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The Relationship Between Parental Alcoholism and Adolescent Psychopathology: A Systematic Examination of Parental Comorbid Psychopathology

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The relationship between parental alcohol dependence (with and without comorbid psychopathology) and adolescent psychopathology was examined in a sample of 665 13–17 year-old adolescents and their parents. Results indicated that adolescents who had parents diagnosed with alcohol dependence only did *not* significantly differ from adolescents who had parents with no psychopathology in regard to any of the measures of psychological symptomatology (substance use, conduct disorder, and depression) or clinical diagnoses (alcohol dependence, marijuana dependence, conduct disorder, or depression) assessed. In contrast, adolescents who had parents diagnosed with alcohol dependence and either comorbid drug dependence or depression were more likely to exhibit higher levels of psychological symptomatology. In addition, adolescents who had parents diagnosed with alcohol dependence, depression, and drug dependence were most likely to exhibit psychological problems. These findings underscore the importance of considering parental comorbid psychopathology when examining the relationship between parental alcoholism and offspring adjustment.

KEY WORDS: comorbidity; substance abuse; conduct disorder; depression; COAs; adolescence.

Previous research has indicated that children of alcoholic parents (COAs) are at an increased risk for many psychological problems during childhood, adolescence, and young adulthood. For example, COAs have been found to have an elevated risk for the development of externalizing problems such as conduct disorder, oppositional disorder, delinquency, and attention deficit disorder (Earls, Reich, Jung, & Cloninger, 1988; Kuperman, Schlosser, Lidral, & Reich, 1999; Merikangas & Avenevoli, 2000; Reich, Earls, Frankel, & Shayka, 1993, Sher, 1991) and for the development of internalizing problems such as depression and anxiety (Bennett, Wolin, & Reiss, 1988; Chassin, Pitts, DeLucia, & Todd, 1999; Reich et al., 1993). In addition, research has indicated that COAs are more likely to experience substance abuse problems in comparison to non-COAs (Chassin et al., 1999; Goodwin, 1988; Russell, Cooper, & Frone, 1990).

Although prior research has consistently indicated that COAs are at an increased risk for these problems, the majority of studies that have examined the relationship between parental alcoholism and COA adjustment have not systematically examined the potential effects of comorbid psychopathology in parents. This is a serious limitation of the COA literature because many studies have shown that comorbid psychiatric problems such as depression, anxiety, drug dependence, and antisocial personality disorder frequently occur among both community dwelling and treated alcoholics (Hill & Hruska, 1992; Kessler et al.,

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1994; Penick et al., 1994; Sher, Walitzer, Wood, & Brent, 1991; Tarter, 1988; Windle & Searles, 1990). For example, it is estimated that 47% of alcoholics from the community have a comorbid psychiatric diagnosis (Helzer & Pryzbeck, 1988). According to the Epidemiological Catchment Area survey, the most common comorbid diagnoses are drug dependence, antisocial personality disorder (ASPD), and mania (Helzer & Pryzbeck, 1988). Studies examining clinical samples of alcoholics have found even higher rates of comorbid psychopathology. For example, in a clinical sample of alcoholics, Hesselbrock, Meyer, and Keener (1985) found that 77% of the hospitalized alcoholics in their study met the diagnostic criteria for an additional psychiatric disorder, with approximately one half of the alcoholic women and one third of the alcoholic men meeting the criteria for major depression and about one fifth of the alcoholic women and one half of the alcoholic men meeting the criteria for ASPD.

Because the majority of alcoholics typically have at least one additional lifetime psychiatric disorder, the potential influence of comorbid psychopathology needs to be considered when examining the relationship between parental alcoholism and psychological adjustment in their offspring. It cannot simply be assumed that psychological problems among COAs are due to parental alcoholism because the parents of COAs also are likely to experience depression, anxiety, drug dependence, or antisocial personality disorder (ASPD). These disorders may be as influential, or even more influential than parental alcoholism, on the offsprings' psychological adjustment. Research has shown that parental ASPD may be a particularly important confound in the relationship between parental alcoholism and COA adjustment (Chassin, Rogosch, & Barrera, 1991; Moss, Baron, Hardie, & Vanyukov, 2001). For example, Puttler et al. (1998) found that children who had alcoholic fathers with ASPD exhibited significantly more behavioral problems than children who had alcoholic fathers without ASPD.

A handful of studies have taken parental comorbid psychopathology into account when examining the relationship between parental alcoholism and COA adjustment. For example, in a study conducted by Neff (1994), adults were classified as having a parent with alcoholism only, mental illness only, both problems, or neither problem. No significant differences in psychological distress (as indicated by self-reported levels of depression, anxiety, and somatization) or drinking patterns (e.g., quantity, frequency) were found when the parental alcoholism only group was compared to the control group. In fact, for men, no significant differences were found across the four groups. In contrast, women in the parental mental illness only group and the parental mental illness and alcoholism group reported higher levels of depression in comparison to the control group.

In another study, Giunta and Compas (1994) compared 25–35 year-old adult women whose parents abused alcohol only, were psychiatric distressed only, both abused alcohol and were psychiatrically distressed, or had neither problem. The psychological adjustment of the daughters did not differ significantly across the groups. Similar to the Neff study (1994), these results indicate that women who had fathers who abused alcohol but who were not psychiatrically distressed did not differ significantly from women whose fathers had no psychopathology. However, different patterns of results were observed across the two studies when the parental comorbid psychopathology group was compared to the other groups. More specifically, in the Neff study, although differences were not observed for men, women who had parents with alcohol problems and comorbid psychopathology reported significantly higher levels of depressive symptomatology in comparison to those who had parents with no psychopathology. In contrast, in the Giunta and Compas study (which included women only), no differences in psychological adjustment were found between the parental comorbidity group and the other groups (including the no parental psychopathology group). These differences may be due to differences in sampling (e.g., Giunta & Compas only included 25–35 year-old adult Caucasian women in their study, whereas Neff included an ethnically diverse sample of 20–60 year-old adult men and women), methodology (e.g., the manner in which the subgroups were defined), and differences in outcomes assessed (Giunta & Compas used more global measures of psychological adjustment than Neff).

It should be noted that both studies also were limited in several respects. For example, in both studies, psychiatric disorders were considered together, potentially masking the effect that specific disorders may have on offspring adjustment. In addition, both studies relied on self-report measures of psychopathology. Moreover, parental alcoholism and mental illness were assessed with single self-report items in the Neff study. Finally, the Giunta and Compas sample was restricted to highly educated Caucasian young adult women, limiting the external validity of the results. Nevertheless, both studies make an important contribution to the literature because parental comorbid psychopathology was considered in their design. The present study was designed to extend the findings from these studies by addressing the noted limitations.

