Antecedents of substance use at ages 8, 10 and 12 years: Evidence from the Avon Longitudinal Study of Parents and Children

Dr Erica Bowen

University of Bristol
ALSPAC
24 Tyndall Avenue
Bristol
BS8 1TQ

Erica.Bowen@bristol.ac.uk

The sample.

The Avon Longitudinal Study of Parents and Children (ALSPAC) is a large study following a cohort of children born to mothers resident in Avon while pregnant. 14,893 pregnant mothers with expected dates of delivery between 1.4.91 and 31.12.92 enrolled in the study, representing 85%-90% of the eligible population. There were 13,971 infants alive after 12 months. The families in the ALSPAC study are characteristic of those in Britain as a whole with a slight under-representation of minority groups; at 3% (5% of the children) this is lower than the 7.6% for the British general population (Baker, Morris & Taylor, 1997). The data used in the present study pertains to maternal substance use during and after pregnancy (47 months postpartum), partner substance use in the same postpartum period and a variety of child-based characteristics assessed between the ages of 47 months and 10 years. The outcomes are substance use at ages 8, 10 and 12. for the 8 and 10 year data, the total sample size is approximately 7000 children, whereas for the 12 year data approximately 1700 children are included as data collection is ongoing for this sample. Throughout the analysis the sample size varies due to missing data.

Measures used.

Outcomes:

Substance use.

The two variables relating to substance use at 8 years were taken from the children's responses to an antisocial activities interview-based posting task. The interview was based on the Self reported antisocial behaviour for young children questionnaire (Loeber et al, 1989). The questions used were ' Have you ever drunk alcohol without your parents' permission?' and 'Have you ever tried a cigarette?' Children were required to place a card relevant to each question into a post box either through a slot above which 'ever' was written, or through a slot above which 'never' was written. In both cases a dichotomous variable was derived (yes / no).

At 10 years of age, the antisocial activities data were obtained via a face-to-face interview. The data of interest concerned alcohol use without parents permission, cigarette smoking and cannabis use. However, as only one child reported cannabis use, no analysis of this final variable is presented in the report. In contrast to the year 8 data, the questions asked of the 10-year-old children focused on behaviour in the last 6 months rather than 'ever'. As with the year 8 data a dichotomous (yes / no) variable was derived for both alcohol use and cigarette smoking.

At 12 years of age separate interviews were conducted regarding each form of substance use. In the case of alcohol consumption the question asked concerned the consumption of alcohol without parents permission in the last 6 months (Yes/No). the question concerning smoking also relates to the same time period and absence of parental permission. The cannabis use question asks about use within the last 6 months. From this a dichotomous (Yes/no) cannabis use variable was derived.

Independent Variables.

Family Adversity.

Levels of adversity were identified through the use of a cumulative Family Adversity Index (FAI: Wolke, Steer & Bowen, 2004). The FAI consisted of 18 items taken from questionnaires that were administered throughout pregnancy and between birth and 24 months postpartum. Summing items that reflected the following family-based risk factors devised the score: the items used in the FAI were (the number of items per block are presented in brackets):

Age of mother younger than 20 years at first pregnancy / child birth (1); *Housing* (3): a) inadequacy: crowding index / periods of homelessness; b) *Basic living*: no availability of hot water or no indoor toilet, bath or shower or no kitchen c) major defects/infestation; No educational qualifications (mother or father) (1); *Financial difficulties* (1); *Partner relationship* (4) a) status, b) affection and aggression, c) physical / emotional cruelty, d) no social support; *Family* (2): a) family size (> 3 children), b) Major care giving problems (child in care / not with natural mother, or on social services at risk register); *Social network*: a) no emotional support, b) no practical / financial support (2); *Maternal affective disorder* (Depression, anxiety, suicidality) (1); *Substance abuse* (1): a) drugs or alcohol (use of hard drugs, alcoholism, high alcohol consumption); *Crime* (2): a) In trouble with police, or b) convictions. The FAI uses a self-weighting optimality-scoring concept (St James-Roberts & Wolke, 1987). Each individual item is assigned a value of 1 if an adversity is present and 0 if it is not present. Therefore scores range from 0 – 18. In the present report High adversity was determined by scores that were above the 95% percentile. In other words scores above 5 for the pregnancy index and above 6 in the birth – 2 year index were labelled ‘High adversity’.

Maternal substance use

Maternal substance use was assessed both during and after pregnancy. During pregnancy enquiries about alcohol, tobacco and cannabis use were made in relation to 5 periods: 8

weeks gestation; the first three months of pregnancy; 18 weeks gestation; 32 weeks gestation (alcohol and cigarettes only), and the last two months of pregnancy. During the postpartum period enquiries were made at 5 points: 8 weeks, 8, 21, 33 and 47 months. At each period mothers were asked about the frequency of drinking and amount of alcohol consumed. Participants indicated whether they drank: never, less than one glass per week, at least 1 glass per week, 1 – 2 glasses most days, 3 – 9 glasses daily, more than 9 glasses daily. From this question a dichotomous variable 'mother drinks alcohol' (yes/no) was derived, and also an ordinal variable reflecting the extent of consumption: 'none, normal, excessive' was derived. Women were categorised as drinking excessively on the basis of Department of Health alcohol consumption guidelines (more than 14 units per week). Mothers were also asked to indicate the number of cigarettes smoked per week ranging through: none; 1 – 4; 5 – 9; 10 – 14; 15 – 19; 20 – 24; 25 – 29; 30+. From this question a dichotomous variable of 'mother smokes cigarettes' (yes/no) was derived, and also an ordinal variable indicating 'none; <10 cigarettes per day; >10 cigarettes per day.
Cannabis use was ascertained through the question 'how often have you smoked cannabis' with the observation period matching the interval between questionnaires. From this again a dichotomous variable indicating 'mother smoked cannabis' (yes/no) derived. In addition, cannabis use was split into a three level ordinal variable indicating 'none, experimental, and regular (daily)'.

Partner substance use

The data pertaining to partner substance use was obtained via the maternal questionnaires. This was done in order to maximize the number of partners that were included in the analyses. At the same five postpartum periods mothers were asked to report on their partners alcohol and tobacco use using the same question forma that they had completed for themselves. From these questions identical categorical and ordinal variables were derived. However, for partners, the ordinal alcohol consumption variable was derived with excessive drinking identified from the consumption of at least 21 units of alcohol per week in line with department of health guidelines for male alcohol consumption.

Child characteristics.

Bullying status.

Involvement in bullying was determined through an interview based on the Bullying and Friendship Interview Schedule (BFIS: Wolke et al, 2000). The children were asked about

their involvement in direct and relational bulling as either victims or bullies. As a result, 6 variables pertaining to the bulling data were derived:

Direct bully (yes / no)

Direct victim (yes / no)

Direct bullying status (bully, victim, bully-victim, neutral)

Relational bully (yes / no)

Relational victim (yes / no)

Relational bullying status (bully, victim, bully-victim, neutral).

For the purpose of this report the bullying status variables were excluded.

Self Esteem

Self-esteem was measured using a 12-item shortened form of Harter's Self Perception Profile for Children (Harter, 1985), consisting of the Global Self-Worth and Scholastic Competence subscales. The task was conducted as a posting task. Children posted envelopes according to how much they felt they were like the statement read to them (either 'sort of true for me' or 'really true for me'). Possible scores ranged from 0 – 24 (0 – 12 on each subscale). Low self esteem for the purpose of this data exploration was identified on the basis of being scoring at least 2 SD below the mean population score (yes / no) indicating extremely low self-esteem. In other words, children with low Scholastic competence had scores of

ADHD/Conduct disorder

The Development and Well-Being Assessment (DAWBA) is a package of interviews, questionnaires and rating techniques designed to generate ICD-10 and DSM-IV psychiatric diagnoses on 5 – 17 year olds (Goodman et al., 2000; www.dawba.com). The diagnoses cover the major emotional, behavioural and hyperactivity disorders including, ADHD, CD, ODD. Information is collected from up to three sources: the parents; the children and the teacher.

Within ALSPAC DAWBA diagnoses are now available for 8253 children, representing all the children who had a completed parent questionnaire. Of these, 4,008 also had a partially or fully completed teacher questionnaire. An experienced child psychiatrist (Dr Tamsin Ford directed by Prof. Robert Goodman) assigned DSM-IV diagnoses of hyperactivity and behavioural disorders after reviewing all the available evidence. The evidence included free comments provided by parents and teachers as well as the structured questionnaire answers.

Where possible, children were assigned operationalised diagnoses (e.g. combined-type ADHD or oppositional-defiant disorder). When the child did not quite meet operationalised criteria but clearly had an externalising disorder that would have been clinically relevant – as judged by substantial social impairment – the child was assigned a diagnosis of 'disruptive behavior disorder, not otherwise specified'. The children in this residual group typically had a mixture of oppositional-defiant and conduct symptoms, not making the operationalised criteria for either oppositional defiant disorder or conduct disorder but having unequivocal social impairment.

Since anxiety or affective disorders can sometimes mimic the symptoms of ADHD, the clinical rater reviewed emotional symptoms carefully before assigning ADHD diagnoses. Under DSM-IV rules, a diagnosis of ADHD is ruled out by a coexistent pervasive developmental disorder. Consequently, all questionnaires and transcripts were carefully screened for evidence of a pervasive developmental disorder. In all, 31 children were assigned diagnoses of pervasive developmental disorders and these 31 children were excluded from the subsequent analyses, leaving a final sample of 8222 children. The children with pervasive developmental disorders were excluded because they were such a distinctive group that even though some did have co-morbid oppositional or conduct disorders, it did not seem appropriate to include them in the externalising or comparison groups. The present analysis focused on whether children had an ADHD diagnosis (yes / no) or a CD diagnosis (yes/no) or an Anxiety Disorder diagnosis (yes / no).

