Published in final edited form as:

Addiction. 2009 August ; 104(8): 1346–1355. doi:10.1111/j.1360-0443.2009.02622.x.

Socio-demographic risk factors for alcohol and drug dependence: the 10-year follow-up of the national comorbidity survey

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Abstract

Aims—Continued progress in etiological research and prevention science requires more precise information concerning the specific stages at which socio-demographic variables are implicated most strongly in transition from initial substance use to dependence. The present study examines prospective associations between socio-demographic variables and the subsequent onset of alcohol and drug dependence using data from the National Comorbidity Survey (NCS) and the NCS Follow-up survey (NCS-2).

Design—The NCS was a nationally representative survey of the prevalence and correlates of DSM-III-R mental and substance disorders in the United States carried out in 1990–2002. The NCS-2 re-interviewed a probability subsample of NCS respondents a decade after the baseline survey. Baseline NCS socio-demographic characteristics and substance use history were examined as predictors of the first onset of DSM-IV alcohol and drug dependence in the NCS-2.

Participants—A total of 5001 NCS respondents were re-interviewed in the NCS-2 (87.6% of baseline sample).

Findings—Aggregate analyses demonstrated significant associations between some baseline socio-demographic variables (young age, low education, non-white ethnicity, occupational status) but not others (sex, number of children, residential area) and the subsequent onset of DSM-IV alcohol or drug dependence. However, conditional models showed that these risk factors were limited to specific stages of baseline use. Moreover, many socio-demographic variables that were not significant in the aggregate analyses were significant predictors of dependence when examined by stage of use.

Conclusions—The findings underscore the potential for socio-demographic risk factors to have highly specific associations with different stages of the substance use trajectory.

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Declarations of interest

None.

Keywords

Alcohol dependence; demographic factors; drug dependence; epidemiology; prospective; substance-related disorders; risk

INTRODUCTION

The considerable impact of alcohol and drug dependence on morbidity and mortality in the general population [1–4] has positioned these disorders as important international public health priorities. Although numerous research domains have contributed to the identification of correlates or risk factors for these conditions, epidemiological research has demonstrated especially consistent links with a number of socio-demographic variables. Rates of both disorders are found usually to increase in community surveys as a function of male sex, younger age, lower education, unmarried status, low income and other variables indicative of social disadvantage that often concentrate together within population subgroups [5–22]. Numerous studies have also shown that early age of first use is a significant predictor of subsequent transitions from alcohol or drug use to dependence [10,23–29]. These results have contributed over previous decades to the development of successful prevention efforts that target high-risk segments of the population [30].

Investigations of nationally representative samples provide necessary descriptive information for developing theories to explain underlying mechanisms of association between socio-demographic characteristics and substance dependence. However, two limitations of previous descriptive research may have hindered the precision at which etiological models and specific hypotheses have been formulated. A first issue is the lack of knowledge about how socio-demographic characteristics may be associated differentially with specific stages of the substance use trajectory. The most common approach to identifying socio-demographic correlates of disorder has been to denote significant predictors among all individuals in a given sample, regardless of stage of use. However, recent epidemiological studies that have examined determinants of transitions across different stages of substance use have demonstrated that commonly reported associations in aggregate analyses, such as those observed for gender and ethnicity, may have highly different or even opposite effects, depending on stage of use examined [31–35]. The ‘one size fits all’ approach of aggregate descriptive analyses may therefore explain partially the minimal or modest success of some forms of prevention (for reviews see [36–38]), and may have contributed to the difficulty at which mechanisms of association are investigated.

A second important limitation is the almost full reliance upon cross-sectional survey data and retrospective reporting of disorder onset. Retrospective assessment may increase the risk of ‘forward telescoping’ [39], a bias whereby the dating of events or disorder onset is estimated to occur closer to the time of interview than is in fact the case. This bias, as well as forgetfulness and other memory distortions, have their greatest impact when assessing life-time disorder history in cross-sectional surveys. More fundamentally, the scarcity of prospective research in nationally representative samples has also hindered the identification of socio-demographic risk and protective factors from among the numerous correlates of these disorders. These former terms are applicable only to variables that precede the outcome of interest, that are associated with the probability of the outcome’s occurrence and that may be used to divide a population into high- or low-risk groups [40,41]. Prospective research is therefore necessary to minimize memory biases and to confirm the nature of associations observed for common socio-demographic characteristics.