Jacob and Leonard (1986) used a different approach for taking potential effects of parental comorbid psychopathology into account when examining offspring of alcoholic parents. More specifically, they controlled for comorbid parental psychopathology by excluding parents

with additional psychiatric diagnoses. In their study of 10–18 year-old community adolescents, the psychosocial functioning of children of alcoholic fathers (COAs), children of depressed fathers (CODs), and a control group of adolescents was compared. The fathers in this study were screened to ensure that they did not have additional psychopathology. When externalizing behaviors (as reported by both parents and teachers) were compared across the groups for boys, no significant differences were found. Similar results were found for girls when teacher reports of externalizing problem behaviors were examined; that is, COAs and CODs did not have higher levels of externalizing behaviors in comparison to controls. However, when parents' reports of externalizing behaviors were examined for girls, CODs were found to have the highest levels of externalizing behaviors, followed by COAs. Although these results are intriguing, this study included only intact families and most of the fathers were employed. In addition, only paternal alcoholism and paternal depression were assessed. Finally, it is likely that excluding individuals with comorbid psychiatric problems compromises the generalizability of the results, given that many alcoholics have comorbid psychological problems. Nonetheless, consistent with the Neff (1994) and Giunta and Compas (1994) studies, these results (especially the results for boys) indicate that once parental comorbid psychopathology is considered, COAs and CODs may be quite similar to controls in their psychosocial adjustment. Findings for girls also suggest that CODs may be at a greater risk for problem behaviors such as externalizing problems than are COAs. These findings highlight the need to consider parental comorbid depression when examining the relationship between parental alcoholism and COA adjustment.

To summarize, results from all of these studies suggest that individuals who have parents with alcohol abuse/dependence only may be similar in their psychosocial functioning to those who have parents with no psychopathology. Findings from the Neff study also indicate that individuals who have parents with alcohol abuse/dependence and comorbid psychopathology may be at an increased risk for psychological problems. However, as noted, these studies were limited in several respects. Therefore, the primary goal of this study was to build upon this work and to examine the relationship between parental alcoholism and offspring psychopathology systematically by addressing the limitations of prior studies.

Most studies examining COAs have focused on paternal alcoholism or have not distinguished between paternal or maternal alcoholism. However, research conducted by Hill and colleagues (Hill & Hruska, 1992; Hill & Muka, 1996) has suggested that the gender of the alcoholic within the family may affect the child's adjustment. More specifically, in their studies, high-risk offspring from female alcoholic families were found to be at an increased risk for psychopathology (Hill & Muka, 1996), whereas high-risk offspring from male alcoholic families were not (Hill & Hruska, 1992). Although these findings are intriguing, the focus of Hill and colleagues' studies was on family history/density of alcoholism and not parental alcoholism per se. Therefore, many of the alcoholics in the high-risk families were aunts, uncles, or grandparents, and not necessarily parents of the children. In contrast to Hill and colleagues' findings, Chassin and colleagues (Chassin, Curran, Hussong, & Colder, 1997) and Ohannessian and Hesselbrock (1994) found paternal alcoholism, but not maternal alcoholism, to be significantly related to substance use in the offspring. Both of these studies focused on subclinical substance use variables. One goal of the present investigation was to extend these studies by comparing the influence of maternal alcoholism and paternal alcoholism on offspring adjustment (as indicated by both symptomatology and clinical diagnoses of externalizing and internalizing disorders), while taking parental comorbid psychopathology into account.

The majority of COA studies also have focused on either children or adults. Relatively few studies have focused on adolescents. Indeed, the lack of studies conducted on adolescent COAs is unfortunate because experimentation with alcohol and drugs typically begins during adolescence (Johnston, O'Malley, & Bachman, 1993). In addition, psychological problems such as depression and anxiety increase dramatically during the adolescent period (Compas, Orosan, & Grant, 1993; Lewinsohn, Clarke, Seeley, & Rhode, 1994; Rutter, 1985). Therefore, the relationship between parental psychopathology and *adolescent* psychological adjustment was examined in the present investigation.

Many previous studies also have assessed offspring psychological problems with self-report symptomatology measures. This study used objective clinical *DSM-III-R* diagnoses to assess psychopathology. In addition, subclinical symptom levels were examined because the adolescents had not yet passed through the greatest risk periods for the clinical disorders assessed. Symptomatology was assessed because high levels of symptomatology may be predictive of subsequent psychosocial problems and psychiatric disorders.

In sum, the primary goal of this study was to examine the relationship between maternal and parental alcoholism (with and without comorbid psychopathology) and adolescent psychopathology. More specifically, the study was designed to contrast the psychological adjustment of adolescents who had parents with no history of psychopathology

to those who had parents with alcohol dependence only and to those who had parents with alcohol dependence and a comorbid psychiatric disorder(s). Adolescents whose parents were depressed only were included as a separate psychiatric comparison group in this study because similar to COAs, children of depressed parents (CODs) have been found to be at an increased risk for the development of psychological problems (Chassin et al., 1991; Downey & Coyne, 1990; Fergusson & Lynskey, 1993; Johnson & Jacob, 1995; Weissman, Warner, Wickramaratne, & Olfson, 1997; Wickramaratne & Weissman, 1998).

METHOD

Participants

All of the participants in this study were involved in the Collaborative Study on the Genetics of Alcoholism (COGA; Begleiter et al., 1995; Bucholz et al., 1994). This large-scale, extended family study includes six center sites (Indiana University; State University of New York; University of California at San Diego; University of Connecticut; University of Iowa; and Washington University in St. Louis) and was designed to identify susceptibility genes for alcohol dependence.

Index adult COGA participants were recruited as either probands (alcohol affected individuals) or controls (unaffected individuals). Family members of both the probands and the controls were asked to participate in the study. The adolescents in this study were family members (immediate or extended) of the probands or controls. Because the primary goal of COGA is to identify genetic susceptibility factors for alcoholism, most of the adolescents (230 boys and 244 girls) were from families of probands (80 boys and 92 girls were from control families). It should be noted that COGA is an "extended" family study (not a "nuclear/immediate" family study); therefore, many of the adolescents were from families that were not targeted directly (i.e., they were from extended families). In addition, because of the family design of COGA, 41.7% of the adolescents had a sibling and/or first or second cousin participating in the study (mean number of participating adolescents per extended family = .63, $SD = .98$).

Probands were recruited from inpatient and outpatient alcoholism programs. All probands met Feighner (Feighner et al., 1972) criteria for definite alcoholism and *DSM-III-R* criteria for alcohol dependence. Controls were recruited through advertisements, dental and medical clinics, mailings to university students, and drivers' license records. Participants were excluded from the study if they had a life-threatening illness, could not speak English, reported recent repeated use of intravenous drugs, or if they had fewer than five individuals in their immediate family who were willing to participate in the study.