Child behavioural and emotional problems

At 47 and 81 months the mothers completed the Strengths and Difficulties Questionnaire (Goodman, 1997) which is an extension and revision of the Rutter Behaviour Questionnaire. The SDQ enquires about 25 attributes, 10 of which would be classified as strengths. The 25 items fall into 5 scales of 5 items: Conduct problems, Emotional Symptoms, hyperactivity, Peer problems and Prosocial behaviour. Each item is scored 0 – 2 in response to 'not true', 'somewhat true' or 'certainly true' and a total score ranging from 0 – 10 is generated for each subscale by summing the scores for the 5 items within each scale. Missing scores were dealt with as follows: if only one item was missing within a subscale, then the score was pro-rated. If more than one score was missing then the subscale was treated as missing data. For categorical analysis the clinical cut offs identified by Wolke et al (2000) were used. That is children were categorised as having low prosocial behaviour if they scored between 0 – 5; Emotional problems 5 – 10; hyperactivity 7 – 10; Conduct problems 4 – 10 and Peer problems 4 – 10. These scores represent the children in the 90th percentile in each instance.

Intelligence.

Intelligence was assessed at 8 years using the WISC-III UK (Wechsler, Golombok & Rust, 1992). A short form of the measure was employed where alternate items were used for all subtests. The ten WISC subtests comprise five Verbal subtests: Information (child's knowledge); Similarities; Arithmetic; Vocabulary and Comprehension, and five Performance subtests: Picture completion; Coding; Picture arrangement; Block design and Object assembly. Raw scores were calculated according to the items used in the alternate item form of the WISC. This was achieved by summing the individual items within each subtest and multiplying by 2 for picture completion, information, arithmetic, vocabulary, comprehension and picture arrangement; multiplying by 5/3 for similarities, multiplying by 3/2 for object assembly and block design. This resulted in scores that were comparable to those that would have been obtained had the full test been administered. Age-scaled scores were obtained by consulting the look-up tables in the WISC-III UK manual, and total scores were calculated for the Performance and Verbal scales. At this point scores were prorated. If a child obtained a score on only four out of the five subtests one each of the performance or verbal scales, the total scores for each scale could still be calculated by substituting the mean of the four available scaled scores in for the fifth score and summing in the usual way. This was done in accordance with WISC instructions. For the purpose of this study the age-scaled verbal, performance and total WISC scores were used. For categorical analyses children were designated as being of low intelligence if they had scores at least 2 standard deviations below the mean, and of high intelligence if they had scores at least 2 standard deviations above the mean. The verbal, performance and total IQ scales were used.

Depression.

Depression was assessed using statements taken from the Short Mood and Feelings Questionnaire (Angold et al, 1995). The thirteen statements were read out by a psychologist then the child was asked to post them into one of three boxes which best described whether they had felt like the statement on the card. The boxes were marked 'true', 'sometimes', 'not at all'. The depression score was derived through the following scoring: 'true' = 2; 'Sometimes' = 1; not at all = 0. As a result a high score indicated elevated levels of depressive symptoms. Children were dichotomised as having depression if they scored at least 2 standard deviations above the mean. In other words, scores of 11 and above were categorised as 'depressed'. This resulted in 6% of the sample categorised as depressed.

Analysis.

The analysis focused purely on singletons, i.e. those children who were not part of multiple births.

A three-stage logistic regression analysis strategy was employed. In the first stage, a series of univariable logistic regression analyses were conducted predicting the outcome (either smoking or alcohol) from each of the independent variables.

In the second stage, all of those variables that were identified in step 1 as being significant predictors of the outcome were entered into further logistic regression analyses in blocks. The blocks represented all variables assessed at the same time for mother and partner data, and for the child characteristics all sub-scales from a particular assessment at a given time. This intra block analysis identified those variables within each group of characteristics that were significantly associated with the outcome after controlling for the other variables within each block.

The final step in the analysis took those variables identified from each separate block as significant predictors of antisocial behaviour in step two, and regressed them onto the outcome as one block of variables. This inter block analysis identified those variables that remained significant predictors of each outcome independently of those identified through the intra block analysis.

In the multivariable analyses (steps 2 and 3), reduced models were identified to allow the maximum amount of data to be used to estimate effect sizes. This was achieved via a backwards elimination process from the initial model of all candidate variables. Following this stage, excluded variables were then tested for re-entry. This allowed a final check on the effect of variables particularly those excluded at early stages where the least amount of data was available. (ORs and p values for non-significant variables were estimated by temporarily adding this variable to the final model. As a consequence the number of cases for these variables will be different and lower than for those variables remaining in the final intra-block or inter-block models.)

1. Prevalence of outcomes and risk factors within the ALSPAC cohort.

Table 1. Alcohol and substance by age 8 and at 10 years.

	Total N	Boys	Girls	Chi square
8 years				
Cigarettes	5900	111 (3.5%)	79 (2.4%)	5.958**
Alcohol	5989	221 (6.9%)	96 (3.0%)	53.516***
10 years.				
Cigarette use	5981	55 (1.7%)	28 (0.8%)	9.820**
Alcohol use	5982	84 (2.6%)	26 (0.8%)	33.062***

Evidently at both 8 and 10 years of age a significantly higher proportion of male than female children reported both consuming alcohol and smoking cigarettes within the Antisocial Activities interview. Due to the change in observation period at 8 and 10 years from having ever smoked or drank alcohol at age 8 to smoking or drinking alcohol in the last 6 months at age 10, there appears to be higher prevalence of these activities at the younger age.

1.1 Child risk factors.

Table 2. Prevalence of child risk factors according to child sex.

			Boys	Girls
		N	% (N)	% (N)
10 years	Depression	6570	4.0 (130)	4.7 (157)
8 years	Direct Bully	6420	1.5 (48)	1.5 (17)
	Direct Victim	6387	30.1 (957)	26.2 (843)
	Relational bully	6276	1.0 (30)	0.6 (18)
	Relational victim	6252	13.1 (406)	16.1 (509)
	Global self worth[a]	6251	4.0 (124)	3.7 (118)
	Global self worth[b]	6251	30.4 (943)	26.2 (825)
	Scholastic competence[a]	6261	2.8 (87)	2.1 (67)
	Scholastic competence[b]	6261	33.9 (1053)	33.9 (1068)
91 months	ADHD	7799	3.5 (138)	0.7 (26)
	Conduct Disorder	7799	4.5 (180)	1.7 (64)
	Anxiety Disorder	7799	3.4 (137)	2.5 (97)
81 months	SDQ Antisocial behaviour	9042	4.9 (230)	2.5 (108)
	SDQ Hyperactivity	9042	5.6 (262)	2.9 (128)
	SDQ Emotional problems	9042	4.5 (210)	4.5 (195)
	SDQ Conduct problems	9042	5.7 (266)	4.3 (190)
	SDQ Peer problems	9042	5.3 (249)	3.5 (152)

[a] 2 standard deviations below the mean
[b] 25th percentile

1.2 Parental risk factors: pregnancy to 47 months of age.

Table 3. Prevalence of maternal and partner substance use

Time	Measure	Total N	Substance use % (N)
Enrolment.	Mother smoked	13293	19.3 (2559)
	Mother drank	12857	27.7 (3560)
First 3 months of pregnancy	Mother smoked	12920	24.7 (3193)
	Mother smoked cannabis	12261	2.6 (315)
	Mother drank	12817	54.6 (7004)
18 weeks gestation	Mother smokes	12921	19.5 (2524)
	Mother drinks	12846	27.9 (3584)
32 weeks gestation	Mother drinks	6718	32 (2150)
	Mother smokes	11114	21.4 (2378)
Last 2 months of pregnancy	Mother smoked	11545	19.6 (2262)
	Mother drank alcohol	11497	50.6 (5817)
	Mother smoked cannabis	10578	2.0 (211)
8 weeks postpartum	Mother smokes	11501	22.6 (2600)
	Partner smokes	11182	26.1 (2913)
	Mother drinks alcohol	11471	81 (9296)
	Mother smokes cannabis	10566	2.8 (297)
8 months postpartum	Mother smokes cannabis	11042	3.0 (334)
	Mother drinks alcohol	11002	86.9 (9571)
	Mother smokes	10956	24.2 (2654)
	Partner smokes	10341	28.5 (2944)
21 months postpartum	Partner drinks alcohol	9484	94.2 (8931)
	Partner smokes	9424	26.6 (2503)
	Mother smokes	10039	22.6 (2272)
	Mother drinks alcohol	10115	85.6 (8659)
	Mother smokes cannabis	10190	3.5 (353)
33 months postpartum	Mother smokes	9256	22.6 (2089)
	Mother drinks	9453	88.3 (8348)
	Mother smokes cannabis	9522	4.2 (396)
	Partner drinks alcohol	8762	94.6 (8291)
	Partner smokes	8733	26.2 (2291)
47 months postpartum	Mother drinks	9384	68.4 (6415)
	Mother smokes	9133	22.8 (2080)
	Mother smokes cannabis	9384	4.2 (392)
	Partner smokes	8460	26.5 (2239)
	Partner drinks	8569	94.7 (8115)
Maternal social class	I Professional		5.9 (585)
	II Management/Technical		31.4 (3096)
	IIIN Skilled		42.8 (4217)
	IIIM Skilled		7.9 (775)
	IV Part Skilled		9.8 (970)
	V Unskilled		2.2 (217)
	Armed forces		0.0 (4)
		9864	

MATERNAL DATA

Table 4. Quantity of maternal substance use

Time	Substance	Level	% (N)
Enrollment	Cigarettes	None	80.7 (10734)
		< 10 per day	7.1 (948)
		> 10 per day	12.1 (1611)
	Alcohol	None	72.3 (9297)
		Normal‡	26.2 (3369)
		Excessive†	1.5 (191)
First 3 months of pregnancy	Cigarettes	None	75.3 (9727)
		< 10 per day	11 (1420)
		> 10 per day	13.7 (1773)
	Alcohol	None	45.4 (5813)
		Normal‡	54.3 (6963)
		Excessive†	0.4 (41)
18 weeks gestation	Cigarettes	None	80.5 (10397)
		< 10 per day	8.7 (1124)
		> 10 per day	10.8 (1400)
	Alcohol	None	72.1 (9262)
		Normal‡	26.4 (3397)
		Excessive†	1.5 (187)
32 weeks gestation	Cigarettes	None	78.6 (8736)
		< 10 per day	14.4 (1600)
		> 10 per day	7.0 (778)
	Alcohol	None	68 (4568)
		Normal‡	30.5 (2049)
		Excessive†	1.5 (101)
Last 2 months of pregnancy	Cigarettes	None	80.4 (9283)
		< 10 per day	8.4 (974)
		> 10 per day	11.2 (1288)
	Alcohol	None	49.4 (5680)
		Normal‡	50.6 (5807)
		Excessive†	0.1 (10)
8 weeks postpartum	Cigarettes	None	77.4 (8901)
		< 10 per day	8.4 (967)
		> 10 per day	14.2 (1633)
	Alcohol	None	19.0 (2175)
		Normal‡	80.7 (9260)
		Excessive†	0.3 (36)
8 months postpartum	Cigarettes	None	75.8 (8302)
		< 10 per day	8.3 (910)
		> 10 per day	15.9 (1744)
	Alcohol	None	13.0 (1431)
		Normal‡	86.6 (9523)
		Excessive†	0.4 (48)

