Transition to parenthood and substance use disorders: Findings from a 30-year longitudinal study

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Abstract

Background: This study examined the associations between the transition to parenthood and substance use disorders from ages 18 to 30 in a New Zealand birth cohort.

Methods: Outcomes included: DSM-IV criteria for: a) alcohol abuse/dependence (AAD); and b) illicit substance abuse/dependence. The study also used measures transition to parenthood during the period 18-30 years; and observed covariate factors including: family socio-economic status; family functioning; childhood abuse exposure; childhood personal and behavioural characteristics; and psychosocial adjustment in adolescence. Data were analysed using repeated measures Generalised Estimating Equation models, and conditional fixed effects regression modelling to control for confounding. Gender interactions were examined using moderated regression analyses.

Results: Those who became parents had unadjusted odds of substance use disorder outcomes that ranged from 0.58 to 0.52 times lower than those who had not become parents. Adjustment of the associations for both: a) observed confounding factors; and b) non-observed fixed effects; strengthened the associations between parenthood status and substance use disorders. After adjustment for non-observed fixed factors, custodial parents had odds of substance use disorders that were 0.43 to 0.22 times lower than those who did not become parents. Additional analyses suggested these effects were confined to custodial parents only. There was also evidence for gender x parenthood status interactions for AAD, with the effects of parenthood on AAD being stronger for females.

Conclusions: The results suggest a causal association between transition to custodial parenthood and reduced risks of substance use disorder, particularly amongst female cohort members.

Keywords: alcohol abuse/dependence, illicit substance abuse/dependence, parenthood, gender, longitudinal study
1. Introduction

There has been increasing life course research into the development and consequences of substance use including the use of alcohol and illicit drugs (Compton et al., 2005; Enoch, 2006; Guxens et al., 2007; Macleod et al., 2004; McCambridge et al., 2011; Moore et al., 2007). This research has tended to focus on the genetic, social, familial and personal factors that are associated with the risks of substance misuse and the consequences of substance misuse for social and personal adjustment and wellbeing. Less attention has been paid to the role of protective or compensatory factors that may lead to desistance of substance misuse (Greenberg, 2006).

One life course process that may have profound effects on rates of substance is the transition to parenthood. Specifically it may be suggested that the transition to parenthood acts as a “turning point” event which has the potential to change life course directions and particularly the use of substances (Bachman et al., 2002; Bachman et al., 1997a; Bachman et al., 1997b; Leonard and Eiden, 2007). More specifically it can be proposed that the transition to parenthood may set in train a series of processes that combine to reduce rates of substance misuse. These processes may include: a) the time demands of parenthood; b) increases in personal responsibility; c) financial limitations; and d) role-related changes in friends and social milieu (Bachman et al., 2002; Leonard and Eiden, 2007). It is also likely that these changes will be more influential for women who generally have greater responsibility for the care and upbringing of children (Bailey et al., 2008; Christie-Mizell and Peralta, 2009; Oesterle et al., 2011). The social role effects may also extend to custodial parenthood; it is likely that the substance use behaviours of custodial parents will be more strongly influenced than those of non-custodial parents, who may not have day-to-day access to or responsibility for children (Merline et al., 2004).

Despite the potential role of parenthood as a turning point in patterns of substance use/misuse, there appears to have been relatively little research into this area. Most research into substance misuse and parenthood has focussed either on: a) the role of substance misuse in early, unintended or mistimed pregnancies (Floyd et al., 2007; Krohn et al., 1997; Naimi et al., 2003); and
b) the consequences of substance use for the care and wellbeing of children (Barnard and McKeeganey, 2004; Dunn et al., 2002; Johnson and Leff, 1999; Walsh et al., 2003; Wells, 2009).

