School Adjustment and Substance Use in Early Adolescent Boys: Association with Paternal Alcoholism with and without Dad in the Home

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Abstract

The present study examined the association of paternal alcoholism with early adolescent boys' school adjustment and substance use, and its moderation by paternal absence, controlling for parents' socioeconomic resources. A community sample of 653 urban, low SES families from Montreal, Canada, was assessed and information collected from parents, teachers, and adolescents' self-reports, and school records. Paternal alcoholism was significantly associated with boys' lower academic performance, lower grades, higher frequency of tobacco, marijuana and hard drugs use, of getting drunk, and using a variety of hard drugs. However, the separation from the alcoholic father represented a significant factor of moderation in regards to boys' substance use: sons of alcoholic fathers living with their dad in intact families were more likely to use tobacco and marijuana, to get drunk, and to use a variety of hard drugs than their peers not living with their alcoholic father, whether in single-mother or stepfamilies.

Keywords: Children of alcoholics, paternal alcoholism, parental separation, early adolescence, psychopathology, school adjustment, substance use.

Abstract word count: 149

In memory of Joan McCord

Children of alcoholics (COAs) have been studied extensively in the last four decades. With a prevalence of alcohol use disorders of 7.4% in the US, and 11.1% in the UK (World Health Organization [WHO], 2014), estimates of 2.5 million UK children living in an alcoholic family (Adamson, Templeton, & Clifton, 2012), and one in 10 children under 18 in the US (U.S. Department of Health and Human Services, 2012), COAs still represent today an important population of youths at risk. Over the years, these children were repeatedly reported to have elevated risk of adjustment problems: substance use and abuse, disruptive behaviors, delinquency, school difficulties, cognitive impairment, somatic problems, anxiety, and depression (Chassin, Pitts, DeLucia, & Todd, 1999; Hussong, Flora, Curran, Chassin, & Zucker, 2008; McGrath, Watson, & Chassin, 1999; Morgan, Desai, & Potenza, 2010; Sher, 1997; Vermeulen-Smit et al., 2012; Windle & Searles, 1990). Despite these converging reports, a number of studies have failed to find differences between COAs and non-COAs on similar behavioral outcomes (Keller, Cummings, Davies, & Mitchell, 2008; Kelley & Fals-Stewart, 2004; Lieb et al., 2002; Ohannessian et al., 2004). Although different hypotheses were proposed to explain the disparity in results across studies, a consensus emerged in the field to consider COAs as a heterogeneous group (Johnson & Leff, 1999; Sher, 1997), including individuals with a variety of familial experiences, genetic heritage, and profiles, similar to the heterogeneity in etiology and manifestations of alcoholism in adults (Zucker, 2006).

Several factors emerge from COAs research as key aspects to consider in order to address this issue of heterogeneity. The first is gender. Studies suggest differences between sons and daughters of alcoholics for the genetic heritability of alcoholism (Hardie, Moss, & Lynch, 2008; Prescott, Aggen, & Kendler, 1999), substance use and abuse (Pearson, D'Lima, & Kelley, 2012; Vermeulen-Smit et al., 2012), behavior problems, and psychopathology (Hussong et al., 2008;

Morgan et al. 2010; Serec et al., 2012). Similarly, the gender of the alcoholic parent seems to have a differential effect on boys and girls (Bijl, Cuijpers, & Smit, 2002; Morgan et al., 2010). Yet, most studies examining school-aged COAs have not made the distinction between the outcomes for boys and girls, or between the effects of paternal and maternal alcoholism (e.g., Kelley & Fals-Stewart, 2004; Ohannessian et al., 2004). The few studies that made this distinction examined samples representing partly or wholly adult COAs, with a wide age-range (e.g., Bijl et al., 2002; Morgan et al., 2010) or high risk subjects (e.g., Kuperman, Schlosser, Lidral, & Reich, 1999; Ohannessian et al., 2005). The nature of the samples – clinical, high-risk or population-based – and the age-range (e.g. 3-18+ years) in studies represent important sources of variation among results pertaining to COAs, making the identification of age-specific profiles difficult, and possibly masking true differences between COAs and non-COAs.

Frequent characteristics of alcoholic families, such as low socioeconomic status (SES) (Vermeulen-Smit et al., 2012), family dysfunction (Finan, Schulz, Gordon, & Ohannessian, 2015) and parental separation (Waldron, Heath, Bucholz, Madden, & Martin, 2011), may have an important influence on COAs' behavioral outcomes, and could account for the effect of parental alcoholism per se (Finan et al., 2015; Keller et al., 2008; Waldron, Grant, et al., 2014). Conversely, there is evidence suggesting that differences between COAs and non-COAs persist above and beyond SES influence (Serec et al., 2012), and that parental separation could rather represent an additional risk factor to parental alcoholism (Waldron, Grant, et al., 2014; Waldron, Vaughan, et al., 2014). Alternatively, the separation from an alcoholic or antisocial father may represent a protective factor for the child (Jaffee, Moffitt, Caspi, & Taylor, 2003; McCord, 1990, 1991), although formal moderation testing of such effect has not been conducted yet.

From a developmental psychopathology perspective, genetic and environmental factors operate jointly to influence the development and to sustain, aggravate, or reduce the child's

adjustment problems (Rutter & Sroufe, 2000). Paternal alcoholism may contribute to socio-familial conditions, including parental separation and low SES for some families, that in turn, impact child's development (i.e., the mediation hypothesis). Alternatively, these conditions may represent cumulative factors impacting the child, adding to the influence (genetic or environmental) of having an alcoholic father (i.e., the additive effects hypothesis). Finally, parental separation may either be a protective factor for the child separated from the father, if the mother has sufficient personal resources and the separation results in a healthier family environment, or on the contrary, a risk factor if the mother is vulnerable (i.e., the moderation hypothesis). Surprisingly, not only parental separation has received little attention in COAs' research (Waldron et al., 2011; Waldron, Grant, et al., 2014), but the presence or absence of the alcoholic parent in the family, despite their important implication to understand the etiology and the mechanisms involved in the association between parental alcoholism and children's adjustment problems, remain understudied. Moreover, the handful of studies that examined this issue (e.g., McCord, 1990; Tarter, Schultz, Kirisci, & Dunn, 2001) used a strategy based on splitting data into groups and conducting group-comparison analysis, a method that does not provide a proper test of moderation (Hayes, 2013). Recent advances in moderation analyses can help to investigate this issue and its significance in the context of COAs' heterogeneity with respect to their social adjustment.

