Childhood socio-economic position and adult smoking: are childhood psychosocial factors important? Evidence from a British birth cohort

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Background: Childhood socio-economic position (SEP) is associated with adult smoking status. Previous studies have investigated mediation by educational attainment. The aim of this study is to examine whether childhood psychosocial factors (cognitive ability, psychosocial adjustment and parental involvement) are important in the association between childhood SEP and adult smoking status over and above educational attainment in a large prospective birth cohort study. Methods: Data on 7709 participants from the National Child Development Study birth cohort from Great Britain were used in this study. Multinomial logistic regression was used to examine the associations of childhood SEP and childhood psychosocial factors with adult smoking status, both bivariate and mutually adjusted, and then additionally adjusted for confounders and participant's educational attainment. Analyses were conducted separately for men and women. Results: Childhood SEP is an important determinant of adult smoking status, even after adjustment for childhood psychosocial factors and educational attainment. Parental involvement, cognitive ability and psychosocial adjustment were all associated with adult smoking status for both men and women. Also parental involvement for men, and both parental involvement and psychosocial adjustment for women, remain important determinants of adult smoking status over and above childhood SEP, other childhood psychosocial factors and educational attainment. Conclusions: These findings add to the evidence base that childhood disadvantage is associated with adult smoking behaviours and highlights the importance of the early childhood social environment for the development of these.

Keywords: cognitive ability, parental involvement, psychosocial, smoking, social adjustment, socio-economic position

Introduction

In 2007, 21% of adults aged ≥16 years in England were reported to be smokers.1 While this proportion has declined in recent years hospital admissions caused primarily by smoking have increased.1 A large proportion of smokers are from socially disadvantaged groups and it is the UK government’s target to reduce this social gap among smokers. Adult socio-economic position (SEP) appears to be one of the strongest social determinants of adult smoking,2 especially amongst men.3 Several studies have shown that not just adult SEP but also childhood SEP is related to smoking.4–7 There has been relatively little research investigating why childhood SEP has this long-term effect.

Possible pathways linking childhood SEP and adult smoking

Previous studies suggest three psychosocial factors which may be important in the association between childhood SEP and adult smoking—cognitive ability, psychosocial adjustment and parent involvement. Childhood cognitive ability8–12 and aspects of behaviour or adjustment13–17 are associated with smoking outcomes. Parenting behaviours have been linked to smoking in both adolescence13,17–22 and adulthood.23 There has been limited research investigating how these childhood factors are involved in the pathway between childhood SEP and adult smoking. Examining the role played by these factors on adult smoking will provide further evidence for the content and timing of effective preventative measures. Past studies suggest that childhood social circumstances are more important predictors of current smoking4,24,25 for women. It is therefore possible that the effects of cognitive ability, psychosocial adjustment and parental involvement may work differently on determining adult smoking status between men and women.

The role of educational attainment

Adults with a basic educational level are more likely to be long-term regular smokers compared with those who obtained advanced education,26,27 suggesting that educational attainment is an effective protective factor for adult smoking. Attenuation found by adjusting for educational attainment in the association between childhood SEP and adult smoking2,3,5,24 also suggests a significant role played by this factor. In this article we investigate how far childhood cognitive ability, psychosocial adjustment and parental involvement explain the relationship between childhood SEP and adult smoking after accounting for the effect of educational attainment. We think that childhood psychosocial factors lie on the pathway between childhood SEP and educational...
attainment. For example, social position may influence parental involvement in reading which in turn may affect how well the child performs at school.

The aim of this study is to examine whether childhood psychosocial factors are important in the association between childhood SEP and adult smoking status over and above educational attainment by using data from a large prospective British birth cohort. Our hypotheses for this study are:

(i) Childhood SEP predicts adult smoking status and
(ii) Childhood cognitive ability, psychosocial adjustment and parental involvement will predict adult smoking status over and above childhood SEP and after adjusting for confounders and educational qualifications.