Time	Substance	Level	% (N)
21 months postpartum	Cigarettes	None	77.4 (7767)
		< 10 per day	7.6 (764)
		> 10 per day	15 (1508)
	Alcohol	None	14.4 (1456)
		Normal‡	84.9 (8590)
		Excessive†	0.7 (69)
33 months postpartum	Cigarettes	None	77.4 (7167)
		< 10 per day	7.3 (677)
		> 10 per day	15.3 (1412)
	Alcohol	None	11.7 (1105)
		Normal‡	87.4 (8262)
		Excessive†	0.9 (86)
47 months postpartum	Cigarettes	None	77.2 (7053)
		< 10 per day	11.5 (1054)
		> 10 per day	11.2 (1026)
	Alcohol	None	31.6 (2969)
		Normal‡	61.8 (5798)
		Excessive†	6.6 (617)

‡ Based on DoH limit of 14 units of alcohol per week for an adult female
† At least 14 units of alcohol per week

Table 5. Quantity of partner substance use

Time	Substance	Level	% (N)
Enrollment	Cigarettes	None	73.9 (8269)
		< 10 per day	13.0 (1453)
		> 10 per day	13.1 (1463)
8 months postpartum	Cigarettes	None	71.5 (7397)
		< 10 per day	6.2 (642)
		> 10 per day	22.3 (2302)
	Alcohol	None	6.0 (622)
		Normal‡	89.6 (9304)
		Excessive†	4.4 (459)
21 months postpartum	Cigarettes	None	73.4 (6921)
		< 10 per day	6.5 (608)
		> 10 per day	20.1 (1895)
	Alcohol	None	5.8 (553)
		Normal‡	89.3 (8471)
		Excessive†	4.9 (460)
33 months postpartum	Cigarettes	None	73.8 (6442)
		< 10 per day	6.2 (540)
		> 10 per day	20.1 (1751)
	Alcohol	None	5.4 (471)
		Normal‡	89.2 (7814)
		Excessive†	5.4 (477)
47 months postpartum	Cigarettes	None	73.5 (6221)
		< 10 per day	6.0 (507)
		> 10 per day	20.5 (1732)
	Alcohol	None	5.3 (454)
		Normal‡	88.1 (7547)
		Excessive†	6.6 (568)

‡ Based on DoH limit of 21 units of alcohol per week for an adult male
† At least 21 units of alcohol per week

Logistic Regression Analyses

CIGARETTE USE BY AGE 8 YEARS.

Table 6.Univariable, intra-block and inter-block associations with maternal antenatal substance use and family adversity.

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
FAI Pregnancy	6582	3.043	2.066 – 4.484	**.000**	6483	2.016	1.237 – 3.287	**.005**				
FAI 0-2	6554	2.903	2.034 – 4.142	**.000**		2.033	1.294 – 3.196	**.002**				
Enrollment												
Mother smoked	6560	2.519	1.818 – 3.489	**.000**	6271				6271	1.271	.680 – 2.376	.453
Mother drank	6291	1.137	.835 – 1.549	.416								
First 3 months of pregnancy												
Mother smoked	6525	2.507	1.850 -3.396	**.000**	6245				6245	1.464	.834 – 2.570	.184
Mother drank alcohol	6516	1.253	.935 -1.680	.131								
Mother smoked cannabis	6289	1.539	.620 -3.819	.352								
18 weeks gestation.												
Mother smokes	6526	2.367	1.701 -3.294	**.000**	6246				6246	.945	.489 – 1.825	.866
Mother drinks	6497	.946	.687 - 1.302	.732								
Mother cannabis	6288	1.077	.338 – 3.433	.900								
Last 2 months of pregnancy												
Mother smoked	6349	2.926	2.134 – 4.012	**.000**	6349	2.926	2.134 – 4.012	**.000**	6349	2.926	2.134 – 4.012	**.000**
Mother drank alcohol	6330	.750	.563 – 1.000	**.050**	6319	.768	.575 – 1.026	.074				
Mother smoked cannabis	5899	.668	.163 – 2.732	.575								
32 weeks gestation.												
Mother drinks	3707	.854	.559 - 1.305	.465								
Mother smokes	5924	2.475	1.778 - 3.445	**.000**	5712				5712	.841	.362 – 1.957	.688

Table 7. Univariable, intra-block and inter-block associations with maternal postpartum substance use and cigarette use at age 8.

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
8 weeks postpartum												
Mother smokes	6334	3.042	2.245 – 4.120	**.000**	6299	2.955	2.177 – 4.011	**.000**	5459	1.661	.918 – 3.006	.094
Mother drinks alcohol	6325	.540	.387 - .752	**.000**	6299	.545	.390 - .762	**.000**	5478	.643	.419 - .986	**.043**
Mother cannabis	5897	1.033	.377 – 2.828	.950								
8 months postpartum												
Mother smokes	6230	2.717	1.997 – 3.697	**.000**	6225	2.708	1.988 – 3.688	**.000**	5384	1.338	.698 –2.565	.381
Mother drinks alcohol	6251	.538	.362 - .800	**.002**	6225	.558	.375 - .831	**.004**	5402	1.166	.629 – 2.161	.626
Maternal cannabis use	6260	1.870	.904 – 3.871	.092								
21 months postpartum												
Mother smokes	6977	2.437	1.856 – 3.201	**.000**	6034	2.821	2.055 – 3.872	**.000**	5478	2.703	1.898 – 3.849	**.000**
Mother drinks alcohol	6034	.475	.330 - .684	**.000**	6034	.482	.334 - .695	**.000**	5478	.552	.351 - .869	**.010**
Maternal cannabis	6066	1.256	.548 – 2.878	.590								
33 months postpartum												
Mother smokes	5765	2.906	2.091 – 4.040	**.000**	5757	.353	.251 - .495	**.000**	5165	1.595	.804 – 3.163	.182
Mother drinks alcohol	5873	.577	.376 - .885	**.012**	5757	1.522	.967 – 2.395	.069				
Maternal cannabis	5902	2.211	1.208 – 4.047	**.010**	5765	1.144	.583 – 2.258	.698				
47 months postpartum												
Mother smokes	5815	2.736	1.969 – 3.803	**.000**	5815	.658	.473 - .915	**.013**	5384	1.429	.773 – 2.640	.255
Mother drinks alcohol	5927	.686	.496 - .948	**.022**	5815	2.490	1.766 – 3.512	**.000**	5478	.865	.586 – 1.277	.465
Mother cannabis	5927	2.767	1.598 – 4.791	**.000**	5815	1.967	1.102 – 3.509	**.022**	5478	1.999	1.094 – 3.652	**.024**

Table 8. Univariable and inter-block associations between partner substance use variables and cigarette use at age 8 years.

	Univariable associations						Inter-block					
	N	***β***	**S.E**	**OR**	**95% CI**	**p**	**N**	***β***	**S.E**	**OR**	**95% CI**	**p**
8 weeks pp												
Partner smokes	6174	.882	.154	2.416	1.786 – 3.267	**.000**	5463	.486	.252	1.598	.974 –2.620	.063
8 months pp												
Partner smokes	5992	.951	.158	2.588	1.899 – 3.529	**.000**	5460	.344	.300	1.410	.783 – 2.541	.253
21 months pp												
Partner drinks alcohol	5765	-.509	.307	.601	.329 – 1.097	.097						
Partner smokes	5715	.917	.165	2.503	1.812 – 3.458	**.000**	5715	.917	.165	2.503	1.812 – 3.458	**.000**
33 months pp												
Partner drinks alcohol	5559	-.625	.321	.535	.285 – 1.004	.051						
Partner smokes	5530	.846	.171	2.331	1.669 – 3.256	**.000**	5164	.517	.336	1.677	.868 – 3.242	.124
47 months pp												
Partner drinks alcohol	5549	-.505	.352	.604	.303 - 1.202	.151						
Partner smokes	5465	.903	.196	2.467	1.749 – 3.480	**.000**	5060	.514	.320	1.672	.892 – 3.133	.109

As only one variable from each of the initial blocks of partner variables were significantly associated there was no requirement for intra-block analysis at step 2

Table 9. Univariable and intra-block associations between child variables and cigarette use at 8 years.