In sum, although numerous studies have shown that children of alcoholic parents are at an increased risk for social maladjustment, many studies have reported opposite conclusions, and this is largely due to the heterogeneity of COAs in the samples studied, and in the population. Consequently, researchers and clinicians have underlined the need for new research and clinical guidelines addressing the plurality of risk factors and needs of these children, including how specific adjustment problems were more frequent depending on gender, age, social class, and

other family characteristics (DeRibeaux, 1997; Sher, 1997). However, to date, relatively few studies have been devoted to this task. Such investigations are important in order to refine the definition of risk among COAs, and eventually provide adapted screening procedure and intervention guidelines that could be used by professionals working with these children or their parents (Hussong et al., 2008; Werner, Joffe, & Graham, 1999). This seems particularly important given that young COAs are more frequent healthcare users, especially through pediatric consultations and emergency room visits (Balsa & French, 2012). Most importantly, the basic issue of whether a child is living with, or separated from, an alcoholic parent, a fundamental aspect of the potential influence of parental alcoholism that could explain differences among COAs, has not been properly addressed.

The Present Study

The present study investigated school adjustment and substance use in sons of alcoholic fathers and controls at age 13, either living with or separated from their father, in an urban, low SES community sample. Thus, parental alcoholism, the alcoholic parent's presence in the family, SES and social environment, children's gender and age were specified to address the issues related to COAs' heterogeneity reviewed above. Because alcoholism is more prevalent in males (WHO, 2014), and given evidence that parental drinking might be more problematic for same-sex offspring (Ohannessian, 2012), sons of alcoholic fathers represent an important subgroup within COAs population. Families with an alcoholic mother were removed from the sample to avoid the confounding effects due to prenatal maternal drinking, and those associated with the extreme dysfunctional family environments likely created by two alcoholic parents. The targeted age corresponds to a key developmental period both biologically, with puberty, and socially, with the transition to high school. Controlling the above key factors by integrating restrictions in the study design represents a robust strategy to limit confounders in order to draw reliable and valid

conclusions on the subpopulation studied (Rothman, Greenland, & Lash, 2012). Furthermore, because parents' resources could either hamper or contribute to boys' adjustment problems in alcoholic families, both mother's and father's socioeconomic resources were included as control variables in the present investigation. Although the study's sample originated from low SES neighborhoods, disparities between families for the different indicators of SES (i.e., age at birth of first child, education, and occupational prestige), and the potential changes in status over time – especially in regards to family structure – prompted the inclusion of separate indicators of mother's and father's socioeconomic resources. Finally, to reduce the risk of inflated associations due to shared source variance, different outcomes and reporting sources were used to determine boys' adjustment. Four independent sources of data (child, parents, teacher, and school records) were used to assess a variety of substances used, school adjustment, and family characteristics.

The specific aims of the present study were to identify the predicaments of early adolescent sons of alcoholic fathers growing up in urban, low SES environments, in regards to school adjustment and substance use, which represent key outcomes at this age-period (Blum, Astone, Decker, & Mouli, 2014), and to determine whether the father's absence acted as a moderator of the risk for the sons associated with paternal alcoholism. Given the strong evidence of genetic factors involved in the link between paternal alcoholism and boys' substance use and adjustment problems, we hypothesized that even within a low SES context, sons of alcoholic fathers would be less adjusted than their peers (i.e., the direct effect hypothesis). Additionally, because the absence of the father is likely to lower the level of dysfunction, conflicts, and risk of social modeling associated with alcoholic families, we expected that among these boys, those living in intact families would have the least adjusted profile with respect to substance use and school functioning in early adolescence (i.e., the moderation hypothesis).

Method

Participants

Subjects were Caucasian boys from families representative of low SES areas of the French school board of Montreal, Canada, and part of the Montreal Longitudinal and Experimental Study (MLES; Tremblay, Vitaro, Nagin, Pagani, & Séguin, 2003). These boys were first assessed at the end of kindergarten (N=1037; Mean age=6.12; SD=0.33). The MLES was originally designed to study the development of behavior problems throughout elementary school in this population at risk, and to identify risk and protective factors associated with a diversity of adolescent negative outcomes, such as school failure and substance use. At age 12, families were contacted to determine the alcoholic status of the parents, and 698 families were successfully assessed. Reports from the adolescents, their parents and their teacher, and information from school records were obtained at age 13. Families assessed were compared with those not included in the survey on a set of demographic variables: both parents' age at birth of first child, age at birth of the boy, education, occupational SES, and family structure. Significant differences (based on a $p<.10$ criterion) between the two groups were observed in favor of the families included in the study for mother's (higher) age at birth of the boy (25.4 vs 24.9 years, $p<.10$), and for mother's (10.7 vs 10.1 years, $p<.001$) and father's (10.8 vs 10.0 years, $p<.001$) education (number of years in school), and occupational SES (39.0 vs 36.7, $p<.05$; and 40.1 vs 37.8, $p<.05$; respectively). In order to compensate for differential attrition, propensity score weighting (Guo and Fraser, 2010), conditional on these observed baseline differences between participant and non-participant families, was applied in the analyses. Using this approach, we first determined the probability (propensity) that a subject would be reassessed at age 13 (T2) based on the above socioeconomic and demographic variables assessed at baseline (age 6; T1), then weighted the observations collected at T2 by the inverse of estimated propensity scores.

Based on a logistic regression model, the propensity scores were estimated from the predicted probabilities generated by the model.

