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Pathways into Risk: Temperament and Behavior Problems in Three- to Five-Year-Old Sons of Alcoholics

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Evidence suggests that a child with a difficult temperament, reared in an alcoholic family, is at high risk for the development of behavior problems that antedate the emergence of antisocial behavior, alcoholism, and coactive psychopathology. However, the causal linkage between difficult temperament and problem behavior in childhood, and antisociality and alcohol abuse in adulthood is far from certain, in part because few studies assess emergent behavior patterns in young children of alcoholics. In this study, we investigated the temperament-behavior problem relationship in 191 3- to 5-year-old boys, 149 of whom were being reared in high-risk alcoholic, low socioeconomic environments. Boys were classified as high in problem behavior or not based on standardized clinical cut-off scores for Total Behavior Problems from the Child Behavior Checklist. Results indicated that boys rated in the clinical range for total behavior problems exhibited more characteristics of difficult temperament than boys who were not rated in the clinical range. Parents of the boys in the clinical group had significantly more alcohol-related problems, higher levels of antisociality, and significantly lower levels of socioeconomic status, income, and education. Results are consistent with the supposition that the difficult temperament-behavior problem relationship flourishes in the context of an antisocial, alcoholic family environment.

Key Words: Children of Alcoholics, Behavior Problems, Temperament, Antisocial Behavior, Alcoholism.

THE LITERATURE on the etiology of alcoholism provides a basis for concluding that this adult syndrome may be antedated by several child variables, including difficult temperament (withdrawal from novel stimulation, low adaptability, high-response intensity, negative mood, and high distractibility) and problem behavior, especially externalizing behavior (e.g., oppositional behavior, conduct disorder, and attention-deficit disorder). A number of studies have linked difficult temperament to heightened risk for the development of alcoholism and related psychopathology.[1–5] Children with difficult temperaments also seem to be predisposed to behavioral disorders,[2,6–10] which, in childhood, may manifest themselves as conduct disorder and/or attention-deficit hyperactivity disorder, and in adulthood as antisocial personality disorder and/or alcoholism.[11] Finally, the circle is completed, because children with behavior disorders are reported to be predisposed to alcoholism.[12] There is a higher rate of occurrence of attention-deficit hyperactivity disorder in children of alcoholics (COAs) than in non-COAs,[13] and hyperactive children are more likely to have a biological father, but not an adoptive father, who is alcoholic.[14,15] Other studies have shown that adopted COAs, who subsequently became alcoholics, are likely to report a childhood history of hyperactivity.[16] The evidence that some relationship exists between hyperactivity and alcoholism is further buttressed by the finding that hyperactive adolescents are more inclined than their non-hyperactive peers to misuse alcohol.[17,18]

Thus, the child with a difficult temperament may have an underlying biobehavioral disorder, that may be expressed as hyperactivity in infancy; as aggressive, conduct problems in childhood and adolescence; and as alcoholism with antisocial behavior in adulthood. Although poor cognitive functioning, peer pressure, familial history of alcoholism, low socioeconomic status (SES), and weak-cultural religious affiliation each has been cited as a determinant of alcohol abuse or dependence,[19–22] there is increasing evidence indicating that a family history of substance abuse coactive with antisociality is strongly linked to the expression of deviancy in COAs.[13–15,21,23] Zucker's[24] assertion that antisocial behavior often predates alcoholism is consistent with findings from the National Institute of Mental Health Epidemiologic Catchment Program,[25] which indicates that 83.6% of respondents diagnosed with antisocial personality disorder had a comorbid substance abuse problem, with the most frequent comorbid condition being alcoholism. The causal linkage between difficult temperament and problem behavior in childhood, and antisociality and alcohol abuse in adulthood, is far from clear.[2,16] Nevertheless, the weight of the evidence suggests that a child with a difficult temperament, reared in an alcoholic environment, is at increased risk for the development of behavioral problems that antedate the emergence of antisocial behavior, alcoholism, or related psychopathology.

Families participating in the current study were originally recruited for a broader longitudinal study of the etiology of alcohol abuse and dependence. The criteria for inclusion were the presence or absence of paternal alcoholism, an initially intact family, and a 3- to 5-year-old son. Community comparison families met these criteria, with the excep-

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tion that neither parent had a history of substance abuse. Data reported herein derive from the first wave of the longitudinal study.[26,27] In the current study, we used a child-based strategy for group assignment, rather than a strategy based on paternal alcoholism. Thus, families were assigned to groups based on the child's Total Behavior Problem (TBP) raw score on the Child Behavior Checklist (CBCL).