Nonetheless a number of studies have examined the extent to which the transition to parenthood has acted as a protective or compensatory factor which reduces rates of substance use and misuse. In an early study, Yamaguchi and Kandel (Yamaguchi and Kandel, 1985) found that cannabis use was reduced for both males and females in a longitudinal sample. Similar findings for alcohol use were reported by Bachman and colleagues (Bachman et al., 1997a), and for alcohol, cannabis and cocaine by Staff and colleagues (Staff et al., 2010), both using data from the long-standing Monitoring the Future longitudinal study in the United States. Oesterle and colleagues (Oesterle et al., 2011) used latent-class analyses of a longitudinal sample, reported similar findings for a sample followed to age 30. Further studies have suggested that there may be gender differences in the linkages between transitions to parenthood and substance use. For example, Christie-Mizell and Peralta (Christie-Mizell and Peralta, 2009), using data from the US National Longitudinal Study of Youth, found decreases in alcohol consumption following the transition to parenthood, but only for females, while Bailey and colleagues (Bailey et al., 2008) reported similar findings.

One explanation of the associations between parenthood and lower levels of substance use is that this association may reflect the presence of third or confounding factors with are associated with both the transition to parenthood and substance use behaviour. The studies reviewed above have attempted to address these problems by introducing a series of observed covariate factors, including family socioeconomic status, demographic factors (e.g. ethnicity) and individual behavioural factors (e.g. conduct problems). The limitation of this approach is that it remains possible that any association between parenthood status and substance use may be explained by residual confounding.

One approach to addressing this issue is to use methods which make it possible to take into account non-observed sources of confounding. An analytic approach to this problem which is made possible in studies collecting repeated measures data is to use fixed effect regression models.
(Cameron and Trivedi, 1998; Greene, 1990). Fixed effect models make it possible to take into account non-observed genetic and environmental factors that have a fixed effect on the associations between transition to parenthood and substance use disorders. In the context of research into parenthood and substance use disorders, factors that may potentially be subsumed by the fixed effect term are all individual, family, social, and related factors that are fixed at the point of adolescence and which have a fixed effect on the transition to parenthood and substance use disorders.

This paper contributes to this general research topic by reporting findings from a 30-year longitudinal study of a New Zealand birth cohort. The aims of this study were:

i) To document the associations between the transition to parenthood and rates of alcohol abuse/dependence (AAD) and illicit drug abuse/dependence;

ii) To use regression methods to adjust any associations between the transition to parenthood and substance use disorders controlling for both observed confounders and non-observed fixed sources of confounding;

iii) To examine the extent to which any associations between the transition to parenthood and substance abuse/dependence vary with gender;

iv) To examine the extent to which the transition to parenthood has effects on substance use/dependence for non-custodial parents.

More generally the aim of the paper is to examine the extent to which the transition to parenthood acts as a turning point event which reduces risks of substance abuse/dependence and the extent to which any such association is modified by parental gender and custodial status.

2. Method

2.1 Participants
The data were gathered during the course of the Christchurch Health and Development Study (CHDS). In this study a birth cohort of 1265 children (635 males, 630 females) born in the Christchurch (New Zealand) urban region in mid-1977 has been studied at birth, 4 months, 1 year and annually to age 16 years, and again at ages 18, 21, 25 and 30 years (Fergusson and Horwood, 2001; Fergusson et al., 1989). All study information was collected on the basis of signed consent from study participants and all information is fully confidential. All aspects of the study have been approved by the Canterbury (NZ) Ethics Committee.

2.2 Parenthood status (transition to parenthood), ages 18-30

At each assessment at ages 21, 25 and 30, participants were questioned concerning their relationship and family history, and were specifically questioned regarding whether they had become a parent in any given year since the previous assessment. Participants were also asked to indicate whether they resided with or cared for a dependent child. Those participants who indicated having become a parent during any year from age 18-19 to age 29-30, and who indicated caring for a dependent child, were classified as being a custodial parent during that year. This classification was held constant for each year following until the final year of assessment (age 29-30). By age thirty, 347 cohort members (213 females, 134 males, representing 33% of the sample for whom parenthood information was available by that age) had reported becoming custodial parents.