A 17.1% prevalence of alcoholism was observed in the 698 families sample. Expectedly, this proportion was above the prevalence of alcohol use disorders in the general population - 6.8% in Canada (WHO, 2014) - but consistent with reports for men from low SES neighborhoods (Bloomfield, Grittner, Kramer, & Gmel, 2006; Van Oers, Bongers, Van de Goor, & Garretsen, 1999). Only ten mothers met criteria for alcoholism (2 in intact, 1 in single-parent, and 7 in step families), including two from families with an alcoholic father, and these families were removed from the sample. Considering that only 8 of the non-intact families were headed by fathers (7 with non-alcoholic fathers and 1 with an alcoholic father), they were also removed from the sample. While taking into account these families' specificity in the analyses was not possible given their low number, removing them resulted in a homogeneous sample where alcoholic and non-alcoholic families referred exclusively to paternal alcoholism, and non-intact families, either single-parent or stepfamilies, implied that the boys didn't live with their father. Finally, twenty-seven boys had received a preventive intervention between ages 7 and 9: six with an alcoholic father (6/116: 5.2%), and twenty-one with a non-alcoholic father (21/564: 3.7%). These boys had been randomly selected among those rated above the sample's 70th percentile for disruptive behaviors at age 6. Because of the potential confounding effect of this intervention, these boys were also removed from the sample, resulting in a final sample of N=653 for the present study.

Measures

Paternal alcoholism. A telephone survey using the Short form of the Michigan Alcoholism Screening Test (SMAST; Selzer, Vinokur, & Van Rooijen, 1975) was conducted by trained interviewers to assess lifetime family alcoholism when the boys were 12-years old. The mother was chosen for the interview because 42.5% of subjects in the sample lived in non-intact

families and were living with their biological mother, making it difficult, and in many cases, impossible, to interview the fathers directly, despite concerted efforts to contact them. The SMAST contains 13 items that have been shown to reliably determine alcoholic status even when a family member of the alcoholic is interviewed (Crews & Sher, 1992). Chassin, Barrera, Bech, and Kossak-Fuller (1992), using a similar telephone interview, reported a reliability rate of 83.3%, when compared to DSM diagnosis of alcoholism using the Diagnostic Interview Schedule (DIS; Robins, Helzer, Croughan, & Ratcliff, 1981). As a means of examining the reliability of the classification of fathers in the present study, 160 of them were tested directly using the DIS during the 6-month period following the SMAST interview. Overall, the SMAST showed a 96.4% agreement with the DIS for positive diagnoses and 76.5% for negative cases (i.e., SMAST-designated non-alcoholic fathers with an alcoholism diagnosis according to DSM criteria, thus making our classification conservative), resulting in a combined agreement of 80.5%, consistent with the results of Chassin and colleagues' (1992).

Paternal absence was established from mother's and father's (when available) interviews when the boys were thirteen. Families were considered intact when both biological parents resided together, in which case, the son was living with his father. As described above, non-intact families implied the separation from the father and his absence from the adolescent son's home. In this later case, families were categorized as either single-mother family, or as stepfamily when boys were living with their mother and her new partner.

Parents' socioeconomic resources were based on three indicators of socioeconomic adjustment: age at birth of first child, education (number of years), and occupational prestige when the boy was age 13. Each dimension was first recoded into a 3-level indicator reflecting the 1st (1), 2nd (2), and 3rd (3) part of the sample distribution. Second, the three resulting indicators were summed into a 3 to 9-point indicator of mother's and father's socioeconomic resources.

School adjustment. Three indicators of school adjustment were used. *Academic performance* was assessed using teacher's ratings of children's performance in four categories: reading, writing, mathematics, and general academic skills. For each of these categories, teachers were asked to compare the child's performance to the average performance of his/her schoolmates on a 5-point Likert scale, where 1 indicated "Clearly under average", 3 indicated "Average", and 5 indicated "Clearly above average". A total academic performance score was used in the analyses by calculating the average of the four evaluations. The validity of this academic performance score has been demonstrated by its high correlation with other types of school performance measures, such as report cards (Mattanah, Pratt, Cowan, & Cowan, 2005). School records were used to determine in which *grade* the boys were and whether they were attending a regular or a *special class*, at age 13.

Substance use. Early adolescents' self-reports regarding their use of tobacco (cigarettes), alcohol, marijuana, and hard drugs (cocaine, heroin, methamphetamine, hallucinogens, inhalants, stimulants or opioids) and sniffing glue over the last year were collected at age 13. The frequency for each of these five substances was coded as 0 (never), 1 (once or twice), 2 (many times), or 3 (very often). Boys also reported on their frequency of getting drunk using the same coding. Finally, boys were asked whether they had used (1) or not (0) each substance included in the hard drugs category. These items were summed into a 7-point scale of hard drugs variety.

Data analysis

All analyses were conducted using SPSS v24 (Armonk, NY: IBM). First, socioeconomic and demographic characteristics of the sample as a function of paternal alcoholism were examined. Second, bivariate associations among independent and outcome variables were computed. Third, in order to test our hypotheses, Multiple linear regression (MLR) and Logistic regression (LR; for the outcome special class) were used to test: 1) a model with the direct (main)

effects of paternal alcoholism and paternal absence, controlling for mother's and father's socioeconomic resources (Model 1), and 2) a model including the interaction between paternal alcoholism and paternal absence, to investigate the potential moderating effect of paternal absence on the impact of paternal alcoholism on boys' school adjustment and substance use (Model 2). Importantly, given that the «main effects» of paternal alcoholism and paternal absence in Model 2 are in fact conditional effects, since their interaction term is included in the model, the non-significance of this term would indicate that it is best to keep a more parsimonious model without the interaction (Model 1), in which the two factors' «main effects» estimates are partial rather than conditional effects (Hayes, 2013). Thus, in absence of a significant interaction in Model 2, Model 1 was considered the final model linking paternal alcoholism and paternal absence to a specific outcome, while controlling for parents' socioeconomic resources.

Finally, when a significant interaction was observed in Model 2, indicating that paternal alcoholism's effect on a specific outcome was dependent on paternal absence, interaction probing was conducted in order to: 1) establish for which values of paternal absence (i.e., the moderator) paternal alcoholism's effect on the outcome was different from zero, and 2) estimate these conditional effects (Hayes, 2013). This last step of analysis formally testing for moderation used regression-based methods in PROCESS v2.16 for SPSS (Hayes, 2013). Specifically, bootstrapped (10,000 resamples) bias-corrected confidence intervals (e.g., significant when not overlapping zero) were used for simple-slope testing at values of categorical moderator (paternal absence) in moderation regression analysis (Aiken & West, 1991; Hayes, 2013). Moderation regression analyses were performed using the full model including covariates: Paternal alcoholism, paternal absence, mother's and father's socioeconomic resources.