This study focused on data collected from the adolescents and their parents between 1989 and 1994. More specifically, the sample for this study included 665 13–17 year-old adolescents (mean age = 15.10, $SD = 1.41$) and their biological mothers and fathers. Both adolescent girls (52%) and boys were assessed. Most of the adolescents were Caucasian (72%) (21% were African American, 5% were Hispanic, and 2% were coded as "other"). The majority of the adolescents were living with their biological mother (88%) or biological father (57%); 52% were living with both their biological mother and their biological father, whereas 7% were living with neither their biological mother nor their biological father. Adolescents were not living with their biological father because their parents were divorced (47%), their parents were separated (14%), their parents had never married (20%), or their father had died (6%) 13% provided "other" reasons. Adolescents were not living with their biological mother because their parents were divorced (28%), their parents were separated (9%), their parents had never married (4%), or their mother had died (7%) 52% provided "other" reasons. The majority of adolescents who were not living with their biological mother or father still had frequent contact with their parent (82% of adolescents not living with their biological mother and 64% of adolescents not living with their biological father reported seeing her/him at least once a month).

Measures and Procedure

The Internal Review Boards at all of the six COGA sites approved the study protocol. The adolescents and their parents provided written informed assent and consent, respectively. The following measures were used to assess psychopathology in the adolescents and their parents.

Parental Psychopathology

Parental psychopathology was assessed using The Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA). The SSAGA is a clinical diagnostic psychiatric interview derived from the National Institutes of Mental Health Diagnostic Interview Schedule (DIS; Helzer & Robins, 1988; Robins et al., 1985), The

Structured Clinical Interview for *DSM-III-R* (Spitzer, Williams, Gibbon, & First, 1992), The Schedule for Affective Disorders and Schizophrenia (SADS; Endicott & Spitzer, 1978), The Composite International Diagnostic Interview (Robins et al., 1988), and The HELPER Interview (Coryell, Cloninger, & Reich, 1978). The SSAGA has good reliability and validity characteristics (Bucholz et al., 1994; Hesselbrock, Easton, Bucholz, Schuckit, & Hesselbrock, 1999). The reliability of the SSAGA has been examined in the COGA sample both within and across the six centers. Test–retest reliabilities (kappas) have been found to range from .65 to .90 and from .74 to 1.00, within centers and across centers, respectively, for the diagnoses examined in the current study (Bucholz et al., 1994). The individual criterion items of the SSAGA also have been shown to be highly reliable in the COGA sample (Bucholz et al., 1995).

The SSAGA assesses the current and lifetime occurrence of 17 Axis I psychiatric diagnoses, in addition to antisocial personality disorder (ASPD). The SSAGA is a unique assessment instrument because it enables psychiatric diagnosis to be made across multiple diagnostic systems, yielding current and lifetime *DSM-III-R*, *DSM-IV*, and *ICD-10* psychiatric diagnoses. However, only *DSM-III-R* lifetime diagnoses were used in this investigation.

For purposes of this study, a parental psychopathology variable was created for both mothers and fathers. This psychopathology variable was derived from the parents' *DSM-III-R* diagnoses of alcohol dependence, drug dependence (dependence on opiods, sedatives, stimulants, cocaine, or marijuana), and major depression. The parental psychopathology variable classified all of the parents into one of the six following groups based on their psychiatric diagnoses: No lifetime history of psychopathology, alcohol dependence only, depression only, alcohol dependence and drug dependence, alcohol dependence and depression, or alcohol dependence, drug dependence, and depression. It should be noted that parents in the "no psychopathology" group did not meet the diagnostic criteria for any of the Axis I diagnoses or ASPD.

Adolescent Psychopathology

The Semi-Structured Assessment for the Genetics of Alcoholism for Adolescents (C-SSAGA-A) was used to assess psychopathology in the adolescents. The C-SSAGA-A is based on The Diagnostic Interview for Children and Adolescents (Reich, Herjanic, Welner, & Gandhy, 1982). It uses the same format as the SSAGA. Diagnoses obtained with the C-SSAGA-A were corroborated by comparison with the corresponding parental interview, the C-SSAGA-P. The psychometric properties of this instrument are good. For example, Kuperman et al. (2001) reported a test-retest reliability of .86 for a diagnosis of alcohol dependence and an average test-retest reliability of .72 ($SD = .17$) for the eight lifetime Axis I nonalcohol dependence diagnoses across a 1 week period in the COGA sample.

DSM-III-R lifetime psychiatric diagnoses of alcohol dependence, marijuana dependence, conduct disorder, and depression were examined in this study. Measures of subclinical substance use, conduct disorder, and depression also were examined with scales created based on symptom counts. To assess substance use, the adolescents were asked the following questions, "Have you ever smoked cigarettes?," "Have you ever taken a drink of beer, wine, wine coolers, hard liquor (like gin, scotch or vodka) or any other kind of drink with alcohol in it?," and "Have you ever used marijuana or hashish?."

Childhood conduct disorder symptomatology was assessed with two separate scales. The following items were summed to create a minor conduct symptomatology scale "Have you ever been suspended from school?," "Have you ever been expelled from school?," "Have you ever run away from home?," "Do you lie or make up stories a lot?," "Have you ever skipped school?," "Have you cut classes?," "Have you ever wrecked or destroyed someone else's property?," and "Have you ever gotten into physical fights with other people?." The following items were summed to create a major conduct disorder symptomatology scale "Have you ever stolen anything?," "Have you ever set any fires on purpose that you weren't supposed to set?," "Have you ever broken into somebody else's house, building, or car?," "Have you ever hurt or killed an animal?," "Have you ever mugged someone?," "Have you ever been in trouble with the police?," "Have you ever appeared in juvenile court?," and "Have you ever done anything on purpose to hurt another person or to cause them physical pain?." The Cronbach alpha coefficients for the minor conduct disorder symptomatology and the major conduct disorder symptomatology scales were .74 and .72, respectively.

The following items were summed to create a depression symptomatology scale: "Has there been any time in your life when you . . . "felt sad, unhappy, or depressed a lot more than usual?," "felt like crying a lot more than usual?," "felt irritable or angry a lot more than usual?," "felt like nothing seemed to be fun anymore (even the things you usually like to do)?," and "were not interested in things you usually like?." The Cronbach alpha coefficient for the depression scale was .85 in this sample.