In addition, for the purposes of comparing custodial parents with individuals who reported parenting children but did not have custodial access to them, those individuals who reported having become a parent during any year from age 18-19 to age 29-30, but who did not report caring for a dependent child were classified as having become non-custodial parents during that year. The percentage of individuals reporting non-custodial parenthood during any given year ranged from 1.3% to 4% of the sample for whom parenthood information was available for that year (male sample members accounted for 73% to 86% of the non-custodial parents).
2.3 DSM-IV Substance abuse/dependence (alcohol abuse/dependence; illicit substance abuse/dependence), ages 18-30

At each assessment at ages 21, 25, and 30, study participants were interviewed concerning alcohol use and the use of illicit substances (cannabis and a range of other illicit substances) using both custom-written survey items to assess substance use, and components of the Composite International Diagnostic Interview (CIDI) (World Health Organization, 1993) to assess DSM-IV (American Psychiatric Association, 1994) symptom criteria for alcohol abuse/dependence (AAD), cannabis abuse/dependence, and other illicit substance abuse/dependence during each year since the previous assessment. Those individuals who met criteria for AAD during any given year were classified using a dichotomous measure as having AAD during that year. Those who met criteria for cannabis or other illicit substance abuse/dependence since the previous assessment, and who reported at least weekly use of illicit substances during any given year, were classified using a dichotomous measure as having illicit substance abuse/dependence during that year.

2.4 Observed confounding factors

In order to examine the extent to which the associations between parenthood status and substance abuse/dependence could be accounted for by observed covariate factors, the following measures were taken from the study database on the basis of their associations with earlier age of parenthood. These measures included:

2.4.1 Measures of childhood socio-economic circumstances. (a) Maternal and paternal education levels were assessed at the time of the cohort member’s birth using a 3-point scale. (b) Family socio-economic status was assessed at birth using the Elley-Irving revised index of socio-economic status
for New Zealand (Elley and Irving, 1976). (c) Family living standards were assessed using an interviewer rating at each interview averaged over the period from birth to age 10 years. (d) Family income level was assessed from age 1 – 10 years using estimates of the family’s gross annual income for the past 12 months, averaged over the 10 years.

2.4.2 Measures of parental adjustment/family functioning. (a) Changes of parents (0-15 years) was measured via a count of the number of changes of parents experienced by the child by age 15. (b) Inter-parental violence during the period 0-16 years was assessed at age 18 using items from the Conflict Tactics Scale (Straus, 1990) to provide an overall measure of the extent of inter-parental violence. (c) Parental illicit drug use, alcohol problems and criminal offending were assessed via parental report when participants were aged 11 and 15 years. Participants were classified on three dichotomous measures reflecting parental history of illicit drug use, alcohol problems or criminality respectively. (d) Parental attachment at age 15 years was assessed at age 15 years using the Armsden and Greenberg (Armsden and Greenberg, 1987) scale of parental attachment. (e) A measure of family adversity was calculated using a count measure of 38 different measures of family disadvantage during the period 0-15 years, including measures of disadvantaged parental background, poor pre-natal health practices and perinatal outcomes, and disadvantageous child-rearing practices (Fergusson et al., 1994).

2.4.3 Measures of exposure to child abuse. (a) Childhood sexual abuse (0-16 years) was measured at age 18 and 21 years (Fergusson et al., 1996). In the present analyses, sample members were classified as having experienced childhood sexual abuse if they reported at either age 18 or 21, any episode of abuse involving physical contact with a perpetrator. (d) Childhood physical abuse (0-16 years) was measured at age 18 and 21 years (Fergusson and Lynskey, 1997). Sample members were classified as having experienced physical child abuse if they reported at either age 18 or 21, that at
least one parent had regularly used physical punishment, or had used physical punishment severely, or in a harsh and abusive manner.