Results

Socioeconomic characteristics of alcoholic and non-alcoholic families

Results showed no differences between alcoholic and non-alcoholic families for mother's education and occupational SES, parents' age at birth of first child and age at birth of target boy (Table 1). However, a significant difference was observed in father's socioeconomic resources (F=6.06, $p<.01$), specifically for father's education (F=10.13, $p<.01$) and occupational SES (F=8.18, $p<.01$), in favor of non-alcoholic fathers. Paternal alcoholism and paternal absence were significantly related ($V=.341$, $p<.001$). This association was based on a substantial difference in the proportion of non-intact families, 31.9% (18.9% single-mother/13.0% stepfamily) vs 79.6% (45.6% single-mother/34.0% stepfamily), respectively, in non-alcoholic and alcoholic families when the boys were age 13. Importantly, parents' separation had already occurred by the time the child was 6 years-old for 65.2% and 76.3%, respectively, of the non-alcoholic and alcoholic families that were identified as non-intact when the boys were age 13.

Bivariate associations

Bivariate analyses among independent and control variables (Table 2) revealed significant associations between: 1) paternal alcoholism and father's socioeconomic resources ($Eta=.102$, $p<.01$); 2) paternal absence and both mother's ($Eta=.106$, $p<.01$) and father's ($Eta=.138$, $p<.01$) socioeconomic resources; and 3) parents' socioeconomic resources ($rho=.310$, $p<.001$). These coefficients indicated low colinearity well below the critical threshold of .70 (Dormann et al., 2013). Paternal alcoholism was not associated with mother's socioeconomic resources.

Testing the bivariate association between each factor and outcome indicated significant associations for paternal alcoholism (academic performance, grade, tobacco, marijuana and hard drug use and hard drug variety) and paternal absence (academic performance, grade, alcohol use and getting drunk). Finally, mother's and father's socioeconomic resources were associated with

academic performance, grade and special class, and marijuana use for mother's resources only.

Effect of Paternal Alcoholism and Moderation by Paternal Absence

Results of the MLR/LR analyses conducted to examine the effect of paternal alcoholism and its possible interaction with paternal absence in association with boys' school adjustment and substance use are shown in Table 3. Model 1 testing main effects indicated that boys' academic performance was negatively associated with paternal alcoholism and positively with mother's socioeconomic resources. Boys' grades were negatively linked with paternal alcoholism and were associated positively with both parents' socioeconomic resources. Surprisingly, paternal alcoholism and paternal absence did not affect the likelihood of attending a special class for the boys. However, both parents' socioeconomic resources were negatively associated with this indicator (that is, higher parents' resources lowered the likelihood for the boy to be assigned to a special class). Interactions between paternal alcoholism and paternal absence (Model 2) were not significant for the three indicators of school adjustment. Thus, the more parsimonious Model 1 represented the best fit to the data on boys' school adjustment.

Models regarding boys' substance use were more consistent across the seven indicators. Paternal alcoholism was significantly associated with boys' tobacco, marijuana and hard drugs use, as well as with their report on getting drunk, and using a variety of hard drugs. Moreover, a significant interaction between paternal alcoholism and paternal absence (Model 2) was observed for tobacco use, getting drunk, marijuana use, and hard drugs variety. Surprisingly, only boys living in intact families, whether they had an alcoholic father or not, were more likely to use alcohol. As for parents' socioeconomic resources, only maternal resources were associated with marijuana use and sniffing glue.

Probing of the above significant interactions supported the moderation hypothesis between paternal alcoholism and paternal absence: sons of alcoholic fathers living with their dad

in intact families were more likely to use tobacco and marijuana, to get drunk, and to use a variety of hard drugs than their peers who were not living with their alcoholic father, whether in single-mother or stepfamilies (Figure 1).

Discussion

The present study examined the relationship between paternal alcoholism and school adjustment and substance use in 13 year-old boys from a community sample of urban, low SES families. Specifically, the hypotheses of a direct effect of paternal alcoholism, and of a moderation effect of paternal absence in favor of boys separated from their alcoholic father, while controlling for parents' socioeconomic resources, were examined. The expected association between paternal alcoholism and sons' adjustment in school was observed: sons of alcoholic fathers showed lower academic performance at age 13, according to their teacher, and had lower grades according to school records than their peers with non-alcoholic fathers. However, the separation from the father did not moderate the association of paternal alcoholism with boys' school adjustment. Simultaneously, parents' socioeconomic resources were positively associated with the boys' academic performance and grades, and were negatively linked with their assignment to a special class. Only a few studies have examined academic performance in school-aged COAs, but the use of mixed-gender samples with a wide age-range, or the absence of distinction between maternal and paternal alcoholism, limits conclusions drawn from these studies. These methodological limitations notwithstanding, our results are consistent with reports of COAs' school difficulties at different ages (McGrath et al., 1999; Torvik, Rognmo, Ask, Røysamb, & Tambs, 2011). Considering the important consequences of school failure in this age-group for later school drop-out and employment (Kennelly & Monrad, 2007), the adjustment problems of these boys as they are in transition to high school call for serious attention.

The hypotheses regarding paternal alcoholism and its moderation by paternal absence

received strong support from the results observed for boys' substance use. Sons of alcoholic fathers were more likely than their peers to use tobacco, marijuana and hard drugs, as well as to get drunk, and use a higher variety of hard drugs. Among these boys, those living with their father in intact families had the worst outcomes for their frequency of tobacco and marijuana use, as well as to get drunk, and for using a higher variety of hard drugs. In regards to paternal alcoholism, these results are consistent with previous reports on COAs at different ages (Chassin et al., 1999; (Finan et al., 2015; Waldron, Grant et al., 2014), and underscore the fact that substance use is already an issue for these boys in early adolescence. However, probing the significant interactions found between paternal alcoholism and paternal absence indicated that sons of alcoholic fathers in intact families were the most at risk, and thus, that the absence of the alcoholic father in the family did represent a moderating, protective factor in regards to the boys' substance use. Higher frequency of hard drugs use in sons of alcoholic fathers was not moderated by paternal absence. Given the young age of the boys with respect to hard drugs, it is possible that the overall lower use of these substances underlies the non-significance of the interaction, but the propensity for sons of alcoholics in intact families to experiment with a larger number of hard drugs is consistent with the hypothesis of a subsequent higher use of these substances as well.