RESULTS

Descriptive Statistics

Demographic Differences

Prior to conducting the primary analyses, a series of chi-squares and analyses of variance (ANOVA) models were carried out to examine whether the paternal and maternal psychopathology grouping variables systematically varied with the demographic characteristics of the sample. Neither the adolescent's age nor gender were significantly associated with the parental psychopathology variables. In contrast, ethnicity was significantly related to both paternal, $\chi^2(20) = 32.45$, $p < .05$, and maternal, $\chi^2(25) = 71.03$, $p < .001$, psychopathology. These results indicated that Caucasian adolescents were most likely to have parents diagnosed with no psychopathology, whereas African American adolescents were most likely to have parents diagnosed with comorbid alcohol dependence, drug dependence, and depression. Because parental psychopathology was found to be significantly related to ethnicity, ethnicity was entered as a covariate in the primary analyses.

Parental Psychopathology[8]

A total of 464 fathers had complete diagnostic data. Of these fathers, 145 (31%) reported no history of psychopathology, 94 (20%) met *DSM-III-R* criteria for alcohol dependence only, 37 (8%) met criteria for depression only, 65 (14%) met criteria for alcohol dependence and drug dependence, 54 (12%) met criteria for alcohol dependence and depression, and 69 (15%) met criteria for alcohol dependence, drug dependence, and depression. A total of 563 mothers had complete diagnostic data; 223 (40%) reported no lifetime history of psychopathology, 50 (9%) met *DSM-III-R* criteria for alcohol dependence only, 139 (25%) met criteria for depression only, 27 (5%) met criteria for alcohol dependence and drug dependence, 49 (9%) met criteria for alcohol dependence and depression, and 75 (13%) met criteria for alcohol dependence, drug dependence, and depression.

As noted previously, the majority of adolescents were from proband families. The fathers and the mothers from the proband families were more likely to be classified in the psychopathology groups than those from the control families, $\chi^2(5) = 121.72$, $p < .001$; and $\chi^2(5) = 100.12$, $p < .001$, respectively. More specifically, 57% of the fathers from the control families and 17% of the fathers from the proband families were classified in the no psychopathology group. In contrast, 1% of the fathers from the control families and 23% of the fathers from the proband families were categorized in the alcohol dependence, drug dependence, and depression group. The pattern was similar for mothers, with 65% of the mothers from the control families and 29% of mothers from the proband families being classified in the no psychopathology group; and 0% of the mothers from the control families and 19% of the mothers from the proband families being categorized in the alcohol dependence, drug dependence, and depression group. Because family type was found to systematically vary with parental psychopathology, it was included as an additional predictor variable in the primary analyses.

Adolescent Symptomatology and Psychopathology

Most of the adolescents (61%) reported that they had consumed at least one alcoholic drink in their lifetime. In addition, 49% reported that they had smoked at least one cigarette and 30% reported that they had used marijuana. The mean scores for the minor conduct disorder symptomatology scale and the major conduct disorder symptomatology scale were 2.24 ($SD = 1.96$) and 1.26 ($SD = 1.62$), respectively (range = 0–8). The mean score for the depression symptomatology scale was 1.79 ($SD = 1.87$; range = 0–5). Relatively few adolescents met the diagnostic criteria for the psychiatric diagnoses. More specifically, 52 adolescents (8%) met the *DSM-III-R* criteria for alcohol dependence, 46 (7%) met the criteria for marijuana dependence, 127 (19%) met the criteria for conduct disorder, and 123 (19%) met the criteria for depression.

The Association Between Parental Psychopathology and Adolescent Psychological Symptomatology

Substance Use

Chi-square analyses were conducted to examine the relationship between the six parental psychopathology groups and adolescent substance use. The substance use variables in these analyses were the adolescents' use of cigarettes, alcohol, or marijuana. In all of the following analyses, boys and girls were analyzed together to ensure that the cell sizes were adequate.

[8] It should be noted that 201 fathers and 102 mothers were not classified into any of the parental psychopathology subgroups because they were either diagnosed with a psychiatric disorder that was not examined in the present study (e.g., schizophrenia, eating disorders) or they were in a subgroup that was initially examined (e.g., drug dependence only), but was not retained due to a small subgroup *n*.

Table I. Substance Use, Conduct Disorder, and Depression Symptomatology by Paternal and Maternal Psychiatric Diagnoses

Parent diagnosis	Cigarettes	Alcohol	Marijuana	Conduct (minor)	Conduct (major)	Depression
Father						
None	35	51	17	1.21	0.78	1.31
Alcohol	39	52	16	1.83	0.93	1.22
Depression	46	54	11	1.84	1.05	1.73
Alcohol & Drug	46	57	29	2.57	1.43	2.03
Alcohol & Depression	59	72	41	2.20	1.04	2.20
Alcohol, Drug, & Depression	66	74	49	3.06	1.80	2.48
Mother						
None	43	53	21	1.72	1.01	1.33
Alcohol	50	66	26	2.42	1.40	1.44
Depression	55	66	32	2.20	1.18	2.01
Alcohol & Drug	30	56	44	2.58	1.38	1.69
Alcohol & Depression	55	63	33	1.92	1.22	2.43
Alcohol, Drug, & Depression	62	67	44	3.04	1.86	2.62

Note. Percentages are presented for the substance use variables and means are presented for the conduct and depression symptom variables.

As shown in Table I, paternal psychopathology was significantly associated with adolescent cigarette use, $\chi^2(5) = 23.13$, $p < .001$, alcohol use, $\chi^2(5) = 16.16$, $p < .01$, and marijuana use, $\chi^2(5) = 41.36$, $p < .001$. Maternal psychopathology also was significantly related to adolescent cigarette use, $\chi^2(5) = 15.59$, $p < .01$, and marijuana use, $\chi^2(5) = 19.18$, $p < .01$, but not to adolescent alcohol use, $\chi^2(5) = 8.88$, $p = .11$.

Logistic regression analyses were conducted to examine these relations in more detail. Because 41.7% of the adolescents had at least one sibling or cousin (first or second) participating in the study, some of the cases were not independent of one another. Therefore, a variable was created to reflect whether or not an adolescent had a sibling or cousin participating in the study. This variable was subsequently entered first in the logistic regression models to account for any potential systematic differences between independent and dependent cases.[9] In addition, because parental psychopathology was found to vary by ethnicity, ethnicity was entered next in these models. Family type (proband or control) was entered next, followed by the parental psychopathology grouping variable. Separate models were conducted for maternal and paternal psychopathology and for each dependent variable (lifetime cigarette use, alcohol use, and marijuana use), yielding six models. Simple contrast coding was selected so that each category of the predictor variable could be compared to the reference category (the "control/no psychopathology" group).[10] Because of the number of pairwise comparisons conducted, a more conservative alpha level of .01 was adopted for these models.