The present investigation examines the associations of socio-demographic variables with the subsequent first onset of alcohol and drug dependence using data from a nationally representative two-wave panel survey of the US population that was interviewed originally in 1990–1992, and then again a decade later. In addition to estimating the aggregate associations of baseline socio-demographic variables with the subsequent onset of alcohol and drug dependence, associations are examined in subsamples defined by stage of use at baseline (never use, use without abuse, abuse without dependence) and by including controls for age of use and polysubstance use, abuse or dependence. A principal objective is to compare aggregate and stage-specific analyses directly in order to uncover the dynamic nature of risk posed by socio-demographic variables and therefore to provide more precise descriptions of their associations with these disorders.

METHOD

Sample

Data come from the 5001 respondents who participated in the 1990–1992 National Comorbidity Survey (NCS) and the 2001–2003 NCS follow-up survey (NCS-2). The baseline NCS [42] was a nationally representative US survey of the prevalence and correlates of DSM-III-R mental and substance disorders that was administered to 8098 respondents aged 15–54 years between 1990 and 1992. The response rate was 82.4%. Interviews were conducted by professional survey interviewers and administered in two parts. Part I, which included the core diagnostic interview, was administered to all respondents. Part II, which included assessments of additional disorders and risk factors, was administered to a probability subsample of 5877 respondents including all those in the age range 15–24, all others with any life-time DSM-III-R disorder assessed in part I and a random subsample of remaining part I respondents. The part II sample was weighted to adjust for differential probabilities of selection and for non-response bias. Further details about the NCS design and weighting are reported elsewhere [42].

The NCS-2 sought to trace and re-interview the part II NCS respondents a decade after the NCS. Of the original 5877 part II respondents, 5463 were traced successfully, of whom 166 were deceased and 5001 re-interviewed, for a conditional response rate of 87.6%. The unconditional response rate is 72.2% (0.876×0.824). NCS-2 respondents were assessed using an expanded version of the baseline interview that assessed onset and course of disorders between the two surveys. Relative to other baseline NCS respondents, NCS-2 respondents were significantly more likely to be female, well educated and residents of rural areas. A propensity score adjustment weight [43] corrected for these discrepancies between respondents and non-respondents.

Diagnostic assessment

The baseline NCS assessed DSM-III-R disorders using a modification of the World Health Organization Composite International Diagnostic Interview (CIDI) version 1.1 [44], a fully structured, lay-administered diagnostic interview. DSM-IV disorders that had first onsets in the decade between the two interviews were assessed in the NCS-2 using CIDI version 3.0 [45]. Alcohol and drug dependence were assessed at the NCS-2 assessment only among individuals who reported symptoms of abuse over the previous decade. DSM organic exclusion rules were used in making diagnoses in both surveys. The NCS-2 assessment also considered first onsets of DSM-IV disorders prior to the time of the baseline interview that were not reported at baseline. These inconsistencies in reporting across surveys were resolved by coding pre-baseline disorders not reported until the follow-up interview as having occurred prior to baseline, in order to make lower-bound estimates of age at onset. Blinded clinical reappraisal interviews administered to a probability sub-sample of respondents using the Structured Clinical Interview for DSM-III-R [46] in the NCS and the Structured Clinical Interview for

DSM-IV (SCID; [47]) in the NCS-2 documented generally good concordance between diagnoses based on the CIDI and independent diagnoses based on blinded clinical reappraisal interviews [48,49].