These findings on the moderating effect of being separated from an alcoholic father on boys' substance use are consistent with previous reports showing worst outcomes for children of alcoholic, criminal or antisocial fathers living in intact families (Jaffe et al., 2003; McCord, 1990, 1991). The additional risk observed for sons living with their alcoholic fathers appears especially important given evidence that adolescent drug use in COAs have more implications for adult outcomes in multiple domains of functioning than adolescent alcohol use (Haller et al., 2010). In the present study, no differences were observed between sons of alcoholic fathers and controls on alcohol use at age 13. The broad character of the measure, and the greater availability and social

acceptance of alcohol, despite the young age of the boys, may explain this absence of difference between the two groups. Besides, it should be noted that previous studies have shown mixed results in regards to differences between COAs and non-COAs on alcohol consumption during adolescence (Ohannessian et al., 2004). However, the significant results observed for the frequency of getting drunk may indicate that precocious alcohol abuse is also a characteristic of early adolescent sons of alcoholics, especially if they are living with their father.

Overall, our observations on boys' school adjustment and substance use in a critical age-period, are consistent with pathways to substance abuse/dependence and co-occurring psychopathologies and adjustment problems in older adolescent and adult COAs (Chassin et al., 1999; Hussong et al., 2008; Lewis-Harter, 2000). These pathways imply that the influence of parental alcoholism is mediated by early substance use in school-aged COAs that subsequently lead to substance abuse or dependence, school drop-out and social maladjustment. Paternal alcoholism was associated with sons' academic performance and grades, as well as with hard drug use, regardless of the father's presence in the family at age 13, which suggests an earlier influence in the boys' development. However, the fact that 76.3% of non-intact alcoholic families were separated by the time the sons were six years-old suggests that the exposition to the father's behaviors mostly took place in the first years of their development. Thus, the effects of paternal alcoholism on the sons could either be genetic (Prescott, Aggen, & Kendler, 1999; Waldron, Grant et al., 2014), environmental, in the boys' early years, or a combination of both (Kendler, Gardner, & Prescott, 2011). A number of studies have concluded that this intergenerational transmission, including substance abuse and adjustment problems, is mainly genetic (Waldron, Martin, & Heath, 2009), and even that the direct effect of being exposed to the alcoholic parent is modest at best (Slutske et al., 2008). Reports on COAs' behavior problems observed in preschool years also support the hypothesis of genetic effects, or the possibility of early life influence

(Edwards, Eiden, Colder, & Leonard, 2006). The observed direct effect of paternal alcoholism and its enhanced effect in boys from intact families in the present study suggest that the impact of living with an alcoholic father up to age 13 is significant above and beyond these significant genetic or early environmental influences related to the father's condition. By the same token, these results suggest that being separated from the alcoholic father might act as a protective factor at this important period of boys' development. Thus, although the importance of such influence has been disputed (Slutske et al., 2008; Yu, 2003), the exposition to paternal behavior, especially his drinking habits – given the results observed for boys' getting drunk (Jacob & Johnson, 1997; White, Johnson, & Buyske, 2000) – but also family conflicts, and potential abusive parenting common in alcoholic families (Finan et al., 2015), may be an essential factor to consider in order to help early adolescent sons of alcoholics.

The associations between parents' socioeconomic resources and boys' school adjustment in our low SES community sample are an eloquent reminder of the powerful relation of family SES with children's success at school (American Psychological Association, 2012). On the other hand, the relative lack of influence of these factors on boys' substance use, contrary to prior findings (Vermeulen-Smit et al., 2012), may be explained by the restricted range of SES in the present sample. In any case, the inclusion of both parents' socioeconomic resources as control variables did not impede paternal alcoholism's association with boys' outcomes.

Strengths, Limitations and Conclusions

The present study had a number of methodological assets: Use of a community sample, investigation focused on paternal alcoholism and 13 year-old boys, use of independent sources of data (e.g. parents, child, teacher, and school record) in assessing boys' adjustment problems and family characteristics, assessment of a variety of substances used, and control for paternal absence, maternal alcoholism, both parents' socioeconomic resources, and socioeconomic

environment. However, its limitations should not be overlooked. First, despite the established validity of our alcoholism measure for fathers, this assessment was made at one time only, when the sons were 12 years old. The data did not allow for us to establish the duration of paternal alcoholism. Similarly, our indicator of father's absence did not measure the degree of involvement or the amount of contacts between fathers and their sons, which are dimensions related to parental separation that substantially vary among families (Cheadle, Amato, & King, 2010; King, 1994). Consequently, the degree to which the boys were exposed to their father's behaviors and drinking problems is uncertain beyond the (non-) residence status of the father. However, as discussed above, the early age of a majority of the boys when their parents separated, as well as evidence from genetic studies and reports from longitudinal and preschool investigations of COAs, suggest that the influence of paternal alcoholism may have been present in the first years of the boys' life. Considering that the age at onset of alcohol use disorders peaks in the late teens or early to mid-20s according to DSM-V (APA, 2013), and that the mean age at birth of their son was 29.3 years, it seems reasonable to assume that a majority of alcoholic fathers in our study had some problems with alcohol before the birth of their child. This would be consistent with reports that most of the fathers seeking substance abuse treatment were already substance-dependent when their first child was born, and that only 20% of them were living with their biological children (McMahon, Winkel, Luthar, & Rounsaville, 2005).