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
Overt victim	6953	2.122	1.615 – 2.790	**.000**	6598	1.637	1.188 – 2.256	**.003**	5434	1.260	.864 – 1.839	.230
Overt bully	6926	3.500	2.447 – 5.008	**.000**	6598	1.923	1.238 – 2.988	**.004**	5434	2.487	1.507 – 4.103	**.000**
Relational victim	6807	2.074	1.521 – 2.828	**.000**	6598	1.288	.897 –1.851	.170				
Relational bully	6794	5.479	3.381 – 8.879	**.000**	6598	2.927	1.650 – 5.189	**.000**	5434	3.082	1.606 – 5.916	**.001**
Low Global self worth	7174	2.459	1.512 – 4.000	**.000**	6600	2.178	.789 – 3.271	**.004**	5434	1.548	.759 – 3.156	.229
Low Scholastic competence	7174	2.042	1.062 – 3.927	**.032**	6600	1.606	1.284 – 3.693	.191				
SDQ 47m Antisocial	5900	1.293	.908 – 1.843	.155								
SDQ 47m Hyperactive	5900	2.182	1.510 – 3.154	**.000**	5900	1.722	1.153 – 2.572	**.008**	5143	1.380	1.434 – 3.615	.181
SDQ 47m Emotionality	5900	1.933	1.058 – 3.532	**.032**	5900	1.463	.788 – 2.716	.228				
SDQ 47m Conduct problems	5900	2.398	1.658 – 3.469	**.000**	5900	1.974	1.321 – 2.949	**.001**	5143	1.521	.939 – 2.464	.088
SDQ 47m Peer problems	5900	1.596	1.018 – 2.503	**.042**	5900	1.395	.885 – 2.201	.152				
SDQ 81m Antisocial	5726	1.525	.955 – 2.436	.077								
SDQ 81m Hyperactive	5722	2.245	1.493 – 3.374	**.000**	5709	1.626	1.045 – 2.528	**.031**	5416	1.249	1.369 – 3.384	.338
SDQ 81m Emotionality	5724	.585	.257 – 1.333	.202								
SDQ 81m Conduct problems	5728	3.060	2.093 – 4.473	**.000**	5709	2.636	1.750 – 3.969	**.000**	5434	2.284	1.489 – 3.503	**.000**
SDQ 81m Peer problems	5723	1.943	1.160 – 3.254	**.012**	5703	1.337	.776 – 2.303	.295				
WISC HighVerbal IQ	6826	.000	.000 -	.995								
WISC Low Verbal IQ	6826	1.533	.709 – 3.315	.277								
WISC High Performance IQ	6367	.290	.029 – 1.498	.119								
WISC Low Performance IQ	6367	1.312	.530 – 3.246	.557								
WISC High Total IQ	6313	.274	.038 – 1.972	.199								
WISC Low Total IQ	6313	2.374	1.229 – 4.587	**.010**	6313	2.374	1.229 – 4.587	**.010**	4917	.738	.178 – 3.062	.676
ADHD	5916	3.201	1.589 – 6.448	**.001**	5782	1.580	.705 – 3.541	.267				
CD	5916	4.118	2.432 – 6.971	**.000**	5782	3.849	2.230 – 6.644	**.000**	5782	3.849	2.230 – 6.644	**.000**
Anxiety	5925	2.451	1.304 – 4.608	**.005**	5782	1.960	1.012 – 3.795	**.046**	5782	1.960	1.012 – 3.795	**.046**

Table 10. Final model predicting Cigarette use at 8 years from maternal, partner and child-based characteristics.

	N	OR	95% CI	p
FAI pregnancy	4865	1.020	.507 – 2.055	.955
FAI 0 – 2	4890	1.543	.897 – 2.655	.117
Mother smoked last 2m	4805	1.619	.841 – 3.117	.150
8 weeks pp alcohol	4792	.712	.482 – 1.186	.192
21m mother smokes	4890	2.260	1.463 – 3.490	**.000**
21m mother drinks	4890	.527	.331 - .840	**.007**
47m mother cannabis	4707	1.476	.695 – 3.135	.311
21m partner smokes	4890	1.614	1.054 – 2.471	**.028**
Overt bully	4890	2.428	1.390 – 4.239	**.002**
Relational bully	4890	2.467	1.129 – 5.391	**.024**
81m Conduct problems	4890	1.988	1.228 – 3.218	**.005**

Interpretation of data.

Six variables were predictive of child self-reported smoking by the age of 8 years.

Maternal smoking at 21months increased the relative risk of children smoking at 8 years by 2.260 times. In contrast, maternal consumption of alcohol at this same period was negatively associated with child drinking at age 8 such that if mothers did not drink when the child was 21m, the risk of children smoking at age 8 increased by 1.98 times (1/.527). Partner smoking at this same period increased the risk of children smoking by age 8 by 1.61 times.

Maternal reports of child conduct problems at 81 months predicted child smoking by age 8, and increased the risk of this happening by 1.99 times. Children who reported being overt bullies were 2.43 times more likely to smoke at age 8, and relational bullies were 2.47 times more likely to smoke at age 8 than were children who were not bullies.

ALCOHOL USE AT 8 YEARS

Table 11. Maternal antenatal univariable associations with alcohol use at 8 years

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
FAI pregnancy	6580	2.209	1.573 – 3.101	**.000**	6481	1.565	1.028 – 2.382	**.037**				
FAI 0 - 2	6552	2.173	1.597 – 2.956	**.000**	6481	1.783	1.223 – 2.598	**.003**				
8 weeks gestation												
Mother smokes	6558	1.962	1.494 – 2.575	**.000**	6558	1.962	1.494 – 2.575	**.000**	6215	1.085	.677 – 1.738	.734
Mother drinks	6289	1.275	1.003 – 1.622	**.047**	6283	1.246	.979 – 1.586	.073				
First 3 months												
Mother smoked	6523	2.046	1.596 – 2.623	**.000**	6268	1.883	1.450 – 2.445	**.000**	6268	1.883	1.450 – 2.445	**.000**
Mother drank alcohol	6514	1.158	.922 – 1.454	.208								
Mother smoked cannabis	6287	3.082	1.767 – 5.376	**.000**	6268	2.271	1.278 – 4.037	**.005**	6268	2.271	1.278 – 4.037	**.005**
18 weeks gestation.												
Mother smokes	6524	1.908	1.451 – 2.508	**.000**	6268	1.747	1.310 – 2.331	**.000**	6254	.973	.612 – 1.547	.907
Mother drinks	6495	1.279	1.010 – 1.620	**.041**	6224	1.207	.945 – 1.541	.132				
Mother cannabis	6286	2.984	1.562 – 5.634	**.001**	6268	2.051	1.062 – 3.962	**.032**	6267	1.033	.338 – 3.150	.955
Last 2 months												
Mother smoked	6347	1.702	1.283 – 2.260	**.000**	6347	1.702	1.283 – 2.260	**.000**	6005	.900	.564 – 1.437	.658
Mother drank alcohol	6328	1.100	.873 – 1.385	.419								
Mother smoked cannabis	5897	1.834	.880 – 3.822	.105								
32 weeks gestation.												
Mother smokes	5922	1.796	1.356 – 2.378	**.000**	5922	1.796	1.356 – 2.378	**.000**	5634	.742	.585 – 1.518	.806
Mother drinks	3705	1.217	.907 – 1.634	.191								

Table 12. Maternal postpartum univariable and intra-block associations with alcohol use at 8

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
8 weeks postpartum												
Mother smokes	6332	1.926	1.484 – 2.500	**.000**	6332	1.926	1.484 – 2.500	**.000**	5730	1.665	1.245 0- 2.227	**.001**
Mother cannabis	5895	2.579	1.460 – 4.557	**.001**	5895	2.579	1.460 – 4.557	**.001**	5330	.871	.401 – 1.891	.727
Mother drank alcohol	6323	1.045	.762 – 1.432	.784	6323	1.045	.762 – 1.432	.784				
8 months postpartum												
Mother smokes	6228	1.776	1.370 – 2.304	**.000**	6228	1.776	1.370 – 2.304	**.000**	5587	1.305	.775 – 2.196	.317
Mother drinks	6249	.965	.663 – 1.405	.853	6249	.965	.663 – 1.405	.853				
Maternal cannabis use	6258	2.664	1.607 – 4.417	**.000**	6258	2.664	1.607 – 4.417	**.000**	5613	.976	.475 – 2.002	.946
21 months postpartum												
Mother smokes	6975	1.494	1.194 – 1.870	**.000**	6975	1.494	1.194 – 1.870	**.000**	5730	1.077	.725 – 1.600	.714
Mother drinks alcohol	6032	1.039	.727 – 1.485	.832	6032	1.039	.727 – 1.485	.832				
Maternal cannabis	6064	2.729	1.685 – 4.421	**.000**	6064	2.729	1.685 – 4.421	**.000**	5502	1.119	.537 – 2.332	.764
33 months postpartum												
Mother smokes	5763	1.661	1.257 – 2.194	**.000**	5763	1.661	1.257 – 2.194	**.000**	5332	.902	.565 – 1.441	.666
Mother drinks	5871	.908	.619 – 1.331	.621	5871	.908	.619 – 1.331	.621				
Maternal cannabis	5900	2.565	1.634 – 4.025	**.000**	5900	2.565	1.634 – 4.025	**.000**	5442	.748	.341 – 1.643	.470
47 months postpartum												
Mother smokes	5813	1.649	1.255 – 2.167	**.000**	5813	1.649	1.255 – 2.167	**.000**	5625	1.063	.685 – 1.648	.786
Mother drinks alcohol	5925	.997	.768 – 1.295	.981	5925	.997	.768 – 1.295	.981				
Mother cannabis	5925	3048	2.011 – 4.618	**.000**	5925	3048	2.011 – 4.618	**.000**	5730	2.570	1.645 – 4.013	**.000**

Table 13. Partner univariable associations and inter-block analysis

	Univariable				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
8 weeks pp								
Partner smokes	6172	1.465	1.135 – 1.890	**.003**	5736	1.128	.740 – 1.718	.576
8 months pp								
Partner smokes	5990	1.644	1.278 – 2.116	**.000**	5990	1.644	1.278 – 2.116	**.000**
21 months pp								
Partner drinks alcohol	5763	1.022	.578 – 1.809	.939				
Partner smokes	5713	1.289	.980 – 1.696	.069				
33 months pp								
Partner drinks alcohol	5557	1.126	.590 – 2.149	.718				
Partner smokes	5528	1.441	1.099 – 1.890	**.008**	5265	1.194	.759 – 1.880	.443
47 months pp								
Partner drinks alcohol	5547	1.228	.623 – 2.419	.553				
Partner smokes	5463	1.337	1.014 - 1.764	**.040**	5174	.878	.569 – 1.356	.557