When paternal psychopathology was examined, adolescents who had fathers diagnosed with both alcohol dependence and depression were significantly more likely to have used marijuana, $B = 1.13$, Wald's $\chi^2(1) = 8.47$, $p < .01$, in comparison to adolescents who had fathers with no psychopathology. Similarly, adolescents who had fathers diagnosed with alcohol dependence, drug dependence, and depression were significantly more likely to have used alcohol, $B = 1.03$, Wald's $\chi^2(1) = 8.12$, $p < .01$, cigarettes, $B = 1.45$, Wald's $\chi^2(1) = 16.32$, $p < .001$, and marijuana, $B = 1.55$, Wald's $\chi^2(1) = 16.53$, $p < .001$, than adolescents who had fathers with no psychopathology. Interestingly, adolescents who had fathers diagnosed with alcohol dependence only or depression only did not differ significantly from adolescents who had fathers with no psychopathology in regard to their substance use. Family type and ethnicity were not significant in these models. In contrast to the results for fathers, maternal psychopathology was not significantly related to any of the adolescent substance use variables.

[9] It should be noted that the primary analyses also were run including only one adolescent per family. These results are not presented because the same pattern of results was observed. More specifically, the pattern was identical in 16 of the 18 models. However, when only one adolescent per family was included, in five of the models, the level of significance of the predictor variable decreased from .01 to .05; and in another model, the significance level dropped from .01 to *ns*. The power clearly was affected when only one adolescent per family was included. Because the pattern of results did not substantially differ across the samples (one adolescent per family vs. all participating adolescents per family), a decision was made to include all participating adolescents. This strategy yielded a greater degree of power to detect significant findings.

[10] The "no parental psychopathology" subgroup was chosen as the reference category because it was intended to serve as a quasi "control" group.

Conduct Disorder Symptomatology

Multivariate analysis of covariance (MANCOVA) models were conducted to examine the relationship between parental psychopathology and lifetime conduct disorder symptomatology. The design factors in these models were family type and the parental psychopathology grouping variable. The dependent variables were the minor conduct disorder scale and the major conduct disorder scale. Case independence and ethnicity were entered as covariates in these models. Separate models were conducted for paternal psychopathology and maternal psychopathology.

Paternal psychopathology significantly predicted minor conducted disorder symptomatology, $F(5, 444) = 4.43$, $p < .01$. Post-hoc Bonferroni comparison tests were conducted to explore differences in the conduct disorder symptomatology scales by paternal psychopathology grouping. As shown in Table I, the three paternal comorbidity groups (adolescents with fathers diagnosed with alcohol dependence and drug dependence; alcohol dependence and depression; or alcohol dependence, drug dependence, and depression) all had significantly higher levels of minor conduct disorder symptomatology in comparison to adolescents who had fathers with no psychopathology (respective mean differences were 1.35, $p < .001$; .98, $p < .05$; and 1.84, $p < .001$). Adolescents who had fathers with alcohol dependence only or depression only did not significantly differ from adolescents who had fathers with no psychopathology in regard to conduct disorder symptomatology (see Table I). Paternal psychopathology did not significantly predict major conduct disorder symptomatology, $F(5, 444) = .97$, $p = .43$.

Similar to the results for paternal psychopathology, maternal psychopathology significantly predicted minor conduct symptomatology, $F(5, 542) = 2.54$, $p < .05$, but not major conduct symptomatology, $F(5, 542) = 1.09$, $p = .36$. Post-hoc Bonferroni comparison tests indicated that adolescents who had mothers with alcohol dependence, drug dependence, and depression had significantly higher levels of minor conduct disorder symptomatology than adolescents who had mothers with no psychopathology (mean difference = 1.32, $p < .001$).

In all models, family type was not a significant predictor of conduct disorder symptomatology. However, in the maternal model, ethnicity was found to significantly predict minor conduct disorder symptomatology, $F(2, 541) = 4.89$, $p < .01$. Post-hoc Bonferroni comparison tests indicated that Caucasian adolescents had significantly lower levels of minor conduct disorder symptomatology than African American and Hispanic adolescents (mean differences = .81, $p < .001$; and 1.34, $p < .01$, respectively).

Depression Symptomatology

Analysis of Covariance (ANCOVA) models were conducted to examine the relationship between parental psychopathology and depression symptomatology. The design factors and covariates were identical to those in the conduct disorder symptomatology models just discussed.

Paternal psychopathology was a significant predictor of lifetime depression symptomatology, $F(5, 443) = 3.29$, $p < .01$. Post-hoc Bonferroni comparison tests indicated that adolescents who had fathers diagnosed with alcohol dependence and depression or with alcohol dependence, drug dependence, and depression had significantly higher levels of depression symptomatology than adolescents who had fathers with no psychopathology (mean differences were .89 $p < .05$; and 1.17, $p < .001$, respectively. Similar to the results for conduct disorder symptomatology, adolescents who had fathers diagnosed with alcohol dependence only or depression only were not significantly different from adolescents who had fathers with no psychopathology in regard to their depression symptomatology (see Table I).

Maternal psychopathology also significantly predicted depression symptomatology, $F(5, 541) = 5.17$, $p < .001$. Post-hoc Bonferroni tests of this model indicated that adolescents who had mothers diagnosed with depression only, alcohol dependence and depression, or alcohol dependence, drug dependence and depression had significantly higher levels of lifetime depression symptomatology than adolescents who had mothers with no psychopathology, mean differences were .68, $p < .01$; 1.09, $p < .01$; and 1.28, $p < .001$, respectively. In contrast, adolescents who had mothers diagnosed with alcohol dependence only did not significantly differ from those who had mothers with no psychopathology in relation to their level of lifetime depression symptomatology. In both the maternal and paternal psychopathology models, family type and ethnicity did not significantly predict depression symptomatology.

The Association Between Parental Psychopathology and Adolescent Psychiatric Diagnoses

Chi-square analyses were conducted to examine the relationship between parent and adolescent psychopathology (using *DSM-III-R* clinical diagnoses). As shown in Fig. 1, paternal psychopathology was significantly associated with adolescent *DSM-III-R* diagnoses of alcohol dependence, $\chi^2(5) = 21.72$, $p < .01$, marijuana dependence, $\chi^2(5) = 30.77$, $p < .001$, conduct disorder,