Baseline socio-demographic predictors of subsequent substance dependence

The baseline socio-demographic variables considered in the analysis include age (defined by age at interview in categories 15–24 years, 25–34 years, 35–44 years and ≥ 45 years); sex; race/ethnicity (non-Hispanic white, other); completed years of education [less than high school (0–11), high school (12), some college (13–15) and college graduate (16 or more)]; occupation (student, homemaker/other, employed); marital status (never married, separated/widowed/divorced and currently married/cohabitating); number of children (none, one, two or more); income [low income (less than or equal to 1.5 times the poverty line), low average (greater than 1.5–3 times the poverty line), high average (greater than 3–6 times the poverty line) and high (greater than 6 times the poverty line)]; region (Northeast, South, West, Midwest); and area (urban, metro, rural, suburban). We also included additional variables in the prediction equations to account for the use of other substances at baseline. Included here were measures of smoking stages (no regular tobacco use, weekly smoking without nicotine dependence, nicotine dependence) and either a dichotomous variable indicating life-time use of any illicit drug at baseline in predicting alcohol dependence, or four variables indicating life-time involvement in alcohol use stages (non-regular use, regular use defined as having 12 drinks in the past year but without alcohol abuse, alcohol abuse without dependence and alcohol dependence) in predicting drug dependence. We also controlled for age at onset of use and abuse of the outcome substance as well as for its recency of use and abuse as of the time of the baseline assessment.

Statistical analyses

Cross-tabulations were used to estimate conditional lifetime prevalence of first onset of alcohol and drug dependence at the NCS-2 assessment. Multivariate logistic regression analysis [50] was used to estimate associations of baseline socio-demographic variables with subsequent first onset of dependence both with and without controls for other baseline risk factors (age of onset and recency of substance use and abuse). Logistic regression coefficients and their standard errors were exponentiated to create odds ratios (ORs) and their 95% confidence intervals. Continuous predictors were divided into categories to minimize the effects of extreme values, while some categories of predictors were combined to stabilize associations when the ORs did not differ meaningfully across contiguous categories. Standard errors and significance tests were estimated using the Taylor series method [51] implemented in the SUDAAN software system [52] to adjust for the geographic clustering of the sample and the use of weights. Multivariate significance was evaluated using Wald χ^2 tests based on design-corrected coefficient variance–covariance matrices. Statistical significance was evaluated using two-tailed 0.05-level tests. Due to the large number of socio-demographic variables examined, preliminary analyses were performed to identify significant predictors either among all non-dependent respondents at baseline (unconditional models) or among respondents according to stage of baseline use (conditional models). Final models included all variables that were significant in at least one of the preliminary models for alcohol or drug dependence, respectively.

RESULTS

The percentage of NCS-2 respondents who met life-time criteria at baseline for alcohol dependence was 14.3% [standard error (SE) = 0.6%, $n = 1018$] and 7.4% for drug dependence (SE = 0.4%, $n = 529$). Of all respondents without alcohol dependence at baseline, 2.3% (SE = 0.4%, $n = 104$) had an onset of DSM-IV alcohol dependence as of the time of the NCS-2,

representing 1.3% (SE = 0.4%, $n = 22$) of baseline non-users, 2.7% (SE = 0.5%, $n = 57$) of baseline users without abuse and 3.6% (SE = 1.1%, $n = 25$) of baseline abusers without dependence. Of all respondents without drug dependence at baseline, 1.5% (SE = 0.2%, $n = 77$) had an onset of DSM-IV drug dependence, representing 0.7% (SE = 0.2%, $n = 17$) of baseline non-users, 2.1% (SE = 0.5%, $n = 43$) of baseline users without abuse and 5.0% (SE = 1.2%, $n = 17$) of baseline abusers without dependence. The types of substances used by individuals with NCS-2 first-onset drug dependence were cannabis (86.7%, SE = 7.6%, $n = 70$), cocaine (73.5%, SE = 7.0%, $n = 53$), stimulants (42.2%, SE = 7.0%, $n = 40$), hallucinogenics (36.9%, SE = 7.2%, $n = 29$), sedatives (35.6%, SE = 6.0%, $n = 34$), analgesics (31.1%, SE = 7.3%, $n = 27$), heroin (19.9%, SE = 5.0%, $n = 17$), ecstasy (17.5%, SE = 5.3%, $n = 15$) and inhalants (9.0%, SE = 4.1%, $n = 7$).