Table 14. Child univariable associations and intra-block analysis

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
Overt victim	6952	2.157	1.734 – 2.685	**.000**	6599	1.678	1.308 – 2.152	**.000**	5003	1.750	1.308 – 2.340	**.000**
Overt bully	6925	4.149	3.128 – 5.502	**.000**	6599	2.655	1.892 – 3.727	**.000**	5003	3.084	2.122 – 4.485	**.000**
Relational victim	6806	1.682	1.293 – 2.188	**.000**	6597	1.048	.774 – 1.417	.763				
Relational bully	6793	5.401	3.581 – 8.144	**.000**	6599	2.516	1.567 – 4.040	**.000**	4926	1.248	.890 – 1.750	.199
Low Global self worth (sd)	6975	1.752	1.106 – 2.776	**.017**	6975	1.752	1.106 – 2.776	**.017**	5003	1.340	.749 – 2.398	.325
Low Scholastic competence	6975	1.182	.598 – 2.338	.631								
SDQ 47m Antisocial	5898	1.196	.911 – 1.570	.198								
SDQ 47m Hyperactive	5898	1.833	1.367 – 2.457	**.000**	5898	1.626	1.186 – 2.228	**.002**	4742	1.304	.900 – 1.890	.161
SDQ 47m Emotionality	5898	1.109	.626 – 1.965	.722								
SDQ 47m Conduct problems	5898	1.715	1.262 – 2.330	**.001**	5898	1.444	1.038 – 2.008	**.029**	4742	.952	.627 – 1.445	.817
SDQ 47m Peer problems	5898	1.181	.809 – 1.724	.388								
SDQ 81m Antisocial	5723	1.521	1.058 – 2.185	**.024**	5702	1.147	.785 – 1.66	.478				
SDQ 81m Hyperactive	5719	2.286	1.667 – 3.133	**.000**	5706	1.793	1.276 – 2.519	**.001**	4984	1.324	.888 – 1.975	.169
SDQ 81m Emotionality	5721	1.057	.647 – 1.726	.824								
SDQ 81m Conduct problems	5725	2.613	1.920 – 3.556	**.000**	5706	2.180	1.566 – 3.035	**.000**	5003	1.947	1.363 – 2.779	**.000**
SDQ 81m Peer problems	5720	1.384	.882 – 2.171	.157								
WISC HighVerbal IQ	6823	.594	.242 – 1.456	.254								
WISC Low Verbal IQ	6823	1.482	.795 – 2.764	.216								
WISC High Performance IQ	6364	.122	.017 - .877	**.037**	6310	.136	.020 - .910	**.040**	5003	.006	.000 – 157.30	.328
WISC Low Performance IQ	6364	2.179	1.214 – 3.910	**.009**	6310	1.165	.546 – 2.487	.692				
WISC High Total IQ	6310	.325	.080 0- 1.319	**.116**								
WISC Low Total IQ	6310	2.853	1.739 – 4.681	**.000**	6310	2.788	1.700 – 4.575	**.000**	5003	2.251	1.136 – 4.458	**.000**
ADHD	5913	1.786	.893 –3.571	.101								
CD	5779	2.727	1.663 – 4.470	**.000**	5779	2.727	1.663 – 4.470	**.000**	4646	.761	.347 – 1.669	.496
Anxiety	5922	1.503	.825 – 2.736	.183								

Table 15. Alcohol at 8 Final model.

	N	*β*	S.E	OR	95% CI	p
FAI pregnancy	5160	-.044	.273	.957	.561 – 1.633	.871
FAI 0 – 2	5166	.456	.195	1.577	1.076 – 2.313	**.020**
Maternal smoking 1-3m	5166	.426	.163	1.531	1.112 – 2.109	**.009**
Maternal cannabis 1 – 3m	4984	.062	.464	1.064	.429 – 2.642	.893
Maternal smoking 8 weeks pp	5061	.152	.266	1.164	.691 – 1.963	.568
Maternal cannabis 47 months pp	5166	1.015	.248	2.759	1.696 – 4.489	**.000**
Partner smokes 8 months pp	4864	.303	.165	1.354	.980 – 1.872	.066
Overt victim	5166	.577	150	1.780	1.326 – 2.390	**.000**
Overt bully	5166	1.162	.187	3.195	2.213 – 4.612	**.000**
81m Conduct problems	5166	.626	.181	1.871	1.311 – 2.668	**.001**
Low Total IQ	4680	.755	.390	2.128	.991 – 4.571	.053

Interpretation of data.

Six variables predicted the use of alcohol by age 8. Having high family adversity levels during the first two years of life increased the risk of later alcohol use by 1.58 times.
Maternal smoking during the first three months of pregnancy was associated with a 1.53 times increase in the likelihood of alcohol use by the age of 8.
Maternal cannabis use when the child was 47 months old increased the likelihood that the child would report using alcohol by the age of 8 by 2.76 times.
Maternal reports of conduct problems at age 81 months were associated with a 1.88 fold increase in the likelihood of reporting alcohol use by age 8.
Children who were victims of overt bullying were 1.78 times more likely to report alcohol use, and children who were themselves overt bullies were 3.20 times more likely to report alcohol use.

CIGARETTES at 10 years.

Table 16. Maternal antenatal univariable associations.

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95%CI**	**p**	**N**	**OR**	**95% CI**	**p**
FAI pregnancy	6701	4.647	2.839 – 7.607	**.000**	6701	4.647	2.839 – 7.607	**.000**				
FAI 0 - 2	6643	2.549	1.489 – 4.363	**.001**	6578	1.127	.563 – 2.258	.735				
8 weeks gestation												
Mother drank	6406	1.542	.993 – 2.393	.054								
Mother smoked	6669	3.072	1.926 – 4.901	**.000**	6669	3.072	1.926 – 4.901	**.000**	6585	12.347	.599 – 3.033	.471
First 3 months of pregnancy												
Mother smoked	6646	3.064	1.974 – 4.754	**.000**	6646	3.064	1.974 – 4.754	**.000**	6646	3.064	1.974 – 4.754	**.000**
Mother drank alcohol	6634	.832	.542 – 1.277	.400								
Mother smoked cannabis	6394	3.424	1.361 – 8.618	**.009**	6373	1.979	.760 – 5.153	.162				
18 weeks gestation.												
Mother smokes	6651	2.779	1.734 – 4.456	**.000**	6651	2.779	1.734 – 4.456	**.000**	6633	1.171	.528 – 2.601	**.**697
Mother drinks	6627	.915	.570 – 1.469	.714								
Mother smokes cannabis	6393	2.439	.757 – 1.860	.135								
Last 2 months of pregnancy												
Mother smoked	6432	3.495	2.195 – 5.564	**.000**	6432	3.495	2.195 – 5.564	**.000**	6333	2.052	.853 – 4.938	.108
Mother drank alcohol	6410	.790	.508 – 1.228	.295								
Mother smoked cannabis	5972	3.417	1.223 – 9.547	**.019**	5961	1.863	.641 – 5.409	.253				
32 weeks gestation.												
Mother smokes	6008	3.441	2.154 – 5.497	**.000**	6008	3.441	2.154 – 5.497	**.000**	5939	.687	.297 – 1.588	**.**379
Mother drinks	3826	.554	.272 – 1.128	.104								

Table 17. Maternal postpartum univariable and intra-block analyses

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
8 weeks postpartum												
Mother smokes	6415	3.536	2.249 – 5.558	**.000**	6415	3.536	2.249 – 5.558	**.000**	6415	1.830	.976 – 3.430	.059
Mother smoked cannabis	5970	1.979	.615 – 6.370	.252								
Mother drank alcohol	6405	.784	.451 – 1.361	.386								
8 months postpartum												
Mother smokes	6308	3.672	2.331 – 5.785	**.000**	6308	3.672	2.331 – 5.785	**.000**	6308	1.954	.985 – 3.876	.055
Mother drinks	6332	.772	.395 – 1.508	.449								
Maternal cannabis use	6347	2.023	.731 – 5.598	.175								
21 months postpartum												
Mother smokes	7169	2.990	1.976 – 4.525	**.000**	7169	2.990	1.976 – 4.525	**.000**	7169	2.990	1.976 – 4.525	**.000**
Mother drinks alcohol	6124	1.139	.544 – 2.389	.730								
Maternal cannabis	6156	1.863	.673 – 5.158	.231								
33 months postpartum												
Mother smokes	5855	3.542	2.163 – 5.798	**.000**	5855	3.542	2.163 – 5.798	**.000**	5855	2.061	.921 - 4.613	.079
Mother drinks	5973	.600	.314 – 1.149	.123								
Maternal cannabis	5999	2.961	1.341 – 6.536	**.007**	5855	1.891	.823 – 4.344	.133				
47 months postpartum												
Mother smokes	5887	3.651	2.200 – 6.060	**.000**	5887	3.651	2.200 – 6.060	**.000**	5887	2.580	1.186 – 5.613	**.017**
Mother drinks alcohol	6008	.727	.436 – 1.213	.223								
Mother smoked cannabis	6008	1.682	.606 – 4.666	**.318**	5887	.689	.209 – 2.271	.541				

Table 18. Partner univariable associations and inter-block analysis.