Methods

Data

This study uses data from the 1958 National Child Development Study (NCDS). Participants are residents from a sample of 17,416 births occurring in one week of 1958 in Great Britain. Data from four sweeps of the NCDS were used in this analysis—birth (1958), age 7 (1965), 16 (1974) and 42 years (2000). The response rate at the age of 42 years was just over 70%. Available cases of 3760 men and 3949 women with complete information were used in this study (the majority of missingness came from item non-response, 6% of original sample died and 7% had emigrated).

Measurements

Father’s social position defined by the Registrar General’s Social Class at birth was used to indicate childhood SEP. If father’s social position at birth was missing, father’s social position from the age of 7 years was used to substitute the information (n = 124). Childhood SEP has four categories: 1 ‘professional and managerial occupational class’ (I and II), the highest SEP in this study), 2 ‘non-manual intermediate social class’ (III non-manual), 3 ‘manual intermediate social class’ (III manual) and 4 ‘unskilled manual’ (IV and V, the lowest SEP in this study). We included lone mothers in the latter group, as suggested by others, as lone parenthood is an indicator of early disadvantage. The results did not differ significantly when comparing the results for this category to those of social class IV and V excluding this group.

Data on cognitive ability were taken from the age 7 sweep using the child’s score on the Copy a Design Test. This test was used to measure the child’s perceptual-motor skills which reflect the child’s conceptual development and ability to reproduce the perceived shape. The total score ranges from 0 to 12, with higher scores relating to higher cognitive ability.

Psychosocial adjustment was measured at age 7 years using the Bristol Social Adjustment Guide (BSAG), a teacher-assessed measure which aims to detect maladjustment, emotional difficulties or unsettledness in school-age children. Data on the BSAG were archived without any item-based information. The total score already derived from sums of the subscales (unforthcomingness, withdrawal, depression, anxiety, hostility towards adults, writing off of adults and their standards, anxiety for acceptance by children, hostility toward children, restlessness, inconsequential behaviour and miscellaneous symptoms) were used for this study. The total scores were then categorized into quartiles, with children in the top quartile being regarded as most adjusted.

Two parental involvement variables were created based on the questions asked of the mother and father of the child regarding the frequency of occasions spent with the child reading and on outings in the age 7 year sweep. For each activity an average score was obtained from the parents. If either of the parent’s information was missing, we used information from the other available parent. This variable was coded as 0 for ‘least frequent’ to 2 ‘most frequent’.

Participant’s own educational attainment was taken from the exam score achieved at the age of 16 years. This has three categories: 0 ‘no qualification’, 1 ‘Certificate of Secondary Education (CSE) grade 2–5’ and 2 ‘CSE grade 1 or Ordinary Examination level (O-level)’. We used exam scores because of their objective nature and as an approximate measure for educational level in adulthood.

Information about adult smoking, the outcome in this study, was taken from the question regarding cohort members’ current smoking status at the age of 42 years collected by cohort member interview. Adult smoking behaviour was coded into three levels: 1 ‘never/infrequent smokers’, 2 ‘ex-smokers’ and 3 ‘current smokers’.

Maternal smoking, maternal education, mother’s age and the number of siblings were treated as confounders. Information on maternal smoking was taken from the birth sweep. Information on father’s smoking was not collected. Mother’s education level was also taken from this sweep, where 0 represents ‘continued in education’ and 1 ‘left full-time education at minimum age’. Mother’s age at time of cohort member’s birth was also taken and ranged from 15 to 47 years. Information on the numbers of siblings was obtained at the age of 7 years from the mother. The distribution of this variable was very skewed and it was therefore categorized into two levels to achieve equal distribution: 0 being no siblings, 1 being ≥1 sibling.