2.4.4 Measures of individual characteristics and educational achievement. (a) Child neuroticism was assessed at age 14 years using a short-form version of the neuroticism scale of the Eysenck Personality Inventory (Eysenck and Eysenck, 1964). (b) Child self-esteem was assessed at age 15 years using the Coopersmith Self-Esteem Inventory (SEI) (Coopersmith, 1981). (c) Child novelty seeking was assessed at age 16 years using the novelty seeking scale of the Tridimensional Personality Inventory (Cloninger, 1987). (d) Childhood conduct and attention problems (7-9 years) were measured at age 7, 8 and 9 years using parent and teacher rating scales that combined items from the Rutter (Rutter et al., 1970) and Conners (Conners, 1969, 1970) child behaviour rating scales. Parent and teacher ratings were summed for each year and then averaged over the interval from 7-9 years to provide a measure of the child’s tendencies to conduct and attention problems. (e) Child IQ was assessed at ages 8 and 9 years using the revised Wechsler Intelligence Scale for Children (Wechsler, 1974). (f) School achievement (11-13 years) was measured at each assessment from age 11-13 years by asking the child’s class teacher to rate the child’s performance in each of five areas of the curriculum. These teacher ratings were summed across years and curriculum areas and then averaged to provide a teacher rating grade point average for each child. (g) Gender was recorded at birth.

2.4.5 Measures of adolescent adjustment. (a) Early onset sexual intercourse was measured at age 18. Young people who reported that they had first had sex before age 16 were classified as having early sexual onset. (b) Substance use at age 15 years was assessed by asking sample members about their use of tobacco, alcohol and cannabis. Tobacco use was assessed on the basis of a 5-point scale reflecting the current frequency of cigarette smoking at age 15. The frequency of alcohol use in the
past 12 months was assessed using a 6-point scale that ranged from ‘never’ through to ‘almost every day’. In addition, a dichotomous measure of cannabis use was created based on the young person’s report of cannabis use in the past 12 months. (c) Mental health problems at age 15 years were assessed via a mental health interview that combined components of the Diagnostic Interview Schedule for Children (DISC) (Costello et al., 1982) and other measures to assess a range of DSM-III-R (American Psychiatric Association, 1987) disorders in the cohort over the previous 12 months. This information was used to construct DSM-III-R diagnoses of major depression and anxiety disorders including overanxious disorder, generalised anxiety disorder, social phobia and simple phobia. In addition, sample members were also questioned about the frequency of suicidal thoughts in the previous 12 months. (d) Peer substance use and offending was measured at age 16 on the basis of four single items assessing the extent to which the participants’ friends: a) used illicit drugs or had problems resulting from alcohol or illicit drugs, and b) engaged in criminal offending, had problems with aggressive behaviour or were in trouble with the law. (e) Adolescent behaviour disorders. Information concerning symptoms of disruptive childhood behaviour (conduct disorder; oppositional defiant disorder; attention deficit hyperactivity disorder) was obtained at two assessments taking place when the sample members were aged 15 and 16 years using the Diagnostic Interview Schedule for Children (DISC) and the Self-Report Early Delinquency (SRED) (Moffitt and Silva, 1988) scale. These symptom measures were used to create symptom count indicators of CD, ODD and ADHD symptoms over the two year period from age 14-16 years.

2.5 Statistical analyses

2.5.1 Associations between parenthood status and substance abuse/dependence, ages 18-30. In the first stage of the analyses, the pooled associations between parenthood status each substance abuse/dependence outcome (AAD; illicit substance abuse/dependence) was estimated via Generalized Estimating Equation methods (Liang and Zeger, 1986; Zeger and Liang, 1986) to fit a population-averaged logistic regression model in which the risk of each substance use disorder
outcome at each year was modelled as a function of parenthood status during each year. These models were of the form:

$$\text{logit} \left( Y_{it} \right) = B_0 + B_1 X_{it} \quad \text{(EQ1)}$$

where $Y_{it}$ was each substance use disorder outcome reported by the $i$th subject in a given year $t$ ($t = 18$-$19$ years to $29$-$30$ years), and $X_{it}$ represented parenthood status during the year $t$. In this model observations from the same individual over time were permitted to be correlated with an unstructured correlation matrix. From the fitted models, estimates of the odds ratio (OR) and 95% confidence intervals (CI) of parenthood status for each substance use disorder outcome were calculated. In addition, these models were extended to include a further terms representing a time period x parenthood status interaction (not shown), in order to account for the possibility that rates of parenthood of dependent children varied over time.