To summarize the aforementioned discussion, this study was designed to test the following hypotheses: (1) boys with high problem behavior will have more difficult temperaments; (2) parents of boys with high problem behaviors will be more antisocial and have more alcohol-related problems than parents of low problem behavior boys; and (3) based on prior reports from the longitudinal study, we predicted that maternal variables would be more powerful predictors of child behavior than paternal variables.[28,29] Finally, if difficult temperament is part of the diathesis that leads to problem behavior, it should be a stronger predictor of problem behavior than are more proximal variables, such as parental antisocial behavior or alcoholism.

METHODS

Subjects

Subjects are participating in the Michigan State University–University of Michigan Longitudinal Study.[26,27] Using a population net in the mid-Michigan area involving four adjacent counties with six district courts, all convicted male drunk drivers with a blood alcohol concentration of 0.15% or higher (or 0.12% or higher if this was a second or more documented drinking-related driving problem) who had a biological son between the ages of 3.0 and 6.0 currently living with them and whose marriage was intact at the time of first contact were recruited into a study of child health and family development. Of the total number of potential subjects, 79% gave permission for project staff to contact them, and of these, 92% agreed to participate. A total of 90 families were recruited into the study from the district courts.

Later data collected as part of the longitudinal protocol ensured that each district court father met Feighner diagnostic criteria for probable or definite alcoholism (88% make the definite level), and that both parents in the comparison families did not make this diagnosis or one of drug abuse or drug dependence.[30] The fact that these men are convicted drunk drivers indicates that their alcoholism is more likely to be cooccurring with antisociality than is true of other types of alcoholics.[24,31] Other analyses from this study indicate that 58.5% are classified as type II alcoholics according to Cloninger's[31] typology; 24.5% were classified as type I (non-antisocial and later onset), and 17% were indeterminant.[23] Thus, this portion of the longitudinal study sample is most representative of the subset of alcoholics known to be most damaged, with the highest antisocial comorbidity and earliest onset.[25,32]

After a high-risk family was recruited into the study, a community comparison family whose parents are neither alcohol- nor drug-dependent was located using door-to-door canvass techniques. Canvassers began a door-to-door search one block away from the alcoholic family, staying within the same census tract, and screening for an age-appropriate (±6 months match) male child in a nonalcoholic home. Community canvassing to obtain comparison families was used to control for effects of age and sex of target child, community influences, and as an approximate control for SES. To restrict ethnic variation that we were not able to oversample because of the study locale, all subjects were non-Hispanic Caucasian and all were paid for their participation. Subsequently, analyses of community families indicated that 60 men made a diagnosis of probable or definite alcoholism according to the previously described criteria.[30]

Maternal alcoholism was neither a criterion for inclusion nor exclusion from the study, except that no family was included if their child manifested characteristics associated with fetal alcohol syndrome (i.e., prenatal and/or postnatal growth retardation, central nervous system involvement, and characteristic facial dysmorphology).[33] On these grounds, two families contacted for study participation were excluded from later study involvement due to the presence of morphological indicators of fetal alcohol syndrome (FAS) in their sons. In addition, preliminary analyses of the effects of maternal prenatal history on the relationship between alcoholism and boys' current functioning provided no support for a link between a potentially teratogenic prenatal history (i.e., maternal health, smoking, and drinking during pregnancy and the onset of prenatal care) and the defining features of FAS.[34] Thus, as in past published reports involving the longitudinal sample, there is no evidence to implicate FAS among the male COAs in the study.[28] Although fetal alcohol effects may be present in these children, our failure to observe such effects previously,[28] combined with the continuing controversy concerning their detection and/or diagnosis, led to our decision not to attempt to document such effects.[33,35,36]

In this study, we report findings from the first wave of data collection (mean age of target child = 4.42 years, SD = 1.02) from the longitudinal study. Initially, three groups of preschool boys were identified as described. One hundred forty-nine boys were at very high risk for the later development of alcoholism due to being reared in an alcoholic family as described herein, and forty-two boys were at lower risk due to the absence of parental substance abuse/dependence. Because we were interested in the effect of child problem behavior in the etiology of risk, the two groups were combined and all boys were reclassified according to their TBP score from the 4- to 16-year-old version of the CBCL.[37]