	Univariable				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
8 weeks pp								
Partner smokes	6262	2.351	1.475 – 3.745	**.000**	5546	.811	.388 – 1.694	.577
8 months pp								
Partner smokes	6071	2.734	1.707 – 4.380	**.000**	5537	.910	.373 – 2.218	.835
21 months pp								
Partner drinks alcohol	5858	.627	.250 – 1.572	.319				
Partner smokes	5803	3.124	1.904 – 5.124	**.000**	5803	3.124	1.904 – 5.124	**.000**
33 months pp								
Partner drinks alcohol	5641	.448	.192 – 1.047	.064				
Partner smokes	5618	2.963	1.812 – 4.845	**.000**	5246	.962	.349 – 2.653	.940
47 months pp								
Partner drinks alcohol	5511	2.831	1.625 – 4.932	**.000**	5114	1.047	.388 – 2.824	.928
Partner smokes	5591	.540	.194 – 1.508	.240				

Table 19. Univariable associations and intra-block analysis of child variables

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	***β***	**95% CI**	**p**
Cigarettes at 8	5983	11.671	6.569 – 21.057	**.000**	5980	8.236	4.323 – 15.691	**.000**	4664	1.975	3.119 – 16.648	**.000**
Alcohol at 8	5981	5.556	3.050 – 10.121	**.000**	5980	3.002	1.528 – 5.898	**.001**	4663	.641	.748 – 4.815	.178
Overt victim	5933	2.862	1.747 – 4.688	**.000**	5905	1.735	.990 – 3.043	.054				
Overt bully	5905	7.117	4.187 – 12.098	**.000**	5905	7.117	4.187 – 12.098	**.000**	4664	1.785	3.022 – 11.748	**.000**
Relational victim	5808	1.365	.739 – 2.519	.320								
Relational bully	5787	2.895	1.036 – 8.087	**.043**	5784	.979	.328 – 2.922	.969				
Low Global self worth (sd)	6997	1.091	.342 – 3.479	.883								
Low Scholastic competence	6779	4.087	1.750 – 9.546	**.001**	6997	2.049	1.337 – 3.141	**.001**	4664	1.798	2.221 – 16.404	**.000**
SDQ 47m Antisocial	5981	1.413	.817 – 2.446	.216								
SDQ 47m Hyperactive	5981	2.222	1.255 – 3.931	**.006**	5981	1.404	.753 – 2.617	.286				
SDQ 47m Emotionality	5981	.355	.049 0- 2.572	.306								
SDQ 47m Conduct problems	5981	3.805	2.258 – 6.411	**.000**	5981	3.805	2.258 – 6.411	**.000**	4664	.808	1.114 – 4.520	**.024**
SDQ 47m Peer problems	5981	1.172	.532 – 2.583	.693								
SDQ 81m Antisocial	5780	1.132	.484 – 2.647	.774								
SDQ 81m Hyperactive	5772	2.252	1.161 – 4.367	**.016**	5753	1.109	.523 – 2.351	.787				
SDQ 81m Emotionality	5778	1.327	.528 – 3.337	.548								
SDQ 81m Conduct problems	5781	4.265	2.433 – 7.477	**.000**	5775	3.282	1.794 – 6.004	**.000**	4663	.520	.748 – 3.784	.209
SDQ 81m Peer problems	5778	3.385	1.971 – 7.463	**.000**	5775	2.662	1.316 – 5.384	**.006**	4664	.886	1.055 – 5.579	**.037**
WISC HighVerbal IQ	6080	.000	.000 -	.996								
WISC Low Verbal IQ	6080	5.905	2.645 – 13.183	**.000**	5633	2.264	.613 – 8.362	.220				
WISC High Performance IQ	5672	.000	.000 -	.996								
WISC Low Performance IQ	5672	3.363	1.033 – 10.951	**.044**	5633	.855	.190 – 3.842	**.**839				
WISC High Total IQ	5633	.000	.000 -	.997								
WISC Low Total IQ	5633	6.135	2.578 – 14.597	**.000**	5633	6.135	2.578 – 14.597	**.000**	4226	1.405	.926 – 17.936	.063
ADHD	5827	4.376	1.725 – 11.103	**.002**	5827	4.376	1.725 – 11.103	**.002**	4424	.457	.412 – 6.061	.505
CD	5827	3.398	1.449 – 7.967	**.005**	5827	.434	.160 – 1.175	.101				
Anxiety	5833	2.736	1.087 – 6.981	**.033**	5827	2.254	.869 – 5.848	.095				
Depression	7087	5.290	3.037 – 9.217	**.000**	7087	5.290	3.037 – 9.217	**.000**	4609	.017	.282 – 3.674	.979

Table 20. CIGARETTES at 10 years final model

	N	*β*	S.E	OR	95% CI	p
FAI pregnancy	4922	1.426	.360	4.164	2.056 – 8.433	**.000**
Mother smoked 1-3m pregnancy	4922	.755	.322	2.127	1.132 – 3.995	**.019**
Mother smoked 21m pp	4922	.023	.432	1.023	.439 – 2.384	.957
Mother smoked 47m pp	4843	.314	.455	1.369	.561 – 3.339	.490
Partner smoked 21m pp	4498	.412	.356	1.509	.751 – 3.035	.248
Child smoked at 8	4922	1.871	.401	6.498	2.963 = 14.251	**.000**
Overt bully	4922	1.723	.328	5.602	2.943 – 10.665	**.000**
Low scholastic competence	4922	1.857	.506	6.406	2.736 – 17.271	**.000**
47m Conduct problems	4922	.714	.341	2.042	1.047 – 3.980	**.036**
81m Peer problems	4604	.802	.440	2.231	.942 – 5.283	.068

Interpretation of data.

Six variables were associated with child self-reported cigarette use at age 10.

High adversity during pregnancy increased the likelihood of smoking at age 10 by 1.26 times. Maternal smoking during the first three months of pregnancy increased the likelihood of smoking by 2.127 times. Children who reported smoking by age 8 were 6.49 times more likely to be smoking at 10 years.

Maternal reports of conduct problems at 47 months were associated with a 2 fold increase in the likelihood that children would be smoking at age 10.

Children who were overt bullies at 8 years were 5.60 times more likely to be smoking two years later. Children with scholastic competence scores 2 standard deviations below the mean, or lower, were 6.40 times more likely to be smoking at 10 years of age.

ALCOHOL at 10 YEARS

Table 21. Maternal antenatal univariable associations and intra-block analysis.

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
FAI Pregnancy	6702	3.061	1.889 – 4.961	**.000**	6702	3.061	1.889 – 4.961	**.000**				
FAI 0 - 2	6644	2.002	1.200 – 3.340	**.008**	6579	1.351	.717 – 2.546	.352				
8 weeks gestation												
Mother smoked	6670	2.894	1.917 – 4.370	**.000**	6670	2.894	1.917 – 4.370	**.000**	5699	.91	.375 – 2.217	.838
Mother drank	6407	1.389	.939 –2.057	.100								
First 3 months of pregnancy												
Mother smoked	6647	2.601	1.755 – 3.853	**.000**	6374	2.324	1.524 – 3.542	**.000**	5713	1.148	.497 – 2.651	**.**747
Mother drank alcohol	6635	.959	.661 – 1.392	.862								
Mother smoked cannabis	6395	4.879	2.406 – 9.893	**.000**	6374	3.133	1.489 – 6.592	**.003**	5733	3.113	1.420 – 6.825	**.005**
18 weeks gestation.												
Mother smokes	6652	2.934	1.949 – 4.417	**.000**	6378	2.667	1.723 – 4.126	**.000**	5719	1.583	.597 – 4.198	.356
Mother drinks	6628	.857	.563 – 1.305	.472								
Mother smoked cannabis	6394	5.327	2.520 – 11.263	**.000**	6378	2.752	1.198 – 6.324	**.017**	5733	1.501	.306 – 7.371	.617
Last 2 months of pregnancy												
Mother smoked	6433	2.760	1.802 – 4.227	**.000**	6433	2.760	1.802 – 4.227	**.000**	5543	1.037	.297 – 3.620	.954
Mother drank alcohol	6411	1.159	.784 – 1.714	.458								
Mother smoked cannabis	5973	4.012	1.714 – 9.393	**.001**	5962	2.083	.796 – 5.450	.135				
32 weeks gestation.												
Mother drinks	3825	1.387	.839 – 2.296	.202								
Mother smokes	6008	3.039	1.990 – 4.640	**.000**	6008	3.039	1.990 – 4.640	**.000**	5733	2.816	1.793 – 4.422	**.000**

Table 22. Maternal postpartum substance use univariable associations and intra-block analysis

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
8 weeks postpartum												
Mother smokes	6416	2.691	1.782 – 4.062	**.000**	5960	2.635	1.676 – 4.143	**.000**	5292	1.386	.639 – 3.010	.409
Mother drank alcohol	6406	2.141	1.078 – 4.252	**.030**	5945	1.162	.769 – 1.756	.476				
Mother smokes cannabis	5971	4.347	2.062 – 9.165	**.000**	5960	2.578	1.128 – 5.890	**.025**	5314	3.215	1.457 – 7.096	**.004**
8 months postpartum												
Mother smokes	6309	2.557	1.712 – 3.820	**.000**	6295	2.414	1.596 – 3.649	**.000**	5200	1.175	.529 – 2.611	.691
Mother drinks	6333	1.282	.645 – 2.550	.478								
Maternal cannabis use	6348	2.713	1.240 – 5.932	**.012**	6295	1.792	.799 – 4.020	.157				
21 months postpartum												
Mother smokes	7170	2.183	1.529 – 3.118	**.000**	6159	2.264	1.466 – 3.497	**.000**	5314	1.138	.528 – 2.455	.741
Mother drinks alcohol	6127	.959	.532 – 1.727	.888								
Maternal cannabis	6159	2.514	1.149 – 5.500	**.021**	6159	1.696	.753 – 3.820	.202				
33 months postpartum												
Mother smokes	5855	2.912	1.904 – 4.455	**.000**	5855	2.607	1.670 – 4.069	**.000**	5314	2.965	1.863 – 4.720	**.000**
Mother drinks	5973	1.065	.533 – 2.129	.857								
Maternal cannabis	5999	3.327	1.702 – 6.504	**.000**	5855	2.164	1.070 – 4.378	**.032**	5314	1.433	.507 – 4.051	.498
47 months postpartum												
Mother smokes	5888	2.882	1.872 – 4.437	**.000**	5888	2.107	1.040 – 4.271	**.039**	5066	1.389	.496 –3.890	.531
Mother drinks alcohol	6009	1.219	.759 – 1.959	.413								
Mother smokes cannabis	6009	3.179	1.627 – 6.213	**.001**	5888	2.576	1.638 – 4.052	**.000**	4972	1.598	.628 – 4.063	.325

Table 23. Univariable associations and inter-block analysis of partner substance use.