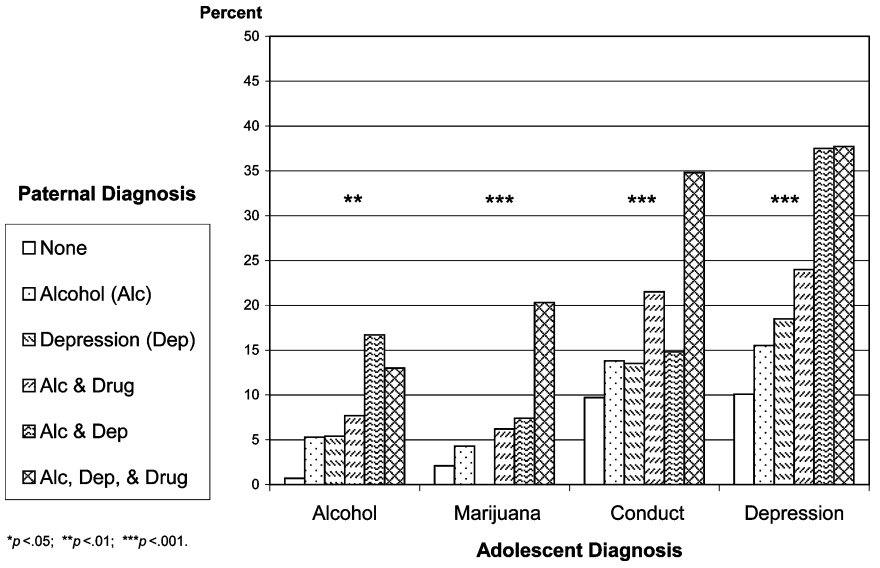

Fig. 1. Adolescent psychiatric diagnoses by paternal psychopathology.

$\chi^2(5) = 23.32$, $p < .001$, and depression, $\chi^2(5) = 24.87$, $p < .001$. Maternal psychopathology was significantly related to diagnoses of adolescent alcohol dependence, $\chi^2(5) = 12.30$, $p < .05$, conduct disorder, $\chi^2(5) = 19.77$, $p < .01$, and depression, $\chi^2(5) = 28.54$, $p < .001$ (see Figure 2).

Logistic regression analyses were conducted to further examine the relationship between parental psychopathology and adolescent psychopathology. The variable reflecting case independence and ethnicity were entered in the first block. Family type (proband or control) was entered next, followed by the parental psychopathology variable. Separate models were conducted for maternal and paternal psychopathology and for each of the dependent variables (*DSM-III-R* diagnoses of alcohol dependence, marijuana dependence, conduct disorder, and depression). The alpha level was adjusted to .01 to reduce the possibility of committing Type I errors.

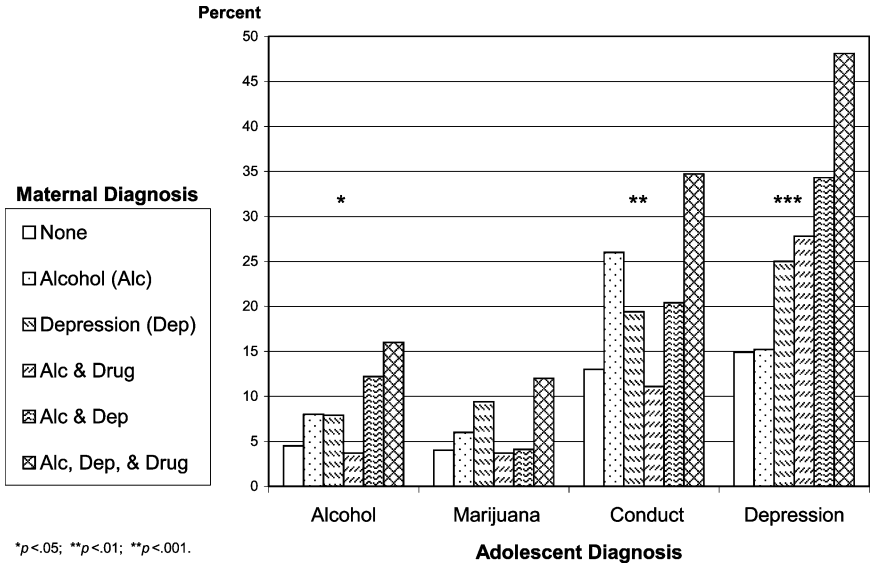

Fig. 2. Adolescent psychiatric diagnoses by maternal psychopathology.

When paternal psychopathology was examined, adolescents who had fathers diagnosed with alcohol dependence and drug dependence were significantly more likely to be diagnosed with alcohol dependence than were adolescents who had fathers with no psychopathology, $B = 3.16$, Wald's $\chi^2(1) = 7.43$, $p < .01$. In addition, adolescents who had fathers diagnosed with alcohol dependence and depression were significantly more likely to be diagnosed with alcohol dependence, $B = 3.76$, Wald's $\chi^2(1) = 11.42$, $p < .01$ and depression, $B = 1.63$, Wald's $\chi^2(1) = 10.62$, $p < .01$, than adolescents who had fathers with no psychopathology. Finally, adolescents who had fathers diagnosed with alcohol dependence, drug dependence, and depression were significantly more likely to be diagnosed with alcohol dependence, $B = 3.97$, Wald's $\chi^2(1) = 12.12$, $p < .001$, marijuana dependence, $B = 3.38$, Wald's $\chi^2(1) = 17.75$, $p < .001$, conduct disorder, $B = 1.73$, Wald's $\chi^2(1) = 15.22$, $p < .001$, and depression, $B = 1.58$, Wald's $\chi^2(1) = 10.24$, $p < .01$, in comparison to adolescents who had fathers with no history of psychopathology. Adolescents who had fathers diagnosed with alcohol dependence only or depression only were no more likely to be diagnosed with one of these disorders than were adolescents who had fathers with no psychopathology. Ethnicity and family type were not significant in any of these models.

Results from the logistic regression analyses also indicated that adolescents who had mothers diagnosed with alcohol dependence, drug dependence, and depression were significantly more likely to be diagnosed with alcohol dependence, $B = 1.37$, Wald's $\chi^2(1) = 7.15$, $p < .01$, conduct disorder, $B = 1.07$, Wald's $\chi^2(1) = 9.58$, $p < .01$, and depression, $B = 1.34$, Wald's $\chi^2(1) = 11.91$, $p < .01$, than were adolescents who had mothers with no psychopathology. No significant differences in psychiatric diagnoses were found when adolescents who had mothers diagnosed with alcohol dependence only or depression only were compared to adolescents who had mothers with no history of psychopathology. In addition, family type and ethnicity were not significant in any of the models.

The Effect of Antisocial Personality Disorder (ASPD)

Logistic regression models were calculated to examine whether paternal ASPD accounted for the relationship between paternal psychopathology and adolescent substance use.[11] Because relatively few mothers met the ASPD diagnostic criteria, maternal ASPD was not examined in these analyses.