Statistical analysis

All analyses were conducted using STATA v.11, using multinomial logistic regression to test the associations between childhood SEP, childhood psychosocial factors and educational attainment with adult smoking status. A series of regression models were run, ordered as follows (phrases in parentheses refer to how these are labelled in results tables): first childhood SEP and childhood factors were entered separately to assess the bivariate effects on adult smoking status (‘bivariate models’). Next all childhood factors and childhood SEP were entered simultaneously into the model testing the mutually adjusted association with adult smoking status (that is, unadjusted for confounders and educational attainment; ‘mutually-adjusted models’). Thirdly, childhood confounders were added to the model to adjust the effects from childhood SEP and childhood factors on adult smoking (‘model 1’). Finally educational attainment was additionally adjusted for in the model to assess if educational attainment explained any of the association and whether childhood psychosocial factors had a significant association with adult smoking status even after controlling for this (‘model 2’). A measure of adult social position was not included in this study as our interest is to examine the pathway leading from childhood SEP to adult smoking outcomes. In this model we include educational attainment at the age of 16 years and adding adult social position is likely to overadjust for the effects of childhood SEP, cognitive ability, psychosocial adjustment and parental involvement. All analyses were conducted separately for men and women.

Results

Almost 30% of men and women in this study were regular smokers at the age of 42 years and ~20% of participants reported smoking regularly in the past. Demographic
characteristics of smoking status were similar between men and women (table 1). The majority of participants were from a skilled manual social position, had mothers who did not smoke during pregnancy, left full-time education at minimum legal age and had other siblings. However, in the group of current smokers, the proportion of those from manual social positions, having mothers who smoked and who left full-time education at the minimum legal age were higher compared to the rest of the smoking status groups. Mothers also seem to be older in the group of none or infrequent smokers.

A greater proportion of participants who were current smokers at the age of 42 years were included in the ‘most disturbed’ category of BSAG score at the age of 7 years. Similarly a greater proportion of current smokers experienced lower levels of parental involvement as indicated by low frequency of reading and outings with parents, and also had lower scores in the copying designs test. A greater proportion of current smokers were also represented in the category of no educational qualifications and less in the category of CSE1 or O-level, compared to other groups.

**Childhood psychosocial factors as predictors of adult smoking status**

Table 2 shows the results from multinomial regression analyses investigating the effect of childhood SEP and childhood psychosocial factors on adult smoking status for men. The results of bivariate analyses show that participant’s SEP of origin predicts smoking status in adulthood. In particular, a graded association is seen whereby those from more disadvantaged childhood SEPs are more likely to be a smoker at the age of 42 years than those who were more advantaged in early life. Psychosocial adjustment is also associated with adult smoking status, with those having the highest scores in the BSAG being more likely to be ex-regular and current smokers as adults. The same pattern is seen for parental involvement with those experiencing the lowest levels being more likely to smoke as adults. Cognitive ability was also associated with adult smoking, with those with a higher score in the copy designs test being less likely to be a current smoker.

The mutually adjusted results in table 2 refer to the results for men when all childhood factors were simultaneously entered into the model. These results show that social position of origin is still associated with adult smoking status after accounting for cognitive ability, psychosocial adjustment and parental involvement. In addition, poor psychosocial adjustment and lower cognitive ability still remain predictors of adult smoking status over and above childhood SEP. With regards to parental involvement, after adjusting for childhood SEP, cognitive ability and psychosocial adjustment a reduction in effect is seen. The results of mutually adjusted analyses...
Table 2. The effect of childhood SEP, childhood psychosocial adjustment, parental involvement and cognitive ability on adult smoking status using multinomial regression among men (n = 3760), odds ratios (95% CIs)