The CBCL, 4- to 16-year-old version, consists of a list of 113 behavior problems. This instrument yields standardized scores on social competency, two broad-band scales concerning externalizing and internalizing behavior, and eight narrow-band subscales (social withdrawal, depressed, immature, somatic complaints, sex problems, schizoid, aggressive, and delinquent). Only the mother's TBP score was used to classify boys into the clinical and nonclinical groups, as is the case in most studies in the literature. Reliability coefficients for the CBCL range from 0.84 to 0.98.[37]

Boys in the clinical range were defined as meeting or exceeding the raw score cut-off for TBPs.[38] This procedure resulted in 56 boys being classified in the clinical range (TBP score: mean = 55.04, SD = 20.65; hereafter referred to as the Clinical Group) and 135 boys in the nonclinical range (TBP score: mean = 25.81, SD = 9.37; hereafter referred to as the Nonclinical Group). Of the boys assigned to the Clinical Group, 45 were from alcoholic families (30% of the 149 alcoholic families) and 11 were from comparison families (27% of the 42 community families).

Measures and Procedure

All families participating in the longitudinal study complete numerous questionnaires, interviews, and direct observation sessions. Data collection for wave 1 takes place over nine sessions, requiring ~15 hr for each parent and 7 hr for each target child.[26]

Parent Measures. A Demographic Questionnaire was administered during the first visit, which inquired about self-reported background information (occupation, education, income, years married, number of children in the house, age, etc.) and family origin (SES, education, etc.). The SES of each parent is established using the occupation-based Revised Duncan Socioeconomic Index (TSE12).[39,40] TSE12 scores are higher, the more prestigious the occupation.

The Antisocial Behavior Checklist (ASBCL)[41] is a 46-item revision of an earlier antisocial behavior inventory used in the Rutgers Community Study, that has been modified so that items retrospectively address both adolescent and adult antisocial activity. The ASBCL asks the frequency of the respondent's participation in a variety of aggressive and antisocial activities. Reliability and validity studies involving male and female college

Table 1. CBCL Descriptive Data of Boys in Clinical and Nonclinical Ranges on TBPs

CBCL scale	Clinical (n = 56)		Nonclinical (n = 135)		F (1,378)	p
	Mean	SD	Mean	SD		
Total problems	46.88	20.10	27.39	14.69	119.94*	0.000
Mother	55.04	20.65	25.81	9.37	29.93†	0.000
Father	38.71	15.91	28.96	18.45		
Internalizing	60.31	7.85	51.68	9.07	129.52*	0.000
Mother	64.21	6.47	51.23	7.35	19.11†	0.000
Father	57.41	7.67	52.13	10.52		
Externalizing	64.28	8.56	52.80	9.44	90.40*	0.000
Mother	68.04	5.94	52.15	8.32	16.06†	0.000
Father	60.52	9.15	53.45	10.43		
Social withdrawal	62.32	6.91	59.04	5.80		
Mother	63.96	6.92	58.59	4.84	9.31†	0.002
Father	60.68	6.56	59.48	6.62		
Depression	60.96	7.15	56.94	4.57		
Mother	62.68	7.68	56.06	2.75	18.76†	0.000
Father	59.25	6.18	57.82	5.72		
Immaturity	62.96	6.22	57.68	4.34		
Mother	65.25	6.22	57.36	3.31	23.27†	0.000
Father	60.68	5.35	57.00	5.17		
Somatic	62.08	9.10	59.39	5.80		
Mother	64.09	9.32	59.19	5.57	9.17†	0.003
Father	60.07	6.11	59.59	6.04		
Sex problems	62.83	7.56	59.98	6.21	14.67*	0.000
Mother	63.05	8.32	59.20	5.60		
Father	62.61	6.79	60.76	6.69		
Schizoid	63.10	6.56	58.48	4.74		
Mother	64.63	6.79	57.99	4.33	11.63†	0.001
Father	61.57	5.99	58.97	5.09		
Aggression	67.32	9.20	58.60	6.24		
Mother	70.89	7.93	57.67	4.54	33.27†	0.000
Father	63.75	9.06	59.53	7.47		
Delinquent	62.29	6.62	57.52	3.94		
Mother	64.05	7.32	57.07	3.10	16.80†	0.000
Father	60.54	5.35	57.96	4.61		

* Univariate Group main effect.
† Univariate Group × Parent interaction.