In these models, the variable reflecting case independence and ethnicity were entered first. Family type (control vs. proband) was entered next, followed by paternal ASPD and the paternal psychopathology grouping variable. Separate models were conducted for cigarette use, alcohol use, and marijuana use. In all three models, paternal ASPD did not significantly predict adolescent substance use. In contrast, paternal psychopathology significantly predicted cigarette use, Wald's $\chi^2(5) = 20.62$, $p < .01$, and marijuana use, Wald's $\chi^2(5) = 30.62$, $p < .001$.

To examine whether paternal ASPD contributed to the relationship between paternal psychopathology and adolescent conduct disorder symptoms, a multivariate analysis of covariance model (MANCOVA) was conducted. Family type, paternal ASPD, and the paternal psychopathology grouping variable were entered as design factors in this model. In addition, case independence and ethnicity were entered as covariates. The dependent variables were the minor and major conduct disorder symptomatology scales. In this model, both paternal ASPD and the paternal psychopathology grouping variable significantly predicted conduct disorder symptomatology, $F(2, 433) = 4.98$, $p < .01$; $F(10, 866) = 3.06$, $p < .01$, respectively. A separate analysis of covariance (ANCOVA) model was conducted to examine whether paternal ASPD accounted for the relationship between paternal psychopathology and adolescent depression symptomatology. The design factors and covariates were identical to those in the conduct disorder symptomatology model. Paternal ASPD was not significant in this model. In contrast, paternal psychopathology significantly predicted adolescent depressive symptomatology, $F(5, 433) = 3.68$, $p < .01$.

Finally, three additional logistic regression models were conducted to examine whether paternal ASPD accounted for the relationship between paternal psychopathology and the adolescent psychiatric diagnoses. Paternal ASPD was not a significant predictor in any of these models. In contrast, paternal psychopathology significantly predicted adolescent *DSM-III-R* diagnoses of alcohol dependence, Wald's $\chi^2(5) = 17.55$, $p < .01$, marijuana dependence, Wald's $\chi^2(5) = 21.54$, $p < .01$, and conduct disorder, Wald's $\chi^2(5) = 17.16$, $p < .01$. Taken together, these analyses indicate that paternal ASPD did not account for the relations between the paternal

[11] ASPD was treated as a control variable instead of a grouping factor because there were not enough cases of ASPD to allow for it to be analyzed as a grouping factor. A total of 108 parents were diagnosed with ASPD (90 fathers and 18 mothers). However, only 15 parents (all of whom were fathers) were diagnosed with ASPD and alcohol dependence. Unfortunately, the lower prevalence of ASPD in our sample did not enable us to examine it in conjunction with other psychiatric diagnoses.

psychiatric diagnoses assessed in this study and adolescent psychopathology.

DISCUSSION

Consistent with the literature, the majority of alcohol dependent parents in this study had a comorbid psychiatric disorder. More specifically, 67% of the fathers and 75% of the mothers had comorbid *DSM-III-R* depression, drug dependence, or both. These rates are in accordance with the 77% comorbidity rate found by Hesselbrock et al. (1985). In the present study, only 20% of the fathers and 9% of the mothers were diagnosed with alcohol dependence only, highlighting the need to consider additional parental psychopathology when examining the relationship between parental alcoholism and offspring adjustment. Unfortunately, many COA studies to date have not included parental comorbid psychopathology in their design. Therefore, it is unclear whether adjustment problems typically found among COAs are due to the parent's alcohol problem, the parent's comorbid psychiatric condition(s) (e.g., depression, drug dependence, ASPD), or both.

Results from this study suggest that parental comorbid psychopathology has a considerable effect on the offspring's adjustment. Remarkably, in this study, adolescents who had either a mother or father diagnosed with alcohol dependence only did not differ significantly from adolescents who had a parent with no psychopathology on any of the conduct disorder, depression, or substance abuse measures assessed, regardless of whether symptomatology or clinical diagnoses were examined. These results are consistent with studies conducted by Neff (1994) and Giunta and Compas (1994). In those studies, no significant differences in psychosocial adjustment (e.g., as indicated by psychological distress, drinking patterns, etc.) were found when adults who had parents with alcohol problems only were compared to adults who had parents with no psychopathology. Results from this study extend these findings to adolescents.

In this study, adolescents who had a parent with alcohol dependence only were similar to those who had a parent with depression only. These findings are in accordance with those from Jacob and Leonard's study (Jacob & Leonard, 1986) in which the psychosocial functioning of adolescent COAs, CODs, and controls was compared. The parents were screened to ensure that they did not have additional psychopathology. No significant differences were found across groups for boys. Findings from the Jacob and Leonard study mirror those found for adolescents of alcoholic parents only, depressed parents only, and controls in this investigation because these groups were not found to differ significantly from one another in regard to psychopathology. This study expands upon Jacob and Leonard's study because psychiatric symptomatology and clinical diagnoses were assessed in both intact and nonintact families. In addition, adolescents who had parents with comorbid psychiatric problems were included, thereby increasing the external validity of the results. Taken together, results from these studies indicate that parental alcoholism, per se, may not be the most important factor influencing COA adjustment because adolescents who had parents with alcohol dependence only appeared to be quite normal in their psychosocial functioning.

In contrast, results suggest that individuals who have alcohol dependent parents with comorbid psychiatric disorders are at a greater risk for the development of psychopathology in comparison to those who have parents with alcohol dependence only. In this study, adolescents who had parents diagnosed with alcohol dependence and a comorbid psychiatric disorder had a significantly elevated risk of developing conduct disorder, depression, and substance abuse problems in comparison to adolescents who had parents with no lifetime psychopathology. Moreover, the subgroup of adolescents whose parents had alcohol dependence, drug dependence, and major depression consistently fared the worst, regardless of the psychiatric disorder assessed.

These findings have important implications. First, it is apparent that all COAs should not be categorized together into one "at risk" group. In fact, these findings indicate that COAs with alcohol dependent only parents do not have an elevated risk for conduct disorder, depression, or early onset alcohol or marijuana dependence. In contrast, COAs who have alcohol dependent parents with a history of comorbid psychopathology do appear to be at an increased risk for the development of such problems. Results also suggest that COAs who have parents with multiple psychiatric disorders (e.g., alcoholism, drug dependence, and depression) have the greatest risk for developing a variety of psychiatric problems. These results are consistent with current developmental psychopathology models and research that suggests that the density of familial risk factors is directly linked to offspring adjustment (Ellis, Zucker, & Fitzgerald, 1997; Zucker et al., 1996). Simply stated, multiple risk factors increase an individual's probability of developing psychological problems.

In addition, these results indicate that parents' comorbid psychopathology (particularly depression and drug dependence) may be more detrimental to COAs' adjustment than parent alcoholism, at least during adolescence. Importantly, these findings also suggest that prevention

programs should target COAs who have parents with comorbid psychological disorders, especially those who have parents with depression, drug dependence or both.