2.5.2 Adjustment for observed covariates. To adjust the associations between parenthood status and substance use disorder outcomes for observed confounding factors, the models described in EQ1 were extended to include the set of observed covariate factors related to family background, functioning, and individuals characteristics and behaviour, detailed above. These models were of the form:

$$\text{logit} \left( Y_{it} \right) = B_0 + B_1 X_{it} + \sum B_j x_{ijt} \quad \text{(EQ2)}$$

where $\sum B_j x_{ijt}$ represented the joint effects of the potential confounding factors on the association between parenthood status and substance abuse/dependence outcomes. In fitting these models, the full set of covariate factors was entered simultaneously. From the fitted models, estimates of the adjusted OR and 95% CI of parenthood status for each substance use disorder outcome were calculated.
2.5.3 Fixed effects model for covariate adjustment. To adjust the associations between parenthood status and substance use disorder outcomes for non-observed fixed sources of confounding, conditional fixed effects regression models were fitted to the joint data for each of the three outcomes over the measurement periods. These models were of the form:

\[
\text{logit}(Y_{it}) = \alpha_i + B_1 X_{it} \tag{EQ3}
\]

In this model \(\alpha_i\) are individual specific terms that are assumed to reflect the effects of all fixed sources of variation in the outcome \(Y_{it}\). The fixed effects \(\alpha_i\) are assumed to be constant over time and to be correlated with other predictors in the model. Again, from the fitted models, estimates of the adjusted OR and 95% CI of parenthood status for each substance use disorder outcome were calculated.

2.5.4 Sensitivity analyses: comparisons with non-custodial parents. In order to examine the extent to which the linkages between parenthood status and substance use disorder outcomes were related to parenthood of dependent children rather than parenthood per se, the above analyses were repeated using a pair of dummy variables representing: a) those individuals who reported being custodial parents during any year; and b) those individuals who reported being non-custodial parents during any year; in place of the original parenthood status variable described above. In cases where an individual may have been both a custodial and a non-custodial parent in any year, participants were classified as custodial parents.

All model fitting was conducted using Stata 10.0 (StataCorp, 2007) for Windows.

2.6 Sample size and sample bias

The present analyses were based on samples ranging from 987 to 1011, representing 78% to 80% of the original cohort of 1265 participants, for whom data were available concerning parenthood status.
and substance use disorder outcomes at the age 21, 25, and 30 year assessments. To examine the effects of sample losses on the representativeness of the sample, the obtained samples with complete data at each age, were compared with the remaining sample members on a series of socio-demographic measures collected at birth. This analysis suggested that there were statistically significant (p<.01) tendencies for the obtained samples to under-represent individuals from socially disadvantaged backgrounds characterized by low parental education, low socio-economic status and single parenthood. To address this issue, the data weighting methods described by Carlin et al. (1999) were used to examine the possible implications of selection effects arising from the pattern of missing data. These analyses produced essentially the same pattern of results to those reported here, suggesting that the conclusions of this study were unlikely to have been influenced by selection bias.