<table>
<thead>
<tr>
<th>Social position of origin</th>
<th>Bivariate</th>
<th>Mutually adjusted</th>
<th>Model 1a</th>
<th>Model 2b</th>
</tr>
</thead>
<tbody>
<tr>
<td>One (least disturbed)</td>
<td>Reference 1.00</td>
<td>Reference 1.00</td>
<td>Reference 1.00</td>
<td>Reference 1.00</td>
</tr>
<tr>
<td>Two</td>
<td>Reference 1.10 (0.86-1.42)</td>
<td>Reference 1.00 (0.85-1.41)</td>
<td>Reference 1.09 (0.84-1.41)</td>
<td>Reference 1.07 (0.83-1.39)</td>
</tr>
<tr>
<td>Three</td>
<td>Reference 1.21 (0.94-1.55)</td>
<td>Reference 1.19 (0.93-1.53)</td>
<td>Reference 1.20 (0.93-1.54)</td>
<td>Reference 1.15 (0.89-1.48)</td>
</tr>
<tr>
<td>Four (most disturbed)</td>
<td>Reference 1.43 (1.11-1.86)</td>
<td>Reference 1.38 (1.06-1.80)</td>
<td>Reference 1.39 (1.07-1.81)</td>
<td>Reference 1.30 (0.98-1.70)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cognitive ability</th>
<th>One (least frequent)</th>
<th>One (least frequent)</th>
<th>One (least frequent)</th>
<th>One (least frequent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One (least frequent)</td>
<td>Reference 0.99 (0.95-0.93)</td>
<td>Reference 0.96 (0.90-0.95)</td>
<td>Reference 0.97 (0.90-0.98)</td>
<td>Reference 0.99 (0.97-1.06)</td>
</tr>
<tr>
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<td>Reference 1.10 (0.86-1.42)</td>
<td>Reference 1.00 (0.81-1.27)</td>
<td>Reference 1.09 (0.85-1.41)</td>
<td>Reference 1.07 (0.83-1.39)</td>
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<td>Three</td>
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<td>Reference 1.17 (0.93-1.46)</td>
<td>Reference 1.19 (0.93-1.53)</td>
<td>Reference 1.20 (0.93-1.54)</td>
</tr>
<tr>
<td>Four (most frequent)</td>
<td>Reference 1.43 (1.11-1.86)</td>
<td>Reference 1.60 (1.28-2.01)</td>
<td>Reference 1.38 (1.06-1.80)</td>
<td>Reference 1.39 (1.07-1.81)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Parent reading</th>
<th>One (least frequent)</th>
<th>One (least frequent)</th>
<th>One (least frequent)</th>
<th>One (least frequent)</th>
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<tr>
<td>One (least frequent)</td>
<td>Reference 1.00</td>
<td>Reference 1.00</td>
<td>Reference 1.00</td>
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<td>Reference 1.43 (1.11-1.86)</td>
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<td>Reference 1.38 (1.06-1.80)</td>
<td>Reference 1.39 (1.07-1.81)</td>
</tr>
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</table>

Discussion

These findings support the idea that childhood SEP is an important predictor of adult smoking status at the age of 42 years for both men and women. The finding supports the hypothesis that psychological distress and parental involvement in reading is associated with childhood SEP and adult smoking status. The results suggest that parental involvement in reading and cognitive ability, as well as the extent of this association, is not fully explained by other childhood factors, such as cognitive ability or parental involvement in reading. These results are consistent with previous findings that parental involvement in reading is associated with better cognitive ability and lower odds of being an ex-regular or current smoker in adulthood. The results also suggest that there is some additional effect of childhood SEP on adult smoking, which is not fully explained by educational attainment or other childhood factors.

Regarding childhood psychosocial factors and educational attainment, the results suggest that these factors are not fully explained by other childhood factors, such as cognitive ability or parental involvement in reading. This finding supports the idea that childhood psychosocial factors and educational attainment are important predictors of adult smoking status. The results suggest that being more psychosocially maladjusted and having less educational attainment are associated with higher odds of being a current smoker. These findings are consistent with previous findings that childhood psychosocial factors and educational attainment are associated with higher odds of being a current smoker. The results also suggest that being less psychosocially maladjusted and having more educational attainment are associated with lower odds of being a current smoker. These findings are consistent with previous findings that childhood psychosocial factors and educational attainment are associated with lower odds of being a current smoker. These findings highlight the importance of childhood psychosocial factors and educational attainment as important predictors of adult smoking status.
Table 3. The effect of childhood SEP, childhood psychosocial adjustment, cognitive ability, and parental involvement on adult smoking status using multivariate regression among women (n=3960).