Second, this study did not control for co-occurring parental psychopathologies that could account for variability in negative outcomes among boys. On the other hand, a number of studies examining jointly parental alcoholism with antisocial personality, depression, or other common psychiatric and substance use disorders, indicated a unique effect of parental alcoholism on children's disorders, above and beyond the effects of co-occurring psychopathologies (Chassin et al., 1999; Hussong et al., 2008; Jacob & Windle, 2000; Kendler, Davis, & Kessler, 1997; Slutske

et al., 2008). Moreover, there is evidence that substance dependent fathers separated from their spouses have more severe substance use disorders, which were associated with their marital breakup (Tarter et al., 2001). Given that parental alcoholism is strongly linked with early parental separation (Waldron et al., 2011), one could hypothesize that alcoholism in parents of intact families may be more recent, less severe, or with lower comorbidities, than in parents of separated families. In that respect, our results might be conservative, if an additional risk (either genetic or in boys' early environment) related to the father's mental health may be involved for sons of alcoholics in non-intact families. Third, the indicator of parents' socioeconomic resources in this study represented a crude proxy of their personal resources. Despite the discriminant validity of this information in previous studies (Pingault et al., 2013), it likely provided only a partial account of the parents' social adjustment. Fourth, despite the rationale supporting the study design restricted to paternal alcoholism, paternal absence, and early adolescent boys in a low SES, urban environment, the findings of this study remain linked with this particular context. Thus, other studies are needed to investigate maternal alcoholism, adolescent girls in a similar context, as well as boys living in different socio-familial environments.

The above limitations notwithstanding, our results suggest that even when controlling for social environment, parental SES, maternal alcoholism, and paternal absence, paternal alcoholism was associated with school adjustment and especially with a variety of substance use indicators, in 13 year-old boys. Importantly, the separation from the alcoholic father represented a significant factor of moderation, by acting as a protective factor in regards to boys' substance use. In that respect, these results represent a step forward in refining the notion of risk among the heterogeneous group of COAs, and in estimating which specific adjustment problems are more frequent depending on gender, age, social class, and family characteristics (DeRibeaux, 1997; Hussong et al., 2008; Sher, 1997). Early adolescence corresponds to an important transition both

biologically, with the beginning of puberty, and socially, with the transition to high school, and represents a key developmental stage of the life course. Given current knowledge on pathways linking parental alcoholism to adjustment problems persisting well into adulthood for their offspring, the kind of impairment these boys are exhibiting at this point of their development put them on a high-risk path for a harmful developmental cascade leading to school dropout, substance abuse/dependence and other co-occurring psychopathologies as young adults (Chassin et al., 1999; Cuijpers, Steunenberg, & Van Straten, 2006; Lewis-Harter, 2000; Morgan et al., 2010). Results of the present study suggest that interventions targeting children or aiming to improve mothers' resources may not be sufficient to protect boys living with an alcoholic father, and that the consequences linked with the father's presence in the family environment should be addressed to safely lower the risk for the sons. Thus, identifying sons of alcoholic fathers before early adolescence and assessing their specific needs in the context of their family environment should be given a high priority by professionals working with children. Additionally, as previous reports indicated that 55% of the men seeking substance abuse treatment were the biological fathers of an average of two children (McMahon & al., 2005), clinicians involved with adult alcoholics who are also parents should make a priority of addressing the issue of the harm associated with paternal substance abuse.

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Table 1 Sample's Socioeconomic and Demographic Characteristics as a Function of Paternal Alcoholism[1]

Socioeconomic and Demographic Characteristics	Total sample (N=680)	Non-Alcoholic Father (N=564; 82.3%)	Alcoholic Father[2] (N=116; 17.1%)
Family structure (%):			
Intact Family / Single-mother / Step-family	61.4 / 22.7 / 15.9	68.1 / 18.9 / 13.0	20.4 / 45.6 / 34.0***
Mother's age at birth of first child	23.4 (3.95)	23.5 (3.90)	22.89 (4.24)
Father's age at birth of first child	26.4 (4.78)	26.2 (4.67)	27.4 (5.37)
Mother's age at birth of target boy	25.6 (4.56)	25.6 (4.50)	25.3 (4.90)
Father's age at birth of target boy	28.5 (5.31)	28.4 (5.28)	29.3 (5.52)
Mother's education (number of years)	10.8 (2.83)	10.7 (2.90)	10.9 (2.38)
Father's education (number of years)	10.9 (3.40)	11.0 (3.36)	9.8** (3.45)
Mother's occupational SES	38.57 (12.11)	38.32 (12.20)	40.11 (11.45)
Father's occupational SES	40.12 (12.99)	40.87 (13.19)	35.49** (10.67)
Mother's socioeconomic resources	6.23 (1.65)	6.21 (1.67)	6.38 (1.54)
Father's socioeconomic resources	6.08 (1.62)	6.15 (1.63)	5.65** (1.50)

[1]: Means (SD) are shown except where indicated. [2]: ***: $p<.001$, **: $p<.01$, indicates significant difference between alcoholic and non-alcoholic families.

Table 2 Bivariate associations between independent variables and boys' adjustment outcomes[1]

Predictor and control variables:	Paternal alcoholism	Paternal absence	Mother's resources	Father's resources
Paternal alcoholism	-	.341***	.024	.068*
Paternal absence		-	.106*	.138**
Mother's resources			-	.414**
Father's resources				-

Boys' adjustment outcomes:	Academic performance	Grade	Special class	Tobacco	Alcohol	Getting drunk	Marijuana	Sniffing glue	Hard drugs	Hard drugs variety
Paternal alcoholism	.099*	.077*	.008	.072*	.053	.030	.067*	.010	.061*	.097**
Paternal absence	.125**	.178***	.065	.022	.143***	.090*	.008	.068	.035	.045
Mother's resources	.262**	.265**	.180***	-.016	-.009	-.063	-.078*	-.004	-.014	.028
Father's resources	.220**	.278**	.193***	-.046	.066	-.018	-.043	-.013	.034	.033

1: Spearman *rho* between continuous variables; *Eta* between categorical and continuous variables; *Phi* / *V* between categorical variables. ***: p<.001 **: p<.01 *: p<.05

Table 3 Boys' School Adjustment and Substance Use as a function of Paternal Alcoholism, Paternal Absence, and Parents' Socioeconomic Resources

