.16	39.50**		.40**	.38**	.38**
3. Fathers' Alcohol Group	.21	.02	4.13*			-.13*	-.08
4. Fathers' Aggression	.24	.03	4.26*				-.09
5. Fathers' Depression							-.14*
Maternal Sensitivity							
1. Maternal Age	.04	.04	7.31**	.19*	.14*	.11	.09
2. Infant Responsiveness	.22	.18	47.49**		.43**	.44**	.44**
3. Maternal Alcohol Problems	.26	.04	9.88**			-.19**	-.19**
4. Maternal Depression	.28	.02	6.12*				-.15*

Note: Both fathers' aggression and depression, when entered alone, were significantly associated with fathers' sensitivity. Infant responsiveness in the equation predicting fathers' sensitivity refers to infant behavior during father–infant interactions. Similarly, infant responsiveness when predicting maternal sensitivity refers to infant behavior during mother–infant interactions. R^2 Inc., increase or improvement in R^2 in each step.

*
 $p < .05$.

**
 $p < .01$.

Table 6
Regression analysis: Predicting infant responsiveness during father–infant interactions

Predictor Variables	Standardized Regression Coefficient						
	R ²	R ² Inc.	ΔF	Step 1	Step 2	Step 3	Step 4
1. Fathers' Sensitivity	.18	.18	10.70**	.38**	.39**	.40**	.40**
Fathers' Negative Affect				.05	.04	.02	-.01
Fathers' Positive Affect				.06	.06	.08	.09
Fathers' Verbalizations				.04	.05	-.07	-.05
2. Fathers' Alcohol Group	.20	.02	1.49		-.12	-.14	-.12
Fathers' Antisocial Behavior					.09	.13	.11
Fathers' Depression					.11	.09	.10
Fathers' Aggression					-.06	-.06	-.03
3. Mothers' Sensitivity	.24	.04	2.15			-.07	-.11
Mothers' Negative Affect						.22**	.24**
Mothers' Positive Affect						-.10	-.13
Mothers' Verbalizations						.08	.10
4. Mothers' Alcohol Problems	.26	.02	1.45				-.10
Mothers' Antisocial Behavior							.15
Mothers' Depression							-.09
Mothers' Aggression							-.07

R^2 Inc., increase or improvement in R^2 in each step.

* $p < .05$.

** $p < .01$.

Table 7
Regression analysis: Predicting infant responsiveness during mother–infant interactions

Predictor Variables	Standardized Regression Coefficient						
	R ²	R ² Inc.	ΔF	Step 1	Step 2	Step 3	Step 4
1. Mothers' Sensitivity	.25	.25	16.09**	.27**	.30**	.32**	.31**
Mothers' Negative Affect				.13	.12	.09	.07
Mothers' Positive Affect				.21*	.23*	.25*	.28**
Mothers' Verbalizations				.03	-.03	-.03	-.05
2. Mothers' Alcohol Problems	.27	.02	1.62		.12	.12	.12
Mothers' Antisocial Behavior					-.03	-.05	-.06
Mothers' Depression					.07	.10	.07
Mothers' Aggression					.07	.07	-.02
3. Fathers' Sensitivity	.30	.03	2.16			.07	.11
Fathers' Negative Affect						.14	.14
Fathers' Positive Affect						.07	.08
Fathers' Verbalizations						-.16	-.17
4. Fathers' Alcohol Group	.32	.02	1.49				.01
Fathers' Antisocial Behavior							-.04
Fathers' Depression							.12
Fathers' Aggression							.13

R^2 Inc., increase or improvement in R^2 in each step.

* $p < .05$.

** $p < .01$.