Table 1 presents the unconditional associations of baseline socio-demographic variables with first onset of alcohol and drug dependence among all NCS-2 respondents who were non-dependent as of the baseline assessment. Elevated risk of alcohol dependence (ORs 3.1–8.8) was found among respondents in the two youngest age cohorts, as well as homemakers or ‘other’ employment status (which included primarily unemployed or disabled individuals). The risk of alcohol dependence was also elevated among respondents with a baseline history of weekly smoking without dependence (OR = 2.8) or nicotine dependence (OR = 5.4). Similarly, elevated risk of drug dependence was found for young age, non-white ethnicity, low education and among individuals with a baseline history of nicotine dependence, regular alcohol use, abuse or dependence (ORs 2.3–56.7).

Table 2 presents findings for socio-demographic predictors of alcohol dependence by stage of baseline alcohol use, revealing important differences compared to the aggregate results. The occupational categories of student and homemaker/other employment were associated with alcohol dependence for distinct baseline populations (non-abusive users or abusers, respectively). Weekly smoking and nicotine dependence were associated with increased risk of alcohol dependence only among baseline non-users or non-abusive users of alcohol. In addition, several variables for which weak or non-significant associations were observed in the aggregate analyses emerged as significant risk factors by stage of baseline use. This was the case notably for male sex and having no children, variables that were significant risk factors for alcohol dependence among baseline non-users. Despite these numerous apparent differences, a test of whether the associations varied by stage of baseline use revealed significant interactions only for occupation ($\chi^2 = 11.0$, $P = 0.027$) and number of children ($\chi^2 = 9.8$, $P = 0.020$).

Concerning predictors of drug dependence by stage of baseline use, Table 3 demonstrates that while the effects of younger age were relatively equal across stages, lower education was predictive of drug dependence only among baseline non-users and non-abusive users. Non-white ethnicity was associated only weakly with drug dependence among these first two baseline stages, and the association for baseline alcohol abuse was limited to respondents who had not yet used drugs at baseline. For variables that were non-significant in the aggregate analyses, male sex was associated with increased risk of drug dependence among baseline non-users, and those living in a metro or urban area were at higher risk for dependence if they were drug abusers at baseline. Significant interactions by stage of baseline drug use were found for age ($\chi^2 = 13.3$, $P = 0.004$), sex ($\chi^2 = 10.8$, $P = 0.004$) and geographic area ($\chi^2 = 10.7$, $P = 0.031$).

DISCUSSION

The current findings contribute to a growing body of research investigating socio-demographic predictors of substance dependence by prior stage of use [5,25,31–35,53–55] and indicate that

many socio-demographic characteristics as well as substance use history are associated with the onset of alcohol or drug dependence over a 10-year period. Importantly, however, none of these predictors remained significant in all the subsamples considered here, and several variables that were not significant predictors in the aggregate analyses emerged as risk factors in at least one subsample examined in the conditional models. These differences underscore the extent to which analyses that take into account baseline substance use status may provide a richer conceptualization of predictors than the more common aggregated approach. The use of two-wave panel data also allow for the term 'risk factor' to be used legitimately to describe these associations [40,41], and the findings add to other prospective research in community samples [10,11,24,56,57] by examining a wider range of socio-demographic characteristics as well as multiple stages of baseline use.

The present findings indicate nonetheless that caution is warranted in interpreting differences in the role of socio-demographic factors by stage of use compared to those of aggregate analyses, as only a minority of these differences could be confirmed by formal interaction tests across stages of substance use. Many apparent discrepancies in the significance of predictors for different stages may therefore be attributable to relatively minor differences in effect sizes or other factors that do not reflect salient changes in the patterns of risk factor expression. The lack of association between certain variables with alcohol or drug dependence may also be attributable to statistical power issues. However, the observation that several socio-demographic risk factors do vary by stage of baseline use has important implications for the prevention of alcohol and drug dependence. Many prevention programs in the United States, including the majority of those examined for effectiveness and characterized as exemplary by national agencies, integrate strategies to address psychosocial or demographic risk factors [30]. Information concerning many of these variables is derived primarily from descriptive epidemiology, using cross-sectional surveys that rely on aggregate analyses. The present findings indicate that such information, even when prospective, may not permit the identification of subgroups of individuals for which socio-demographic risk factors are most relevant. The reliance on aggregate findings could therefore explain partially the highly variable efficacy of existing prevention programs [36–38], in particular considering that the aggregate analytical approach would fully ignore several socio-demographic characteristics that have predictive value for the onset of alcohol or drug dependence. Significant associations observed for certain variables among non-users of alcohol but not among abusers, for example, may indicate that this variable is perhaps integrated more appropriately into universal prevention efforts than into indicated programs and treatment. The refinement of prevention science based on conditional analyses may therefore lead to changes in strategies that target high-risk groups by stage of use, as well as adjustment of resources for subpopulations and regions that are most vulnerable to developing dependence.