students, male and female inmates, and antisocial and nonantisocial alcoholics, as well as community comparison families in the current longitudinal study, have shown that the instrument has adequate test-retest reliability, internal consistency, and discriminability.[42] Higher scores indicate higher antisocial behavior. With a cut-off score of 24, the ASBCL's sensitivity is 0.85, and its specificity is 0.83 for a diagnosis of Antisocial Personality Disorder based upon DSM-III-R criteria.[43]

The Lifetime Alcohol Problems Score (LAPS)[44] was the primary drinking variable used in the current study. The score is designed to assess differences in the extent of drinking problems over the life course, and is derived from the information gained from the administration of the Drinking and Drug History Interview,[45] the Diagnostic Interview Schedule,[46] and the short form of the Michigan Alcoholism Screening Test.[47] LAPS provides a composite score derived from three component subscores: (1) the primary component, involving the squared inverse for the age at which the respondent reported first drinking enough to get drunk; (2) the variety component, involving the number of areas in which drinking problems are reported; and (3) the life percentage component, involving a measure of interval between most recent and earliest drinking problems, corrected for current age. Scores are standardized separately for males and females within our project sample. High scores indicate greater severity of lifetime alcohol problems.

Child Measures. The Dimensions of Temperament Survey (DOTS-Child)[48] is administered to each parent independently. The DOTS-Child provides measures of five dimensions of temperament: activity level, attention span/distractibility, adaptability-approach/withdrawal, rhythmicity, and reactivity. Reliability coefficients obtained with samples of infants, preschoolers, school-aged children, and young adults, on the five scales ranged from 0.31 to 0.96, with reactivity the only factor that was consistently below 0.60.[49,50] Temperament ratings with the DOTS have been found to be related to better grades, positive self-esteem, and better peer relations in children, as well as self-concept and self-ratings of depression in early and late adolescence.[51,52] High scores indicate greater activity, longer attention span and higher persistence, greater reactivity, more rhythmicity, and more adaptability.

RESULTS

CBCL Problem Behaviors

Table 1 contains means, standard deviations, and univariate F tests for maternal and paternal ratings of child behavior on all CBCL scales. Twenty-nine percent of the COAs were rated in the clinical range. Statistical values for Group main effects are shown (marked with an asterisk in Table 1). However, with the exception of Sex Problems, every comparison yielded a significant Group × Parent interaction. (These results are marked with a dagger in Table 1.)

Data presented in Table 1 indicate that boys whose mothers rated them to be in the Clinical Group range for TBPs receive higher problem behavior scores on all CBCL scales from both their mothers and fathers than do boys in the Nonclinical Group range (i.e., there was a Group main effect). These findings were expected and are consistent with previous analyses of wave 1 data. The Group × Parent

Table 2. Parent Ratings of Child Temperament (DOTS) on Boys in CBCL Clinical and Nonclinical Ranges for TBPs

	Clinical (n = 56)		Nonclinical (n = 135)		F	p
DOTS scale	Mean	SD	Mean	SD	(1,375)	
Activity	1.77	1.39	1.33	1.43	7.75	0.006
Reactivity	3.89	1.27	2.87	1.57	35.77	0.000
Rhythmicity	4.80	2.13	5.67	2.08	12.99	0.000
Adaptability	4.17	1.55	3.96	1.67	NS	
Attention	4.03	2.95	5.65	2.86	24.18	0.000

Table 3. Parents' ASBCL, LAPS, and Indices of SES for Boys in Clinical and Nonclinical Range for TBPs on the CBCL

	Clinical (n = 56)		Nonclinical (n = 135)				
Measure	Mean	SD	Mean	SD	F	df	p
ASBCL	19.18	13.29	14.70	11.24	12.67	1,377	0.000
Mothers	15.44	9.66	10.47	6.55			NS
Fathers	22.91	15.32	18.94	13.22			NS
LAPS							
Mothers	10.72	2.32	9.68	1.81			NS
Fathers	10.20	2.37	9.69	2.27			NS
SES	30.46	13.93	35.07	15.76	7.25	1,377	0.007
Income*	6.09	2.39	7.01	1.75	17.53	1,377	0.000
Education	12.39	1.92	13.21	1.93	14.09	1,377	0.000

* 6 = $16,001–$20,000; 7 = $20,001–$30,000.

interactions indicate that without exception, mothers of boys in the Clinical Group gave their sons higher TBP scores than fathers did, whereas fathers of Nonclinical Group boys gave their sons higher TBP scores than mothers did. Although the mean differences between mother and father scores for Nonclinical Group children never were significantly different from each other, father scores were higher than mother scores on every CBCL scale. This finding was completely unexpected, given the nearly consensual view in the literature that mothers rate their sons as having more problem behavior than do fathers.[28]

In sum, boys in the Clinical Group were rated by each of their parents as significantly more troubled than were boys in the Nonclinical Group. However, the primary question asked in the current study concerns the extent to which child behavior problems and difficult temperament are linked.