	Univariable				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
8 weeks pp								
Partner smokes	6265	1.685	1.155 – 2.548	**.013**	4970	.894	.434 – 1.840	.761
8 months pp								
Partner smokes	6072	1.489	.971 – 2.285	.068				
21 months pp								
Partner drinks alcohol	5861	.908	.366 – 2.254	.835				
Partner smokes	5806	1.459	.928 – 2.296	.102				
33 months pp								
Partner drinks alcohol	5643	.599	.259 – 1.388	.232				
Partner smokes	5620	2.044	1.314 - 3.179	**.002**	5176	1.797	1.104 – 2.925	**.018**
47 months pp								
Partner drinks alcohol	5594	.397	.189 - .833	**.015**	5176	.341	.161 - .721	**.005**
Partner smokes	5514	1.248	.892 – 2.287	.138				

Table 24. Univariable associations and intra-block analysis of child variables

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
Cigarettes at 8	6159	7.160	4.100 – 12.506	**.000**	5982	3.727	1.993 – 6.969	**.000**	5169	3.938	2.017 – 7.687	**.000**
Alcohol at 8	6157	8.671	5.507 – 13.651	**.000**	5982	6.9930	4.244 – 11.521	**.000**	5169	4.510	2.556- 7.960	**.000**
Overt victim	6109	3.249	2.162 – 4.882	**.000**	5806	2.079	1.290 – 3.352	**.003**	5169	1.846	1.108 – 3.078	**.019**
Overt bully	6081	4.796	2.991 – 7.688	**.000**	5806	2.872	1.687 – 4.888	**.000**	5169	2.225	1.215 – 4.072	**.010**
Relational victim	5981	3.177	2.082 – 4.849	**.000**	5806	2.119	1.337 – 3.358	**.001**	5169	1.962	1.186 – 3.246	**.009**
Relational bully	5961	3.964	1.883 – 8.343	**.000**	5785	1.295	.561 – 2.986	.545				
Low Global self worth (sd)	7199	2.071	1.000 – 4.291	**.050**	7199	2.071	1.000 – 4.291	**.050**	5169	1.673	.723 – 3.872	.230
Low Scholastic competence	7199	1.740	.633 – 4.781	.283								
SDQ 47m Antisocial	5982	1.349	.849 – 2.145	.205								
SDQ 47m Hyperactive	5982	2.106	1.296 – 3.420	**.003**	5982	2.106	1.296 – 3.420	**.003**	4465	1.115	.564 – 2.204	754
SDQ 47m Emotionality	5982	1.025	.373 – 2.815	.961								
SDQ 47m Conduct problems	5982	1.872	1.123 – 3.120	**.016**	5982	1.506	.868 – 2.614	.145				
SDQ 47m Peer problems	5982	1.032	.516 – 2.064	.929								
SDQ 81m Antisocial	5779	1.157	.577 – 2.321	.681								
SDQ 81m Hyperactive	5771	3.162	1.918 – 5.215	**.000**	5757	2.596	1.510 – 4.465	**.001**	4364	1.748	.885 – 3.452	.108
SDQ 81m Emotionality		.687	.251 – 1.884	.466								
SDQ 81m Conduct problems	5780	2.520	1.489 – 4.266	**.001**	5757	1.846	1.042 – 3.273	**.036**	4368	1.152	.558 – 2.378	.702
SDQ 81m Peer problems	5777	2.390	1.257 – 4.545	**.008**	5752	1.710	.868 – 3.368	.121				
WISC HighVerbal IQ	6081	.370	.051 – 2.666	.323								
WISC Low Verbal IQ	6081	1.514	.473 – 4.844	.485								
WISC High Performance IQ	5673	.000	.000 -	.996								
WISC Low Performance IQ	5673	2.684	.965 – 7.465	.058								
WISC High Total IQ	5634	.000	.000 -	.996								
WISC Low Total IQ	5634	4.182	1.981 – 9.249	**.000**	5634	4.182	1.981 – 9.249	**.000**	5169	4.495	1.895 – 10.662	**.001**
ADHD	5962	2.283	.824 – 6.322	.112								
CD	5962	3.508	1.738 – 7.082	**.000**	5962	3.508	1.738 – 7.082	**.000**	4407	.859	.242 – 3.055	.815
Anxiety	5968	1.416	.515 – 3.895	.500								
Depression	7291	3.536	2.094 – 5.970	**.000**	7291	3.536	2.094 – 5.970	**.000**	5110	1.358	.571 – 3.230	**.**489

Table 25. ALCOHOL at 10 final model

	N	*β*	S.E	OR	95% CI	p
FAI pregnancy	3966	.209	.464	1.232	.957 – 8.362	.653
Maternal cannabis in 1st 3m	3851	.435	.691	1.545	.399 –5.981	.529
Maternal smoking 32 weeks a.n	3664	.324	.481	1.383	.539 – 3.548	.500
Maternal cannabis 8 wks pp	3981	1.082	.540	2.950	1.023 – 8.507	**.045**
Maternal smoking 33m pp	3981	.837	.297	2.310	1.292 – 4.130	**.005**
Partner smoking 33m pp	3776	.244	.338	1.276	.658 – 2.474	.471
Partner alcohol use 47m pp	3621	-.943	.557	.390	.131 – 1.161	.091
Child smoking at 8	3981	1.507	.402	4.514	2.052 – 9.932	**.000**
Child alcohol use at 8	3981	.924	.387	2.518	1.179 – 5.381	**.017**
Overt victim	3981	.389	.318	1.475	.790 – 2.753	.222
Overt bully	3981	1.356	.333	3.882	2.022 –7.453	**.000**
Relational victim	3981	.747	.309	2.111	1.152 – 3.866	**.016**
Low total IQ	3981	1.331	.576	3.783	1.223 – 11.705	**.045**

Interpretation of data.

Seven variables significantly predicted the likelihood that children would be drinking alcohol at 10 years of age.

Maternal cannabis when the child was 8 weeks old increased this risk by 2,95 times. Maternal smoking at 33 months postpartum was associated with a 2.30 fold increase in the likelihood that children would report drinking alcohol at age 10.

Children who at 8 years of age reported smoking were 4.51 times more likely to report drinking alcohol at 10 years of age. Those children who at age 8 reported having drunk alcohol were 2.16 times more likely to report drinking alcohol at age 10.

Children who were overt bullies were 3.88 times more likely to drink alcohol at age 10 and victims of relational bullying were 2.11 times more likely to do so.

Having an IQ score at least two standard deviations lower than the mean also increased the likelihood of reporting alcohol use at age 10 by 3.78 times.

YEAR 12 data.

Due to there being only a sub-sample of children for whom 12 year data were available at the time of writing the report, the general characteristics of this sample were compared with the remaining absent sample. These comparisons were conducted across all variables assessed in the analysis.

Table 26. Total sample size for each outcome variable and incidence of substance use in 12 year data.

	N	Incidence
Alcohol	1511	164 (10.9%)
Smoking in past 6 months	1677	143 (8.9%)
Ever smoked cannabis	1475	25 (1.7%)

The total number of children who provided data across the substance use outcomes was 1680. These children were compared to the total sample who contributed to the 8/10 year data but for whom no 12 year data were available on family adversity, and 8 and 10 year reported substance use using chi-square analyses. These results are presented below.

Table 27. Comparisons of 12 year sub-sample to remainder of 8 and 10 year sample.

		N	8/10 year	12 year	χ^2
High FAI pregnancy	No	7108	92.2 (5684)	94.2 (1424)	
	Yes	572	7.8 (484)	5.8 (88)	7.237**
High FAI 0 – 2 years	No	6901	90.5 (5540)	90.8 (1361)	
	Yes	718	9.5 (580)	9.2 (138)	.104
Smoked by 8 years	No	6762	96.9 (5352)	97.1 (1410)	
	Yes	512	3.1 (173)	2.9 (42)	.219
Alcohol at 8 years	No	6628	94.5 (5219)	97.0 (1409)	
	Yes	347	5.5 (304)	3.0 (43)	15.726***
Smoked at 10 years	No	7076	98.6 (5555)	99.0 (1521	
	Yes	92	1.4 (77)	1.0 (15)	1.453
Alcohol at 10 years	No	7046	98.3 (5535)	98.3 (1511)	
	Yes	124	1.7 (98)	1.7 (26)	.016

It is evident from the data presented in table 33 that in comparison to the 8/10 year sample, the 12 year sub-sample were significantly less likely to experience high adversity during pregnancy, and were significantly less likely to report drinking alcohol by 8 years of age.

The analysis of the 12 year data followed that of the 8 and 10 year data. However, due to the reduced sample and low occurrence of Cannabis use in some instances the logistic regression analyses returned very high standard errors, and are therefore omitted from the analyses of Cannabis use at 12 years.

ALCOHOL at 12 YEARS

Table 28. Maternal antenatal univariable associations and intra-block analysis.

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
FAI Pregnancy	1356	1.739	.953 – 3.175	.072								
FAI 0 - 2	1342	1.431	.841 – 2.436	.186								
8 weeks gestation												
Mother smoked	1350	1.298	.791 – 2.129	.302								
Mother drank	1301	1.394	.956 – 2.033	.084								
First 3 months of pregnancy												
Mother smoked	1339	1.535	1.006 – 2.342	**.047**					1153	1.356	.847 – 2.170	.205
Mother drank alcohol	1343	1.050	.743 – 1.483	.783								
Mother smoked cannabis	1278	1.924	.638 – 5.799	.245								
18 weeks gestation.												
Mother smokes	1340	1.658	1.047 – 2.625	**.031**								
Mother drinks	1313	1.085	.711 – 1.654	.706								
Mother smoked cannabis	1278	2.046	.674 – 6.207	.206					1154	1.414	.840 – 2.379	.192
Last 2 months of pregnancy												
Mother smoked	1284	1.382	.855 – 2.233	.187								
Mother drank alcohol	1281	1.493	1.042 – 2.141	**.029**	1174	1.446	.991 – 2.110	.056				
Mother smoked cannabis	1176	3.122	1.095 – 8.902	**.033**	1174	2.896	1.011 – 8.292	**.048**	1174	2.896	1.011 – 8.292	**.048**
32 weeks gestation.												
Mother smokes	1220	1.415	.880 – 2.276	.152								
Mother drinks	102											

Table 29. Maternal postpartum substance use univariable associations and inter-block analysis

	Univariable				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
8 weeks postpartum								
Mother smokes	1281	1.322	.849 – 2.059	.217				
Mother drank alcohol	1277	1.220	.764 - 2.029	.443				
Mother smokes cannabis	1176	3.122	1.095 – 8.902	**.033**	1061	1.031	.277 – 3.844	.964
8 months postpartum								
Mother smokes	1271	1.402	.918 – 2.142	.118				
Mother drinks	1279	1.087	.595 – 1.985	.787				
Maternal cannabis use	1282	2.679	1.123 – 6.391	**.026**	1164	1.464	.452 – 4.741	.525
21 months postpartum								
Mother smokes	1511	1.203	.852 – 1.698	.293				
Mother drinks alcohol	1263	1.139	.667 – 1.946	.633				
Maternal cannabis	1267	2.548	1.073 - 6.051	**.034**	1163	1.144	.327 – 3.998	.833
33 months postpartum								
Mother smokes	1169	1.041	.640 – 1.695	.871				
Mother drinks	1190	1.360	.692 – 2.671	.372				
Maternal cannabis	1197	2.854	1.362 – 5.982	**.005**	1197	2.854	1.362 – 5.982	**.005**
47 months postpartum								
Mother smokes	1199	1.118	.698 – 1.791	.642				
Mother drinks alcohol	1215	1.220	.802 – 1.855	.354				
Mother smokes cannabis	1215	2.434	1.214 – 4.877	**.012**	1138	1.143	.301 – 4.345	.845

Table 30. Univariable associations and inter-block analysis of partner substance use.