3. Results

3.1 Associations between parenthood status and DSM-IV substance use disorders, ages 18-30

Table 1 shows the rates of DSM-IV alcohol abuse/dependence (AAD) and illicit substance abuse/dependence, by parenthood status for cohort members during each year from age 18 to age 30. The Table also shows the population-averaged odds ratio (OR) and 95% confidence interval (CI) for the associations between each substance use disorder outcome and parenthood status, pooled over the period 18-30 years, derived from estimates obtained via Generalized Estimating Equation modelling (see Methods). In addition, the Table reports on tests of age x parenthood status interactions for each outcome. The Table shows:

1. There were clear and consistent trends for those individuals who were custodial parents to have lower rates of substance use disorder. These trends are reflected in the pooled odds ratios (OR) which show: a) odds of AAD were 0.58 (95%CI: 0.45-0.73) times lower for custodial parents
and b) odds of illicit substance dependence that were 0.54 (95%CI: 0.42-0.70) times lower for custodial parents (p < .0001).

2. Tests of age x parenthood status interactions showed no statistically significant findings, suggesting that the strength of the association between parenthood status and AAD did not vary with age.

INSERT TABLE 1 HERE

3.2 Adjustment for potential sources of confounding

To estimate the extent to which the associations in Table 1 could be accounted for by confounding factors, two models were fitted to the data (see Methods). The first model adjusted the associations for a wide range of observed confounding factors relating to: family socio-economic status; family functioning; childhood abuse exposure; childhood personal and behavioural characteristics; and psychosocial adjustment in adolescence. The second model used methods of fixed effect regression to adjust for non-observed fixed sources of confounding (see Methods). The results of these analyses are presented in Table 2, which shows the associations between both of the substance abuse/dependence outcomes and parenthood status, after adjustment for: a) observed confounding factors; and b) non-observed fixed confounding factors. The Table shows:

1. Adjustment for observed confounding factors (Model A) had a relatively small effect on the magnitude of the associations between substance use disorders and parenthood status, but the association remained statistically significant (p < .0001) for each outcome. After adjustment for observed confounding factors, those individuals who were custodial parents of dependent children had rates of substance use disorder that ranged from 0.59 to 0.42 times lower than those who were not custodial parents.

2. Adjustment for non-observed fixed confounding factors (Model B) using conditional fixed effect regression models had a somewhat greater influence, in all cases strengthening the associations.
between substance use disorders and parenthood status. After adjustment for non-observed fixed sources of confounding, those individuals who were custodial parents had rates of substance use disorder that ranged from 0.43 to 0.22 times lower than those who were not custodial parents.

3.3 Testing for gender interactions

As noted in Methods, because of the widely-observed gender differences in both rates of substance use disorder and rates of parenthood at any given age, it may be possible that there are gender differences in the magnitude of the associations between substance use disorder and parenthood status (gender x parenthood status interactions). To examine these issues, moderated regression models were fitted to the data in which slopes for the association between substance use disorder and parenthood status were estimated separately for males and females, with a chi-squared test of equality between the regression parameters serving as the test of interaction. The results of these analyses are presented in Table 3, which shows the ORs and 95% CIs derived from the regression parameters of the fitted models, for males and females for: a) models adjusted for observed confounding factors; and b) models adjusted for non-observed fixed confounding. The analysis in Table 3 leads to the following conclusions:

1. For the associations between parenthood status and AAD, there was a significant gender difference (p < .05) for both analyses. Examination of the ORs from the fixed effects regression analyses suggests that the transition to parenthood had less of an effect on male AAD (OR from fixed effect regression: 0.70; 95% CI: 0.43-1.15) than on female AAD (OR from fixed effect regression: 0.26; 95% CI: 0.14-0.49)

2. For both analyses, the associations between illicit substance abuse/dependence and parenthood status were similar for and not significantly different (p > .40) for males (OR from fixed effect
regression: 0.25; 95% CI: 0.13-0.51) and females (OR from fixed effect regression: 0.17; 95% CI: 0.07-0.40).

INSERT TABLE 3 HERE

3.4 Supplementary analyses

The analyses above were extended to examine differences in the associations between parenthood status and substance use disorders for custodial and non-custodial parents (see Methods). These analyses produced a clear pattern of results in which:

1. Parenthood was associated with significant (p < .0001) reductions in rates of substance use for custodial parents;
2. Parenthood was not associated (p > .20) with reduced rates of substance use disorder for non-custodial parents.
3. These trends held for both males and females, and held after controlling for both observed and non-observed sources of confounding.