Temperament

The first hypothesis predicted significantly more difficult temperaments in children whose CBCL TBP scores exceeded the clinical cut-off than in children whose scores fell below the cut-off. Means, standard deviations, and univariate F values for the DOTS temperament scales are presented in Table 2 for both groups of boys. These analyses indicated that boys in the Clinical Group displayed temperament patterns consistent with what other investigators have described as "difficult." Specifically, boys in the Clinical Group had higher motor activity levels, poorer attention spans and higher levels of distractibility, were more reactive in their everyday activities, and had more arrhythmic eating and sleeping patterns than did boys in the Nonclinical Group. The differences shown in Table 2 are robust, with all significant comparisons showing moderate-to-strong effect sizes at $a = 0.05$: Activity $d = 0.36$; Reactivity $d = 0.72$; Rhythmicity $d = 0.59$; and Attention $d = 0.56$.

Overall, these analyses support the hypothesized relationship between difficult temperament and severe behavior problems. Moreover, the higher levels of motor activity and distractibility, combined with poor rhythmicity and attention span in the Clinical Group, suggest that these boys have more difficulty with self-regulation and self-control than the boys in the Nonclinical Group.

Parental Psychopathology

The second hypothesis predicted that parents of boys in the Clinical Group would be more antisocial and would have more lifetime alcohol problems than parents of boys in the Nonclinical Group. Means, standard deviations, and univariate F values for parental ASBCL and LAPS scores are presented in Table 3. MANOVA revealed main effects for Group [$F(5,373) = 5.84$, $p = 0.000$] and Parent [$F(5,373) = 14.96$, $p = 0.000$] but no Group × Parent interactions. Univariate F tests indicated that parents of boys in the Clinical Group had significantly higher ASBCL [$F(1,377) = 12.67, p < 0.000$] and LAPS [$F(1,377) = 10.59$, $p < 0.001$] scores than parents of boys in the Nonclinical Group. The Parent main effect held only for ASBCL [$F(1,377) = 40.15$, $p < 0.00$]; ASBCL scores for fathers were significantly higher than those for mothers (Table 3).

We also calculated an overall difficult temperament index (using mothers' mean scores over the 5 DOTS subscales, just as we used mothers' scores to classify children into Clinical and Nonclinical TBP Groups) and assessed its relationship to child problem behavior and parental alcoholism; herein, the relationship among temperament, problem behavior, and paternal alcoholism was stronger. Twen-

Table 4. Hierarchical Multiple Regression Analyses: Significant Predictors of 3- to 5-Year-Olds CBCL TBPs for Mothers and Fathers Separately (Total Sample for Each Regression, $n = 191$)

Predictor	R	Multiple R^2	Adjusted R^2	SE	Beta	T	P
Mothers' analysis	0.46	0.22	0.19	15.99			
DOTS Reactivity					0.20	3.33	0.001
ASBCL					0.20	2.78	0.006
Income					−0.13	−1.96	0.05
Fathers' analysis	0.49	0.24	0.21	1.99			
DOTS Attention					−0.14	−2.42	0.02
DOTS Rhythmicity					−0.11	−1.95	0.05
DOTS Reactivity					0.23	3.88	0.0001
ASBCL					0.20	2.78	0.005

ty-six of 56 children in the Clinical CBCL TBP Group scored in the upper quartile of difficult temperament, and 22 of the 26 (85%) had alcoholic fathers. Ten of 135 children in the Nonclinical CBCL TPB Group scored in the upper quartile of difficult temperament and all 10 (100%) had alcoholic fathers. Because calculation of the difficult temperament index was "post-hoc," we did not proceed with further analyses, but will in future studies involving the longitudinal sample. Nevertheless, when one considers all results involving parental measures, the current results are consistent with all other analyses from wave 1 of the longitudinal dataset, and provide strong support for the hypothesized relationship between parental antisociality and children's problem behavior.