The reasons why COAs who have parents with comorbid psychological disorders are at a heightened risk for psychopathology in comparison to COAs who have alcohol dependent only parents need to be explored further. One possibility is that COAs who have parents with alcohol problems and additional psychiatric problems have a higher genetic risk for psychopathology. However, many environmental factors also are likely to differentiate these subgroups of COAs. For instance, alcoholics who have comorbid psychiatric conditions may be less likely to remain married and employed than those who have alcohol dependence only. If this is the case, families that have alcoholic parents with comorbid psychopathology may be characterized by comparatively higher levels of family conflict and stress—variables that have been consistently linked to adolescent psychological problems (Hallfors & van Dorn, 2002; Sheeber, Hops, Alpert, Davis, & Andrews, 1997). Clearly, future studies need to examine the underlying genetic and environmental processes that place COAs whose have parents have comorbid psychological problems at a substantially elevated risk for developing psychological problems themselves.

Although the effects of maternal versus paternal psychopathology on offspring psychological adjustment were not directly examined in this study, paternal psychopathology was found to be more consistently associated with adolescent psychopathology than was maternal psychopathology. More specifically, adolescents who had alcoholic fathers with comorbid drug dependence, depression, or both were more likely to develop psychopathology. Adolescents who had alcohol dependent mothers diagnosed with comorbid depression and drug dependence also were at a substantially elevated risk for psychopathology. However, adolescents who had alcoholic mothers with only one comorbid disorder (depression or drug dependence) were not found to be at increased risk for substance use or for any of the other clinical disorders assessed. These results are consistent with those found by Chassin, et al. (1997) and Ohannessian and Hesselbrock (1994). In both of those studies, paternal alcoholism, but not maternal alcoholism, was found to be associated with substance use. However, it should be noted that in this study, more men than women were classified as having alcohol dependence and depression or alcohol dependence and drug dependence. Similarly, there were more alcoholic fathers than alcoholic mothers in the Chassin et al. and Ohannessian and Hesselbrock studies. Consequently, there may have been less power to detect significant relations when maternal alcoholism was examined; the stronger relations between paternal alcoholism and offspring adjustment may simply be a statistical artifact. Future studies using larger samples of maternal alcoholics should be conducted to verify these results.

Although the examination of ethnicity was not a primary aim of this study, it should be noted that rates of parental psychopathology were found to differ significantly by ethnicity. More specifically, Caucasian parents were more likely to be classified in the "no psychopathology" group, whereas African American parents were more likely to be categorized in the alcohol dependence, drug dependence, and depression group. Because of these differences, ethnicity was included as a covariate in the primary analyses. In these analyses, ethnicity was found to be a significant predictor in only one of the 18 models predicting adolescent psychological adjustment. More specifically, ethnicity significantly predicted minor conduct disorder symptomatology, with Caucasian adolescents exhibiting significantly lower levels of minor conduct disorder symptomatology than African American or Hispanic adolescents. These results are consistent with previous studies examining the relationship between ethnicity and conduct disorder (DelBello, Lopez-Larson, Soutullo, & Strakowski, 2001). However, it is important to note that in the present study, ethnic differences were not found for major conduct disorder symptomatology or for clinical *DSM-III-R* conduct disorder. Moreover, ethnicity was not found to predict any of the psychiatric diagnoses assessed in this study or any of the symptomatology measures.

Although these findings extend the current literature, some caveats should be mentioned. One limitation of the present investigation is that the design was not longitudinal. Longitudinal research is needed to examine the relationship between parental psychopathology and offspring adjustment over time as both the offspring and the parents pass through different developmental stages and periods of risk for developing psychiatric problems. As noted previously, Jacob and Leonard (1986) did not find differences in psychosocial adjustment among their adolescent COAs, CODs, and controls. However, when the adolescents from their study were followed up 10 years later, COAs were found to be at a significantly greater risk for the development of alcohol problems in comparison to CODs and controls (Jacob & Windle, 2000). Chassin and colleagues (Chassin et al., 1999) also found parental alcoholism to uniquely predict young adult alcohol and drug abuse and dependence after statistically controlling for parental depression, anxiety, and ASPD. Again, these differences were found for adult COAs. Although parental alcoholism alone was found to significantly predict substance abuse and dependence among young adults in these studies, in

both studies, the potential effect of comorbid parental drug dependence was not assessed. Because parental drug dependence is a common comorbid psychological problem among alcoholics, it may have contributed to the significant relationship observed between parental alcohol abuse/dependence and offspring substance abuse and dependence in these studies. In this investigation, parental drug dependence was considered. Therefore, it may, at least partially, explain the differences found across studies. However, only adolescents were examined in this study. Perhaps the individuals in our parental alcoholism only group will be at increased risk for psychopathology once they enter adulthood. These adolescents are being tracked longitudinally and we should be able to address this question in the near future.

Longitudinal research also is needed to examine the underlying processes involved in the relationship between parental comorbidity and adolescent psychological adjustment within alcoholic families. As hypothesized previously, parents who have alcohol problems and additional psychiatric problems may be less likely to remain married and/or employed than parents who have alcohol problems only. This may create further stress on the family, which in turn, may negatively influence the adolescent. Alternatively, perhaps financial and marital problems in the alcoholic family create further distress for the alcoholic parent. This increased stress may contribute to the development of comorbid psychological disorders in the parent, which in turn, may negatively influence the adolescent.

Another limitation of this study is that adolescent gender differences could not be addressed because the cell sizes became too small when parental diagnostic categories were split by gender. However, our previous research (Ohannessian et al., 2004) has indicated that the relationship between parental psychopathology and adolescent adjustment may depend on the gender of the adolescent. More specifically, adolescent girls were found to be more negatively affected by parental psychopathology in comparison to adolescent boys. Perhaps female COAs similarly are more affected by parental comorbidity than are male COAs. Future studies should address this possibility.

It also should be noted that the sample was somewhat unique. None of the adolescents were directly ascertained, but were identified as family members of index cases of treated alcoholics or community dwelling controls. Some of the adolescents were members of high-density alcoholism families, others had only an affected parent, whereas others had no biological relatives affected with alcohol dependence. Although the COGA study design allows for the examination of many genetic hypotheses, the sampling strategy does not always provide ideal subsamples for the testing of nongenetic hypotheses.

In light of the limitations, this study does make an important contribution to the extant literature because the effect of parental comorbid psychopathology on the relationship between parental alcohol dependence and adolescent psychological adjustment was thoroughly and systematically examined. Moreover, results from this study underscore the need to focus on the diversity of COAs and their families to better address the question of why some COAs appear to be well adjusted, whereas others do not. Results from this study indicate that parental comorbid psychopathology may provide at least a partial answer to this question.

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