The specific variables examined in this investigation are among the most frequent socio-demographic characteristics analyzed in descriptive epidemiology, and they are often classified broadly into individual or environmental risk factors [58]. However, the actual mechanisms of risk underlying the observed associations are highly complex and may reflect numerous biological, psychological or social influences for any given variable. An illustration of this complexity is observed readily for characteristics such as respondent sex. While differences have been observed in the reinforcing effects of certain substances by sex, and sex hormones may be implicated in vulnerability to transition across substance use stages [59,60], normative peer behavior or social values also encourage substance use differently by gender [61–63]. In the same way, numerous individual and environmental risk factors may interact to determine the final expression of substance use patterns observed in descriptive epidemiology. For example, younger cohorts are at greatest risk for the onset of use, abuse and dependence, but this developmental trajectory can also be affected by interactions between other risk factors, such as sex and genetic susceptibility [64]. For these reasons, the identification of socio-

demographic predictors of alcohol or drug dependence is only an initial, albeit necessary, starting point for identifying high-risk populations in the allocation of resources or in the advancement of research concerning underlying mechanisms.

The contribution of this investigation is fostered by its prospective design and the increased precision of analyses that clarify the stage at which different socio-demographic risk factors have their greatest predictive value. Additional strengths include the use of direct diagnostic interviews within a large, nationally representative sample. In interpreting these findings, however, it is important to conceptualize risk factors relative to the time-frame used in their identification. The 10-year period covered by this study indicates that even the youngest age cohort at baseline had passed through the age of greatest risk for alcohol or drug dependence by the follow-up assessment. However, as a proportion of alcohol or drug dependence cases will occur subsequently in this sample, this time-frame may not capture the full predictive value of all socio-demographic characteristics examined. The numerous socio-demographic variables examined here included certain characteristics that may have changed over the assessment period (e.g. education status), while others remained stable (e.g. sex). In any case, their interpretation is limited to their status as assessed at baseline. Concerning drug dependence, it remains possible that different risk factors would be identified if analyses were performed by specific drug type, and it is important to note that both drug and alcohol dependence were assessed only among respondents at follow-up who met criteria for abuse. Although this gated assessment encompasses the majority of individuals who eventually develop dependence and has little impact on the significance of socio-demographic correlates [65,66], this approach results in lower overall prevalence rates [67]. In addition, the risk factors for individuals who develop drug or alcohol dependence without a life-time history of abuse may be highly specific or different from the present findings. Additional prospective research concerning how socio-demographic risk factors vary across the full trajectory of alcohol and drug use is now needed to adjust risk formulas and increase the precision of prevention strategies in targeting vulnerable individuals.