<table>
<thead>
<tr>
<th>Model</th>
<th>Never Ex-regular</th>
<th>Current</th>
<th>Never Ex-regular</th>
<th>Current</th>
<th>Never Ex-regular</th>
<th>Current</th>
<th>Never Ex-regular</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Social position of origin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>III manual</td>
<td>Reference</td>
<td>1.02 (0.81–1.27)</td>
<td>1.77 (1.43–2.19)</td>
<td>Reference</td>
<td>0.96 (0.77–1.21)</td>
<td>1.59 (1.28–1.98)</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td>IV and V + single mothers</td>
<td>Reference</td>
<td>1.05 (0.80–1.38)</td>
<td>2.67 (2.09–3.38)</td>
<td>Reference</td>
<td>0.98 (0.74–1.39)</td>
<td>2.08 (1.62–2.70)</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td>BSAG quartiles</td>
<td>One (least disturbed)</td>
<td>Reference</td>
<td>1.00</td>
<td>1.00</td>
<td>Reference</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Three (most disturbed)</td>
<td>Reference</td>
<td>1.12 (0.88–1.43)</td>
<td>1.53 (1.25–1.87)</td>
<td>Reference</td>
<td>1.11 (0.86–1.42)</td>
<td>1.39 (1.13–1.71)</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td>Cognitive ability</td>
<td>One (least frequent)</td>
<td>Reference</td>
<td>1.00</td>
<td>1.00</td>
<td>Reference</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Three (most frequent)</td>
<td>Reference</td>
<td>0.70 (0.55–0.89)</td>
<td>0.58 (0.47–0.70)</td>
<td>Reference</td>
<td>0.68 (0.53–0.87)</td>
<td>0.65 (0.50–0.80)</td>
<td>Reference</td>
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<td></td>
<td>Parent outings</td>
<td>One (least frequent)</td>
<td>Reference</td>
<td>1.00</td>
<td>1.00</td>
<td>Reference</td>
<td>1.00</td>
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<tr>
<td></td>
<td>Two (most frequent)</td>
<td>Reference</td>
<td>1.21 (0.62–2.38)</td>
<td>0.78 (0.47–1.36)</td>
<td>Reference</td>
<td>0.84 (0.53–1.36)</td>
<td>0.68 (0.41–1.10)</td>
<td>Reference</td>
</tr>
</tbody>
</table>

a: Adjusted for confounders (maternal smoking, age and education and no. of siblings)
b: Adjusted additionally for educational attainment

discussion
complete case analyses tend to be underestimates of the true effects had the whole sample been used. As such the associations shown in this study are likely to exist and this study provides evidence of the long-lasting impact of childhood SEP and childhood factors upon adult smoking outcomes. Many previous studies have used retrospective measures of childhood factors. The major strength of this study is the use of one of the UK’s birth cohort studies which employs prospective data collection to minimize recall bias. Also including objectively measured variables, such as score in the copying designs test and exam scores, reduces the likelihood of reporting bias.

In summary, this study suggests that childhood SEP is an important determinant of adult smoking status, even after adjustment for childhood psychosocial factors and educational attainment. We also find that parental involvement for men and both parental involvement and psychosocial adjustment for women, remain important determinants of adult smoking status over and above childhood SEP, other childhood factors and educational attainment. This study highlights the importance of the early childhood social environment for the development of smoking behaviours and consequently points towards the targeting of health promotion activities in early life in order to reduce smoking rates. This study points towards schemes, such as the Sure Start initiative, which aim to tackle early disadvantage and encourage parental involvement in order to reduce the likelihood of smoking behaviours in later life.

Acknowledgements

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Conflicts of interest: None declared.

Key points

- Childhood SEP is associated with adult smoking status.
- For men, parental involvement remained an important determinant of adult smoking status after accounting for childhood SEP and educational attainment.
- For women, parental involvement and psychosocial adjustment remained important determinants of adult smoking status after accounting for childhood SEP and educational attainment.
- This evidence suggests that public health programmes should be targeted towards the early family social environment in order to reduce smoking in adulthood.

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