Socioeconomic Indices

MANOVA also revealed significant Group main effects for family SES, family income, and parental education. Means, standard deviations, and F values for these variables also are presented in Table 3. These analyses indicate that parents of boys in the Clinical Group had significantly lower scores on family SES, family income, and years of education, thereby supporting other studies involving the longitudinal sample.[19,28,29]

Predictors of Children's TBPs

A central objective of the longitudinal study involves the identification of critical variables that predict child behavior over the life course from early childhood to young adulthood. Consistent with the overall developmental models guiding this project, therefore, hierarchical regression models were tested independently for predictors of children's TBP scores, with Child DOTS entered on the first step, followed by Parent ASBCL, LAPS, and SES scores in sequence. The order was based on a model that asserts that child temperament antedates child behavior problems. According to this model, the developmental progression to adult alcoholism is difficult temperament (infancy), behavior problems (childhood), antisociality (early adolescence), and substance abuse (adolescence).[53] There is substantial evidence linking difficult temperament to behavior problems of childhood.[51–53] We reasoned that the child with a difficult temperament who is reared in a chaotic, antisocial, substance-abusing household is more likely to be on a developmental pathway leading to substance abuse. Conversely, the child with a difficult temperament who is reared in a stable, nurturant, and nonsubstance-abusing household is likely to be on a developmental pathway that will buffer the child from subsequent substance abuse.

The order of the parent variables was based on results of other analyses performed on the wave 1 data set.[19,23,54–56] Although these studies involved comparisons of groups differing on the basis of the presence or absence of paternal alcoholism rather than on the basis of child variables, such as behavior problems, they consistently show parental antisociality, lifetime alcohol problems, and SES as key predictors of various preschool-aged child behaviors. Six regression analyses were performed, three involving mothers and three involving fathers.

The first two regression analyses, one for mothers and one for fathers, included data from all children in the study. The results are presented in Table 4. The regression equation for mothers was significant [$F(10,260) = 7.15$, $p = 0.000$] and accounted for 22% of the variance associated with children's TBP scores. Thus, one measure of child temperament (reactivity), one measure of maternal behavior (antisociality), and one measure of family socioeconomic level (income) each was predictive of children's TBP scores. These results suggest that reactive children being reared in low-income households who have mothers who are high in antisociality tend to have higher TBP scores.

The regression equation for fathers was also significant [$F(10,260) = 8.15$, $p = 0.000$]. For fathers, four indices of child temperament (attention span, rhythmicity, activity, and reactivity) and one measure of paternal behavior (antisociality) were significant predictors of children's TBPs. The pattern of high reactivity, poor attention span, and rhythmicity in children, combined with paternal antisociality, accounted for 24% of the variance in children's TBPs.

These results were unexpected, because in previous analyses involving these children, maternal variables for the most part have been the exclusive and/or more powerful predictors of child behavior.[28] Because the regression involving fathers yielded significant predictors, we wanted to determine which mother and father variables were predictive of TBP scores for boys in the Clinical and Nonclinical groups. Table 5 summarizes the results of the four addi-

Table 5. Hierarchical Multiple Regression Analyses: Significant Predictors of CBCL TBP Scores for Boys Scoring in the Clinical and Nonclinical Ranges

Predictor	*R*	Multiple R^2	Adjusted R^2	SE	Beta	*T*	*P*
Boys above the clinical cut-off (n = 56)							
Mothers' analysis	0.33	0.11	0.09	21.54			
Fathers' analysis	0.61	0.37	0.23	14.04			
DOTS Rhythmicity					−0.28	2.00	0.05
DOTS Activity					0.28	2.10	0.04
Boys below the clinical cut-off (n = 135)							
Mothers' analysis	0.40	0.16	0.09	8.95			
Education					0.27	2.66	0.008
Fathers' analysis	0.54	0.29	0.23	16.20			
DOTS Adaptability					−0.22	−2.78	0.002
DOTS Reactivity					0.28	3.41	0.000
ASBCL					0.41	3.94	0.0001

tional regression analyses required to examine maternal and paternal predictors of children's TBP scores for Clinical and Nonclinical groups separately.