Acknowledgments

The NCS data collection was supported by the National Institute of Mental Health (NIMH; R01MH46376). The NCS-2 data collection was supported by the National Institute on Drug Abuse (NIDA; R01DA012058). Data analysis for this paper was additionally supported by NIMH grants R01MH070884, R01MH077883 and U01MH060220, with supplemental support from the Substance Abuse and Mental Health Services Administration (SAMHSA), the Robert Wood Johnson Foundation (RWJF; Grant 044780) and the John W. Alden Trust. The views and opinions expressed in this report are those of the authors and should not be construed to represent the views of any of the sponsoring organizations, agencies, or US government. A complete list of NCS and NCS-2 publications can be found at <http://www.hcp.med.harvard.edu/ncs/>. Send correspondence to ncs@hcp.med.harvard.edu. The NCS-2 is carried out in conjunction with the World Health Organization World Mental Health (WMH) Survey Initiative. We thank the staff of the WMH Data Collection and Data Analysis Coordination Centres for assistance with instrumentation, fieldwork and consultation on data analysis. These activities were supported by the National Institute of Mental Health (R01MH070884), the John D. and Catherine T. MacArthur Foundation, the Pfizer Foundation, the US Public Health Service (R13MH066849, R01MH069864 and R01DA016558), the Fogarty International Center (FIRCA R03TW006481), the Pan American Health Organization, Eli Lilly and Company, Ortho-McNeil Pharmaceutical, Inc., GlaxoSmithKline and Bristol-Myers Squibb. A complete list of WMH publications can be found at <http://www.hcp.med.harvard.edu/wmh/>.

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Table 1

Socio-demographic predictors of alcohol and drug dependence (unconditional models).

	T2 onset of alcohol dependence among T1 non-alcohol-dependent					T2 onset of drug dependence among T1 non-drug-dependent				
	OR	LOWOR	UPOR	χ^2	P-value	OR	LOWOR	UPOR	χ^2	P-value
Age (years)										
15–24	8.4	2.2	31.9	18.0	0.000	56.7	6.5	497.0	28.3	0.000
25–34	8.8	2.7	29.2	–	–	44.0	5.3	362.7	–	–
35–44	2.8	0.8	10.0	–	–	5.3	0.5	52.1	–	–
Male	1.9	0.9	4.0	2.8	0.091	1.3	0.6	2.8	0.6	0.458
Race (not white)	–	–	–	–	–	2.3	1.1	4.9	4.9	0.028
Education 0–11 years	–	–	–	–	–	15.1	4.0	57.5	34.1	0.000
Education 12 years	–	–	–	–	–	11.5	3.2	40.6	–	–
Education 13–15 years	–	–	–	–	–	2.1	0.5	8.8	–	–
Student	3.1	1.6	6.3	14.5	0.001	–	–	–	–	–
Homemaker/other employment	2.6	1.3	5.2	–	–	–	–	–	–	–
0 Children	0.9	0.5	1.7	1.2	0.557	–	–	–	–	–
1 Child	1.5	0.6	4.0	–	–	–	–	–	–	–
Northeast region	0.9	0.3	2.6	1.6	0.665	–	–	–	–	–
South region	0.994	0.5	2.1	–	–	–	–	–	–	–
West region	1.6	0.7	4.0	–	–	–	–	–	–	–
Metro area	1.1	0.6	2.3	1.2	0.746	1.043	0.4	2.9	1.5	0.672
Urban area	0.8	0.4	1.6	–	–	0.7	0.3	1.5	–	–
Rural area	1.1	0.6	2.0	–	–	0.8	0.4	1.6	–	–
Weekly smoke without dependence	2.8	1.2	6.3	46.4	0.000	1.4	0.5	4.2	13.9	0.001
Tobacco dependence	5.4	3.3	8.9	–	–	3.4	1.7	7.0	–	–
12 drinks without abuse	–	–	–	–	–	2.3	1.001	5.4	8.4	0.039
Alcohol abuse without dependence	–	–	–	–	–	2.9	1.019	8.0	–	–
Alcohol dependence	–	–	–	–	–	4.5	1.5	13.0	–	–
Number of cases	3983					4472				
Number of alcohol/drug-dependent cases	104					77				

OR: odds ratio; LOWOR: lower bound OR based on 95% confidence intervals; UPOR: upper bound OR based on 95% confidence intervals.

Table 2

Socio-demographic predictors of alcohol dependence by baseline stage of use (conditional models).