The results of these supplementary analyses suggest that it was not parenthood per se that was associated with lower rates of substance use disorder, but rather the presence of a dependent child in one’s home that was related to reduced rates of substance use disorder.

4. Discussion

In this paper we have used data gathered over the course of 30-year study of a New Zealand birth cohort to examine the extent to which the transition to parenthood is a protective factor which reduces rates of substance abuse/dependence. The results of these analyses lead to four relatively straightforward conclusions.

First, consistent with previous findings in the area (Bachman et al., 1997a; Bailey et al., 2008; Christie-Mizell and Peralta, 2009; Oesterle et al., 2011; Staff et al., 2010; Yamaguchi and Kandel,
1985), becoming a custodial parent was associated with a detectable reduction in risks of alcohol abuse/dependence (AAD) and illicit substance abuse/dependence. Estimates of the bivariate associations between parenthood status and substance use disorders suggested that custodial parents had odds of substance use disorder that ranged from .58 to .52 times lower than those without dependent children.

Second, consistent with at least two earlier studies (Bailey et al., 2008; Christie-Mizell and Peralta, 2009), the effects of becoming a custodial parent on rates of substance abuse/dependence were generally greater for females than for males. Tests of gender x parenthood status interaction, using moderated regression models, showed that females had significantly larger reductions in risk than males for AAD and any substance abuse/dependence.

Third, consistent with previous findings (Merline et al., 2004), becoming a parent without custody of children did not result in a reduction in risks of substance abuse/dependence. Those individuals who had become a parent but did not have custody of the child had rates of substance abuse/dependence that: a) did not differ from those who had not become parents; and b) were significantly greater than those individuals who had dependent children.

Fourth, these conclusions persisted after extensive control for both observed and non-observed sources of confounding, supporting the hypothesis that the transition to custodial parenthood is a protective event that mitigates risks of substance abuse and dependence.

The observation of a protective effect for substance abuse/dependence amongst parents of dependent children suggests the existence of a set of developmental routes or processes which limit both the potential and opportunities for parents to misuse substances (Bachman et al., 2002; Bachman et al., 1997a; Bachman et al., 1997b; Leonard and Eiden, 2007). These processes are likely to include: a) reduced opportunities for social activities involve the use of substances because of the demands of parenthood; b) limitations on disposable income as a result of the financial demands of parenthood; and c) changes in world view and personal priorities contingent on becoming a parent.
It would appear that between them, these and similar factors lead to a situation in which odds of substance abuse and dependence are reduced by approximately 60% to 75% amongst custodial parents when compared to an equivalent group of adults who are not custodial parents.

For many of this cohort, those becoming parents did so at a relatively early age (i.e. before age 25) and there is a large literature which suggests that such parenthood has multiple adverse consequences for both the parent and the child. Adverse consequences associated with early parenthood for parents include increased risks of mental health disorders, lower rates of educational achievement, and increased risks of unemployment and welfare dependence (Boden et al., 2008; Bradley et al., 2002; Caldwell and Antonucci, 1997; Corcoran, 1998; Deal and Holt, 1998; Hobcraft and Kiernan, 2001), whereas adverse consequences of early parenthood for children include increased risk of health issues at birth, and increased risks of symptoms of behaviour disorders in childhood, and earlier initiation of sexual activity (Corcoran, 1998; Hofferth and Reid, 2002; Jaffee et al., 2001; Moffitt, 2002). For these reasons it would be very unwise to use the results of this study to advocate for early parenthood as a solution to the problems of substance abuse amongst young people. However, despite this, the findings may have some practical implications for substance abuse and prevention programmes since they suggest that as people become parents, they may be more amenable to reducing substance use behaviours than at other points in their lives, with this being particularly the case for women. This does suggest the possibility of incorporating substance abuse screening and prevention programmes with other medical and social programmes aligned with pregnancy and parenthood (Armstrong et al., 2003; Goler et al., 2008; Russell et al., 1994).