The first thing to note in Table 5 is that the equation for maternal predictors of behavior problems in boys scoring above the clinical cut-off was not significant [$F(10,45)$ = 0.55, NS]. No maternal variable, nor any child variable, predicted children's TBP scores (mothers' ratings). In contrast, the regression equation for fathers of boys above the clinical cut-off accounted for 37% of the variance [$F(10,44)$ = 2.60, p = 0.01] related to children's TBP scores (fathers' ratings). Children's high activity level and poor rhythmicity predicted their TBP scores. What was most surprising was that neither mother's nor father's antisociality emerged as a significant predictor as it did in the regression equations that included children from both groups combined.

For boys below the clinical cut-off, only maternal education emerged as a significant predictor [$F(10,122)$ = 2.28, p = 0.02] of TBP scores. The regression equation for fathers was significant [$F(10,125)$ = 5.06, p = 0.000]; children's adaptability and reactivity combined with fathers' antisocial behavior to account for 29% of the variance associated with children's TBPs.

DISCUSSION

The current study examined two groups of preschool age boys. In one group of boys, maternal ratings of their sons' behavior problems placed them above the clinical cut-off for TBPs as assessed by the CBCL. The other group of boys scored below that point. Results supported the hypothesized relationship between behavior problems and temperament; boys scoring in the clinical range of problem behavior had more difficult temperaments. The results also indicated that boys in the clinical range had parents who tended to be more antisocial; to have more lifetime alcohol problems; and to have less education, less family income, and lower SES than parents of boys whose problem behavior was not in the clinical range.

Studies using cross-sectional or longitudinal designs provide evidence for a direct relationship between difficult temperament and problem behavior in children as young as preschool age. In fact, the linkage between difficult temperament and problem behavior in early childhood is extremely strong,[11] particularly when parent–child interactions reinforce the child's deviant behavior[53] and when the child is a boy.[57,58] Maziade et al.[2] found a connection between difficult temperament and externalizing behaviors in clinic-referred children. Characteristics of difficult temperament, such as withdrawal from novel stimuli, low adaptability, and high reactivity, were associated with externalizing behavior disorders, such as attention deficit disorder, oppositional behavior, and conduct disorder. There is evidence for continuity for the correlation between difficult temperament and problem behaviors from preschool to the elementary years,[7] as well as for an intergenerational link between adult substance abuse and child problem behavior.[57]

Tarter and his colleagues[53] suggest that the newborn's temperament is its "psychology"; that is, it is the endpoint of the psychobiological substrate gained via genetic and congenital influences.[53] As temperament stabilizes ontogenetically, its influence on adaptive functioning diminishes with age at the same time that factors from the child's expanding experiential world become more influential. Nevertheless, the degree to which temperament can change is constrained by the range of environments to which the child is exposed. Martin et al.[59] suggest that the four key factors that describe difficult temperament (aggressivity, inattention, hyperactivity, and impulsivity) share a common causal connection with substance abuse; namely, dysregulation of executive functions, particularly with respect to the planning and execution of goal-directed activities. Fitzgerald et al.[28] found that 3-year-old sons of alcoholics acted more impulsively on a delay of gratification task than did comparison children. Separate regression analyses for mothers and fathers indicated that only the child's IQ predicted delay of gratification scores. Neither maternal nor paternal antisociality, lifetime alcohol problems, IQ, depression, or socioeconomic indices were significant predictors of 3-year-old COAs delay of gratification. Although a direct measure of temperament was not used, the fact that impulsivity—an implicit aspect of behavioral style was predicted by a child characteristic (IQ) but not by various

parental characteristics—is consistent with suppositions that the underlying heritable substrate for high-risk children is biobehavioral dysregulation.[8,53,60]

To the extent that difficult temperament, hyperactivity, or problem behavior reflect disorganization in self-regulatory mechanisms, such behaviors may negatively affect parental self-esteem and parental valuations of their parenting skills.[61] If devaluation of parenting skills leads, in turn, to decreased parental involvement with their children, it is likely to be associated with an increase in the severity of children's problem behavior.[62] This cycle of dysfunction seems ideal for creating circumstances that would interfere with the orderly progression of rule-learning and the internalization of standards necessary for inhibition of antisocial behavior.[63]