Age 13 Outcomes[1]	Model 1: Main effects						Model 2: Main effects + interaction					
	B	SE	95% CI (B) Lower	Upper	t (X^2)	Sig.	B	SE	95% CI (B) Lower	Upper	t (X^2)	Sig.
School												
Academic performance												
Paternal alcoholism	-.353	.148	-.643	-.063	-2.396	**.017**	-.688	.405	-1.48	.107	-1.700	.090
Paternal absence	-.006	.072	-.147	.135	-.084	.933	-.034	.078	-.187	.120	-.432	.666
Mother's SE resources	.250	.055	.143	.358	4.571	**<.001**	.248	.055	.141	.356	4.534	<.001
Father's SE resources	.091	.055	-.017	.199	1.663	.097	.091	.055	-.017	.199	1.662	.097
Alcoholism x absence							.173	.195	-.210	.557	.888	.375
ΔR^2 Model 1 → 2							ΔR^2 = .003; F = 0.498, p = .608					
Grade												
Paternal alcoholism	-.230	.098	-.423	-.038	-2.350	**.019**	-,156	,275	-,696	,385	-,565	,572
Paternal absence	.025	.045	-.064	.113	.545	.586	,030	,049	-,066	,125	,613	,540
Mother's SE resources	.211	.035	.142	.280	5.964	**<.001**	,211	,035	,142	,280	5,962	<.001
Father's SE resources	.126	.035	.058	.194	3.612	**<.001**	,126	,035	,058	,195	3,613	<.001
Alcoholism x absence							-,038	,131	-,295	,219	-,291	,771
ΔR^2 Model 1 → 2							ΔR^2 = .001; F = 0.366, p = .693					
Special class												
Paternal alcoholism	-.263	.3199	-.890	.364	.678	.410	-.254	.640	-1.51	1.001	.157	.692
Paternal absence	.301	.2515	-.192	.794	2.880	.237	.091	.2860	-.469	.652	1.107	.575
Mother's SE resources	-.383	.1170	-.612	-.153	10.691	**<.001**	-.383	.118	-.614	-.151	10.496	<.001
Father's SE resources	-.364	.1113	-.582	-.145	10.670	**<.001**	-.372	.111	-.590	-.154	11.199	<.001
Alcoholism x absence							.624	.764	-.874	2.122	.667	.716
ΔR^2 Model 1 → 2							ΔR^2 = .001; X^2 = .330, p = .848					
Substance use												
Tobacco												
Paternal alcoholism	.309	.111	.090	.527	2.772	.006	.935	.312	.323	1.547	2.999	**.003**
Paternal absence	-.005	.051	-.105	.095	-.098	.922	.039	.055	-.069	.146	.703	.482
Mother's SE resources	-.013	.040	-.092	.066	-.323	.746	-.012	.040	-.091	.066	-.311	.756
Father's SE resources	-.022	.040	-.100	.056	-.564	.573	-.021	.040	-.099	.056	-.541	.589
Alcoholism x absence							-.319	.148	-.609	-.028	-2.150	**.032**
ΔR^2 Model 1 → 2							ΔR^2 = .016; F = 4.226, p = **.015**					
Alcohol												
Paternal alcoholism	-.075	.107	-.285	.135	-.700	.484	.200	.300	-.389	.789	.665	.506
Paternal absence	-.128	.049	-.224	-.031	-2.596	**.010**	-.109	.053	-.213	-.005	-2.050	.041
Mother's SE resources	.025	.039	-.051	.101	.651	.515	.025	.039	-.050	.101	.658	.511
Father's SE resources	.037	.038	-.039	.112	.950	.342	.037	.038	-.038	.112	.964	.336
Alcoholism x absence							-.140	.143	-.420	.140	-.979	.328
ΔR^2 Model 1 → 2							ΔR^2 = .003; F = 0.649, p =.523					

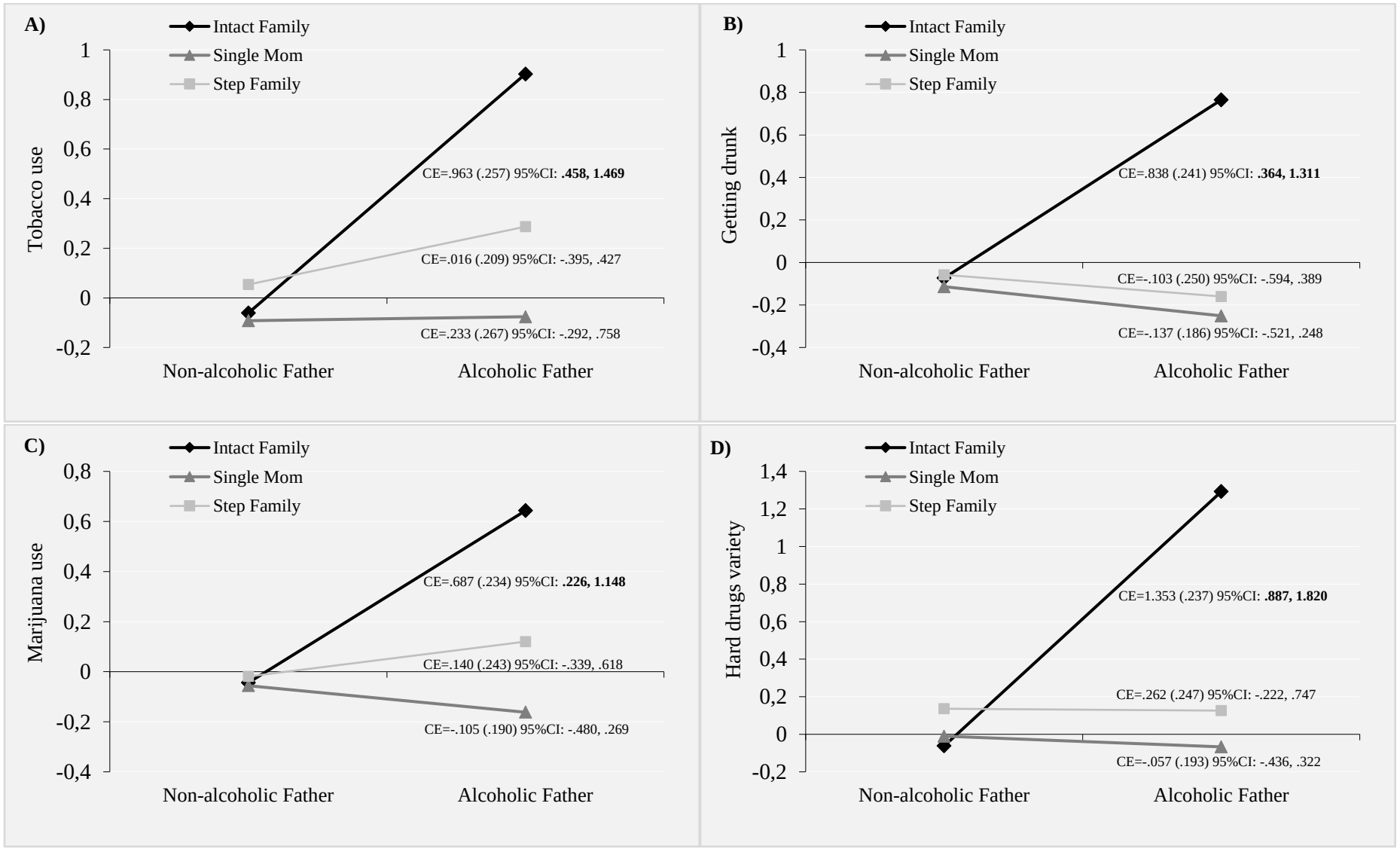
[1]: Frequency over the last year, except for Special class (%; Wald X^2) and Hard drugs variety (N). SE: Socioeconomic. Values of the more parsimonious Model representing the best fit to the data are indicated in Bold.