In summary the findings of this study suggest that the transition to custodial parenthood is likely to act as a protective process which mitigates rates of substance abuse and dependence amongst young adults. These findings suggest the possibility of incorporating substance abuse prevention programmes into medical and social services targeted at parents. It should be borne in mind that these findings apply to a particular birth cohort studied at a particular time and social
context. For these reasons the findings and conclusions may not generalise to other samples and social contexts.
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The Authors declare no competing interests.
References


Table 1: Associations between parenthood status and: a) DSM-IV alcohol abuse/dependence; and b) illicit substance abuse/dependence; ages 18-30

<table>
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<th>% Illicit substance abuse/dependence</th>
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<td>7.1</td>
</tr>
<tr>
<td>28-29 years</td>
<td>8.9</td>
<td>5.1</td>
<td>6.2</td>
</tr>
<tr>
<td>29-30 years</td>
<td>10.3</td>
<td>6.6</td>
<td>5.7</td>
</tr>
<tr>
<td>Pooled OR (95% CI)</td>
<td>0.58 (0.45-0.73) p&lt;.0001</td>
<td>0.54 (0.42-0.70), p&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>Test of age x parenthood status interaction</td>
<td>$\chi^2(1) = 3.8, \ p &gt; .05$</td>
<td>$\chi^2(1) = 0.99, \ p &gt; .30$</td>
<td></td>
</tr>
</tbody>
</table>
Table 2: Associations between parenthood status and DSM-IV substance use disorders, ages 18-30, after adjustment for: a) observed confounding factors; and b) non-observed fixed confounding.

<table>
<thead>
<tr>
<th>Model</th>
<th>Alcohol abuse/dependence</th>
<th>P</th>
<th>Illicit substance abuse/dependence</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) adjusted for observed confounding factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR (95% CI)</td>
<td>0.59 (0.45-0.76)</td>
<td>&lt;.0001</td>
<td>0.42 (0.30-0.59)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>b) adjusted for non-observed fixed confounding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR (95% CI)</td>
<td>0.43 (0.29-0.61)</td>
<td>&lt;.0001</td>
<td>0.22 (0.13-0.39)</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>
Table 3. Adjusted associations between parenthood status and DSM-IV substance use disorder, age 18-30, for males and females with tests of gender x parenthood status interactions.

<table>
<thead>
<tr>
<th>Model</th>
<th>Gender</th>
<th>Alcohol abuse/dependence</th>
<th></th>
<th>Illicit substance abuse/dependence</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>OR (95% CI)</td>
<td>p</td>
<td>OR (95% CI)</td>
<td>p</td>
</tr>
<tr>
<td>a) adjusted for observed confounding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td>0.82 (0.58-1.15)</td>
<td>&gt;.20</td>
<td>0.41 (0.26-0.65)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td>0.40 (0.27-0.61)</td>
<td>&lt;.0001</td>
<td>0.44 (0.27-0.71)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Test of equality of slope parameters</td>
<td></td>
<td>$\chi^2(1) = 6.99$</td>
<td>&lt;.01</td>
<td>$\chi^2(1) = 0.02$</td>
<td>&gt;.80</td>
</tr>
<tr>
<td>b) adjusted for unobserved fixed confounding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td>0.70 (0.43-1.15)</td>
<td>&gt;.10</td>
<td>0.25 (0.13-0.51)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td>0.26 (0.14-0.49)</td>
<td>&lt;.0001</td>
<td>0.17 (0.07-0.40)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Test of equality of slope parameters</td>
<td></td>
<td>$\chi^2(1) = 6.23$</td>
<td>&lt;.05</td>
<td>$\chi^2(1) = 0.46$</td>
<td>&gt;.40</td>
</tr>
</tbody>
</table>