	T2 onset of alcohol dependence among T1 non-users					T2 onset of alcohol dependence among T1 non-abusive users					T2 onset of alcohol dependence among T1 non-dependent abusers				
	OR	LOWOR	UPOR	χ^2	P-value	OR	LOWOR	UPOR	χ^2	P-value	OR	LOWOR	UPOR	X2	P-value
Age (years)															
15–24	2.2	0.1	33.1	0.7	0.696	8.7	1.9	39.7	17.0	0.001	9.5	1.3	71.4	5.7	0.128
25–34	0.8	0.0	17.4	–	–	13.8	3.6	53.6	–	–	4.2	0.7	25.4	–	–
35–44	–	–	–	–	–	4.1	1.042	16.5	–	–	1.7	0.3	9.7	–	–
Male	4.5	1.5	13.5	7.7	0.006	1.3	0.5	3.1	0.3	0.601	0.965	0.3	3.6	0.0	0.957
Student	2.6	0.6	11.6	1.6	0.456	4.8	1.5	15.5	9.7	0.008	2.2	0.3	14.7	15.3	0.000
Homemaker/other employment	2.0	0.2	25.9	–	–	2.3	0.9	5.9	–	–	5.3	2.2	13.0	–	–
0 Children	33.2	1.5	717.7	5.3	0.021	0.8	0.3	1.9	2.4	0.294	0.4	0.1	0.997	5.1	0.077
1 Child	–	–	–	–	–	2.0	0.6	6.4	–	–	0.5	0.2	1.4	–	–
Northeast region	0.7	0.1	5.3	5.9	0.115	1.8	0.3	9.2	4.2	0.242	0.3	0.1	1.3	5.7	0.129
South region	0.2	0.0	0.7	–	–	3.0	0.9	10.5	–	–	0.3	0.0	2.6	–	–
West region	0.6	0.1	2.8	–	–	3.5	0.8	15.0	–	–	1.6	0.2	15.9	–	–
Metro area	0.6	0.1	2.8	3.2	0.363	1.7	0.7	3.9	5.5	0.138	0.6	0.1	4.8	6.0	0.110
Urban area	2.2	0.5	8.9	–	–	0.4	0.1	1.3	–	–	2.8	0.7	11.0	–	–
Rural area	1.5	0.2	10.0	–	–	0.6	0.2	1.6	–	–	3.5	0.5	24.0	–	–
Weekly smoke without dependence	7.4	2.6	21.1	22.0	0.000	1.9	0.7	5.0	23.2	0.000	1.2	0.2	8.4	3.8	0.153
Tobacco dependence	6.3	2.3	17.2	–	–	4.2	2.3	7.8	–	–	3.2	0.9	11.9	–	–
Alcohol use onset early	–	–	–	–	–	1.9	0.6	5.8	2.2	0.335	0.1	0.0	0.5	8.5	0.014
Alcohol use onset average	–	–	–	–	–	2.2	0.7	6.7	–	–	0.9	0.3	2.8	–	–
Alcohol abuse onset early	–	–	–	–	–	–	–	–	–	–	1.3	0.3	6.2	1.3	0.511
Alcohol abuse onset average	–	–	–	–	–	–	–	–	–	–	0.6	0.2	1.7	–	–
Alcohol abuse last 12 months	–	–	–	–	–	–	–	–	–	–	22.8	4.8	108.2	16.5	0.000
Alcohol abuse last 1–5 years	–	–	–	–	–	–	–	–	–	–	6.7	2.3	20.1	–	–
No. drinks daily/year	–	–	–	–	–	1.1	1.002	1.2	4.3	0.039	1.3	1.2	1.5	18.9	0.000
Number of cases	1248					2066					669				
Number of alcohol-dependent cases	22					57					25				

T2 onset of alcohol dependence among T1 non-users					T2 onset of alcohol dependence among T1 non-abusive users					T2 onset of alcohol dependence among T1 non-dependent abusers				
OR	LOWOR	UPOR	χ^2	P-value	OR	LOWOR	UPOR	χ^2	P-value	OR	LOWOR	UPOR	X2	P-value

OR: odds ratio; LOWOR: lower bound OR based on 95% confidence intervals; UPOR: upper bound OR based on 95% confidence intervals.

Table 3

Socio-demographic predictors of drug dependence by baseline stage of use (conditional models).