Table 3 (continued)

Age 13 Outcomes[1]	Model 1: Main effects						Model 2: Main effects + interaction					
	B	SE	95% CI (B) Lower	Upper	t (X^2)	Sig.	B	SE	95% CI (B) Lower	Upper	t (X^2)	Sig.
Getting drunk												
Paternal alcoholism	.109	.104	-.096	.313	1.041	.298	.938	.291	.367	1.51	3.223	**.001**
Paternal absence	-.058	.048	-.152	.037	-1.201	.230	.000	.051	-.101	.101	.004	.997
Mother's SE resources	-.041	.038	-.115	.033	-1.097	.273	-.041	.037	-.114	.033	-1.085	.278
Father's SE resources	.025	.037	-.048	.098	.683	.495	.027	.037	-.046	.099	.721	.471
Alcoholism x absence							-.422	.138	-.693	-.150	-3.050	**.002**
ΔR^2 Model 1 → 2							ΔR^2 = .022; F = 5.681, p =**.004**					
Marijuana												
Paternal alcoholism	.155	.106	-.053	.363	1.467	.143	.768	.303	.174	1.36	6.412	**.011**
Paternal absence	-.030	.049	-.125	.066	-.606	.545	.003	.052	-.100	.105	.002	.961
Mother's SE resources	-.077	.038	-.152	-.002	-2.023	.043	-.084	.039	-.160	-.008	-4.743	**.029**
Father's SE resources	-.044	.038	-.119	.030	-1.164	.245	-.046	.038	-.121	.029	-1.421	.233
Alcoholism x absence							-.306	.142	-.585	-.027	-4.622	**.032**
ΔR^2 Model 1 → 2							ΔR^2 = .013; F = 3.484. p =**.031**					
Sniffing glue												
Paternal alcoholism	.154	.089	-.021	.328	1.731	.084	1.742	.853	.070	3.41	4.171	.041
Paternal absence	-.109	.041	-.189	-.029	-2.667	**.008**	-.066	.044	-.152	.020	-1.511	.131
Mother's SE resources	.064	.032	.001	.127	2.000	**.046**	.823	.410	.019	1.63	4.025	.045
Father's SE resources	-.035	.032	-.098	.027	-1.117	.264	-.421	.389	-1.18	.342	1.170	.279
Alcoholism x absence							-.031	.118	-.544	.481	.000	.998
ΔR^2 Model 1 → 2							ΔR^2 = .000; F = .000. p =1.00					
Hard drugs												
Paternal alcoholism	.303	.109	.089	.517	2.778	**.006**	.264	.306	-.336	.865	.864	.388
Paternal absence	-.071	.050	-.169	.028	-1.408	.159	-.073	.054	-.179	.033	-1.358	.175
Mother's SE resources	-.026	.039	-.103	.051	-.663	.507	-.026	.039	-.103	.051	-.664	.507
Father's SE resources	-.024	.039	-.101	.053	-.609	.543	-.024	.039	-.101	.053	-.610	.542
Alcoholism x absence							.020	.145	-.266	.305	.134	.893
ΔR^2 Model 1 → 2							ΔR^2 = .006; F = 1.963 p =.141					
Hard drugs variety												
Paternal alcoholism	.392	.102	.191	.593	3.827	<.001	1.34	.285	.783	1.90	4.711	**<.001**
Paternal absence	-.095	.047	-.187	-.002	-2.015	.044	-.029	.050	-.127	.070	-.567	.571
Mother's SE resources	.014	.037	-.059	.086	.377	.706	.015	.037	-.057	.087	.400	.689
Father's SE resources	-.018	.037	-.090	.054	-.489	.625	-.016	.036	-.088	.055	-.444	.657
Alcoholism x absence							-.484	.135	-.750	-.218	-3.571	**<.001**
ΔR^2 Model 1 → 2							ΔR^2 = .041; F = 11.026. p **<.001**					

[1]: Frequency over the last year, except for Special class (%; Wald X^2) and Hard drugs variety (N). SE: Socioeconomic. Values of the more parsimonious Model representing the best fit to the data are indicated in Bold.

Figure 1 Interaction probing : Moderation of Paternal Alcoholism' Effect on Boys' Substance Use by Paternal Absence



CE : Conditional effect (SE). Coefficients at Moderator's values from interaction probing are displayed; 95% (bootstrap) CIs revealing significant conditional effects are indicated in Bold.