There is another side of the story linking temperament to children's behavior problems. Lambert and Windmiller[64] compared elementary age children classified either as hyperactive, low achieving, or with school adjustment problems, with control children without such classifications. Of six temperament factors identified, only distractability significantly differentiated among the groups. Maziade et al.[2] found that 67% of clinic-referred 3- to 8-year-old children with diagnosed externalizing disorders (hyperactivity, oppositional disorder, and conduct disorder) did not present with difficult temperaments, leading them to conclude that clinical behavioral disorders and difficult temperament were not equivalent phenomena. Their data, in fact, suggest that difficult temperament cooccurring with hyperactivity, exacerbates the severity of symptomatology associated with hyperactivity; that is, difficult temperament may act as a moderator of hyperactivity symptomatology. Interestingly enough, temperament characteristics were significant predictors of CBCL TBP scores in every regression analysis, but they were only predictors of father's ratings of their son's scores. These results suggest that the quality of father–child interaction may be compromised for boys who have problems with self-regulation, compliance, and attention. Moreover, because father variables were not predictive of child behavior in a study involving only 3-year-olds from the longitudinal study,[28] these results suggest that father variables begin to show effects at the time most children are making their first significant move away from the home setting as they begin formal schooling.

Lilienfeld and Waldman[65] argue that hyperactivity comorbid with conduct problems (aggression and noncompliance) is related developmentally to antisocial personality in adults, whereas hyperactivity alone is not. Because children scoring in the clinical range for behavior problems in the current study also had higher activity scores, it is reasonable to hypothesize that they may be locked into a developmental pathway leading to antisocial personality.[17,66] August et al.[17] found that hyperactive-aggressive children are reported by their parents to be using alcohol earlier than nonaggressive hyperactive children. Moreover, children who are hyperactive and conduct-disordered are more likely to have parents who are antisocial and/or alcoholic.[17,65,66]

Boys who are hyperactive and/or have problem behavior often have fathers who are antisocial, aggressive, and substance-abusing, and/or who have histories of incarceration.[67–69] The current study found that both fathers and mothers of boys with clinical behavior problems were significantly more antisocial and had more alcohol problems than the parents of the nonclinical boys. However, of parents' alcohol problems and antisocial behavior, only the latter predicted CBCL problem behavior scores for all children combined, and for children scoring below the clinical cut-off (father's regression only). For children scoring in the clinical range, neither parental variable predicted problem behavior scores.

There is some indication that antisocial behavior is transgenerational,[69] a finding that supports the notion that boys with behavior problems are not only at risk for developing alcohol and/or drug dependency, but also are at risk for the later appearance of antisocial personality disorder. Thus, the Clinical group of boys may be in the early stages of a developmental pathway that may ultimately lead to "antisocial alcoholism."[55] COAs consistently are reported to be more hyperactive, to have more management problems, and to have poorer attention spans than several comparison groups. These characteristics describe the Clinical Group in the current study to a greater degree than they describe the Nonclinical Group. It seems then that parental antisociality coupled with drinking may have a direct effect on child behavioral problems,[13,28] particularly in boys.[70] There is some indication that this is especially true in families where husbands model aggression by abusing their wives.[71–73] Indeed, the mean maternal CBCL T-scores for children's internalizing and externalizing behavior in the current study (Table 1) are nearly identical to those reported by Sternberg et al.[74] in their study of the effects of domestic violence on children's behavior problems (65.56 for internalizing, 65.52 for externalizing).

Parents of boys scoring above the clinical cut-off for behavior problems are characterized by lower levels of SES, income, and education, than parents of nonclinical boys, confirming the hypothesized relationship between family resources and children's problem behavior, as well as between low SES and problem drinking in adults.[54] Other research has shown low levels of SES, income, or parental education to be associated with higher rates of alcoholism[75,76] and with antisociality and lifetime alcohol problems.[51] Although it is true that variables such as social class do not provide information about variation in the salient proximal variables available to children in different social classes,[77] there is strong evidence that antisocial alcoholism is more likely to cooccur with low socioeconomic class than are other types of alcoholism.[22,24] Thus, social class variation may help structure the experiential world to which children are exposed. The climate of poverty is different from the climate of the middle class in terms of employ-

ment availability, educational opportunity, family stability, spousal relationships, and parent–child relationships.[54]

Current findings indicate that as early as the preschool years children presenting clinical behavioral problems differ significantly from nonclinical children on a number of inherently biopsychosocial variables. Moreover these boys, most of whom are from antisocial alcoholic families, with difficult temperaments and high levels of behavioral problems, are at significantly higher risk for alcohol abuse, substance abuse, and/or antisociality in adulthood.[19,23,28,29]

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