	T2 onset of illicit drug dependence among T1 non-users					T2 onset of illicit drug dependence among T1 non-abusive users					T2 onset of drug dependence among T1 non-dependent abusers				
	OR	LOWOR	UPOR	χ^2	P-value	OR	LOWOR	UPOR	χ^2	P-value	OR	LOWOR	UPOR	X2	P-value
Age (years)															
15–24	21.7	4.4	106.8	15.1	0.000	8.3	2.0	34.0	12.5	0.002	3.6	0.8	16.4	7.7	0.021
25–34	–	–	–	–	–	8.2	2.4	27.6	–	–	4.9	1.5	15.9	–	–
35–44															
Male	7.8	1.5	41.6	6.1	0.013	0.7	0.3	1.5	0.9	0.336	2.4	0.8	6.7	2.8	0.1
Race (non-white)	2.3	0.9	5.6	3.4	0.064	2.8	0.978	7.8	3.9	0.048	2.4	0.6	9.9	1.5	0.219
Education 0–11 years	13.9	2.7	71.1	11.5	0.003	35.5	4.6	272.7	27.4	0.000	5.9	0.5	69.0	3.4	0.335
Education 12 years	9.7	2.1	45.5	–	–	28.5	3.2	255.0	–	–	4.3	0.3	68.8	–	–
Education 13–15 years	–	–	–	–	–	3.7	0.5	28.3	–	–	1.7	0.1	23.0	–	–
Metro area	0.9	0.2	3.5	0.0	0.980	1.007	0.3	3.1	2.6	0.450	13.9	1.7	116.6	15.9	0.001
Urban area	0.9	0.2	4.8	–	–	0.4	0.1	1.4	–	–	8.5	1.2	61.6	–	–
Rural area	–	–	–	–	–	1.1	0.5	2.4	–	–	6.2	0.5	82.4	–	–
Weekly smoke without dependence	0.4	0.0	2.9	4.3	0.116	1.7	0.5	5.4	5.7	0.057	0.2	0.0	1.3	7.9	0.019
Tobacco dependence	3.2	0.5	21.9	–	–	3.0	1.2	7.6	–	–	2.6	0.6	11.8	–	–
12 drinks without abuse	1.7	0.5	5.8	11.1	0.011	2.1	0.6	6.7	6.9	0.076	0.3	0.0	4.7	1.4	0.707
Alcohol abuse without dependence	9.2	2.0	43.1	–	–	1.2	0.2	7.3	–	–	0.1	0.0	5.2	–	–
Alcohol dependence	3.3	0.5	21.6	–	–	4.2	0.956	18.2	–	–	0.5	0.1	2.8	–	–
Drug use last 12 months	–	–	–	–	–	2.2	0.8	5.8	4.3	0.119	0.3	0.0	4.6	5.7	0.059
Drug use later	–	–	–	–	–	2.2	0.8	6.4	–	–	0.1	0.0	1.006	–	–
Drug abuse last 12 months	–	–	–	–	–	–	–	–	–	–	0.5	0.0	5.1	2.0	0.364
Drug abuse later	–	–	–	–	–	–	–	–	–	–	0.2	0.0	2.4	–	–
Drug use onset early	–	–	–	–	–	1.3	0.6	2.7	1.6	0.439	0.4	0.1	1.2	2.9	0.235
Drug use onset average	–	–	–	–	–	1.5	0.7	3.2	–	–	0.8	0.2	3.0	–	–
Drug abuse onset early	–	–	–	–	–	–	–	–	–	–	1.9	0.4	9.3	0.7	0.695
Drug abuse onset average	–	–	–	–	–	–	–	–	–	–	1.6	0.4	6.3	–	–
Number of cases	2012					2127					333				

	T2 onset of illicit drug dependence among T1 non-users				T2 onset of illicit drug dependence among T1 non-abusive users				T2 onset of drug dependence among T1 non-dependent abusers			
	OR		χ^2		P-value		OR		LOWOR		UPOR	
	OR	LOWOR	UPOR	χ^2	P-value		OR	LOWOR	UPOR	χ^2	P-value	
Number of drug-dependent cases	17					43				17		

OR: odds ratio; LOWOR: lower bound OR based on 95% confidence intervals; UPOR: upper bound OR based on 95% confidence intervals.