	Univariable				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
8 weeks pp								
Partner smokes	1236	1.091	.723 – 1.647	.677				
8 months pp								
Partner smokes	1226	1.355	.900 – 2.039	.145				
21 months pp								
Partner drinks alcohol	1213	1.223	.518 0- 2.893	.646				
Partner smokes	1203	1.383	.907 – 2.109	.132				
33 months pp								
Partner drinks alcohol	1128	2.889	.692 - 12.057	.146				
Partner smokes	1127	1.588	1.055 – 2.391	**.027**	1127	1.588	1.055 – 2.391	**.027**
47 months pp								
Partner drinks alcohol	1128	1.754	.536 – 5.744	.353				
Partner smokes	1118	1.203	.772 – 1.876	.414				

Table 31. Univariable associations and intra-block analysis of child variables

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
Cigarettes at 8	1306	5.243	2.695 – 10.199	**.000**	1246	4.442	2.178 – 9.058	**.000**	1219	4.177	2.037 – 8.563	**.000**
Alcohol at 8	1306	3.095	1.516 – 6.318	**.002**	1246	2.030	.906 – 4.548	.085				
Cigarettes at 10	1382	5.358	1.70 – 16.599	**.004**	1245	2.936	.703 – 12.263	.140				
Alcohol at 10	1383	7.547	3.317 – 17.173	**.000**	1246	7.783	3.314 – 18.281	**.000**	1219	7.213	2.978 – 17.468	**.000**
Overt victim	1289	1.594	1.126 – 2.256	**.009**	1267	1.531	1.072 – 2.184	**.019**	1219	1.474	1.013 – 2.144	**.043**
Overt bully	1288	1.914	1.079 – 3.396	**.027**	1266	1.275	.657 – 2.476	.473				
Relational victim	1270	1.192	.772 – 1.842	.428								
Relational bully	1267	3.498	1.570 – 7.794	**.002**	1267	2.995	1.328 – 6.752	**.008**	1199	2.144	.870 – 5.282	.097
Low Global self worth (sd)	1460	2.139	.966 – 4.737	.061								
Low Scholastic competence	1460	1.637	.671 – 3.996	.279								
SDQ 47m Antisocial	1208	.953	.613 – 1.483	.831								
SDQ 47m Hyperactive	1208	1.337	.825 – 2.165	.238								
SDQ 47m Emotionality	1208	.373	.089 – 1.557	.176								
SDQ 47m Conduct problems	1208	.865	.491 – 1.525	.617								
SDQ 47m Peer problems	1208	.383	.153 - .959	**.040**	1208	.383	.153 - .959	**.040**	1012	.461	.165 – 1.288	.140
SDQ 81m Antisocial	1192	.488	.222 – 1.071	.073								
SDQ 81m Hyperactive	1193	1.255	.705 – 2.232	.440								
SDQ 81m Emotionality	1192	.637	.272 – 1.493	.299								
SDQ 81m Conduct problems	1191	.753	.356 – 1.952	.458								
SDQ 81m Peer problems	1191	.780	.330 – 1.840	.570								
WISC HighVerbal IQ	1304	.597	.182 – 1.957	.395								
WISC Low Verbal IQ	1304	1.397	.404 – 4.826	.597								
WISC High Performance IQ	1173	.783	.276 - 2.222	.646								
WISC Low Performance IQ	1173	.620	.080 – 4.776	.646								
WISC High Total IQ	1167	.231	.031 – 1.700	.150								
WISC Low Total IQ	1167	1.346	.298 – 6.084	.699								
ADHD	1206	.792	.184 – 3.417	.754								
CD	1206	1.769	.663 – 4.720	.255								
Anxiety	1207	.329	.044 – 2.449	.278								
Depression	1382	1.823	.869 – 3.824	.112								

Table 32. ALCOHOL at 12 final inter block model

	N	*β*	S.E	OR	95% CI	p
Cannabis use in last 2m of pregnancy	863	-.208	.857	.812	.151 – 4.358	.808
Maternal cannabis use at 33 months	961	.563	.488	1.756	.675 – 4.565	.248
Partner smoked at 33 months postpartum	961	.524	.235	1.688	1.065 – 2.674	**.026**
Victim of overt bullying at 8 years	939	.264	.218	1.302	.849 – 1.998	.227
Cigarette use at 8 years	961	1.738	.418	5.864	2.505 – 12.895	**.000**
Alcohol use at 10 years	961	1.623	.527	5.070	1.804 – 14.247	**.002**

Interpretation of data.

The strongest predictor of alcohol use at age 12 was cigarette use by 8 years which increased the risk by 5.8 times. Alcohol use at 10 years increased the risk by 5 times and mothers' partners smoking at 33 months increased the risk by 69%.

CIGARETTES at 12 YEARS

Table 33. Maternal antenatal univariable associations and intra-block analysis.

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
FAI Pregnancy	1510	2.150	1.177 – 3.927	**.013**	1479	1.305	.616 – 2.763	.487				
FAI 0 - 2	1497	2.287	1.390 – 3.761	**.001**	1479	1.977	1.074 – 3.640	**.029**				
8 weeks gestation												
Mother smoked	1503	2.035	1.281 – 3.232	**.003**	1503	2.035	1.281 – 3.232	**.003**	1271	.766	.298 – 1.970	.580
Mother drank	1448	.944	.622 – 1.432	.786								
First 3 months of pregnancy												
Mother smoked	1492	1.955	1.286 – 2.973	**.002**	1426	1.805	1.166 – 2.794	**.008**	1274	1.546	.637 – 3.752	.335
Mother drank alcohol	1497	1.362	.938 – 1.977	.104								
Mother smoked cannabis	1431	4.498	1.828 – 11.065	**.001**	1426	3.404	1.341 – 8.641	**.010**	1279	3.085	1.148 – 8.291	**.026**
18 weeks gestation.												
Mother smokes	1491	2.309	1.486 – 3.589	**.000**	1425	2.220	1.406 – 3.505	**.001**	1274	.460	.176 – 1.204	.114
Mother drinks	1466	.909	.571 – 1.445	.686								
Mother smoked cannabis	1431	3.359	1.210 – 9.330	**.020**	1425	2.230	.773 – 6.435	.138				
Last 2 months of pregnancy												
Mother smoked	1432	2.482	1.589 – 3.877	**.000**	1313	2.297	1.444 – 3.654	**.000**	1225	.764	.203 – 2.872	.690
Mother drank alcohol	1427	1.126	.770 – 1.649	.540								
Mother smoked cannabis	1314	2.664	.876 – 8.107	**.084**	1313	1.588	.499 – 5.053	.433				
32 weeks gestation.												
Mother smokes	1350	2.650	1.713 – 4.098	**.000**	1350	2.650	1.713 – 4.098	**.000**	1279	2.466	1.562 – 3.892	**.000**
Mother drinks	126											

Table 34. Maternal postpartum substance use univariable associations and intra-block analysis

	Univariable				Intra-block				Intra-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
8 weeks postpartum												
Mother smokes	1428	2.463	1.619 – 3.747	**.000**	1309	2.228	1.439 – 3.449	**.000**	1356	1.446	.676 – 3.093	.342
Mother drank alcohol	1422	1.210	.700 – 2.092	.495								
Mother smokes cannabis	1314	2.823	1.034 – 7.707	**.043**	1309	1.829	.641 – 5.219	.259				
8 months postpartum												
Mother smokes	1421	2.234	1.481 – 3.370	**.000**	1421	2.118	1.388 – 3.232	**.000**	1362	1.415	.641 – 3.124	.391
Mother drinks	1430	1.106	.580 – 2.111	.759								
Maternal cannabis use	1433	2.738	1.100 – 6.812	**.030**	1421	1.860	.725 – 4.773	.197				
21 months postpartum												
Mother smokes	1677	1.952	1.378 – 2.765	**.000**	1412	1.849	1.170 – 2.922	**.008**	1412	1.849	1.170 – 2.922	**.008**
Mother drinks alcohol	1407	1.686	.865 – 3.287	.125								
Maternal cannabis	1412	6.494	3.047 – 13.839	**.000**	1412	4.644	2.087 – 10.331	**.000**	1412	4.644	2.087 – 10.331	**.000**
33 months postpartum												
Mother smokes	1305	2.111	1.353 – 3.294	**.001**	1305	1.613	.990 – 2.628	.055				
Mother drinks	1328	1.141	.581 – 2.244	.702								
Maternal cannabis	1335	5.105	2.587 – 10.072	**.000**	1305	4.407	2.093 – 9.279	**.000**	1299	1.914	.641 – 5.715	.245
47 months postpartum												
Mother smokes	1334	1.836	1.170 – 2.882	**.008**	1334	3.516	1.741 – 7.100	**.000**	1287	.811	.378 – 1.741	.591
Mother drinks alcohol	1353	.950	.618 – 1.458	.813								
Mother smokes cannabis	1351	4.452	2.336 – 8.483	**.000**	1334	1.480	.913 – 2.400	.112				

Table 35. Univariable associations and inter-block analysis of partner substance use.

	Univariable						Inter-block					
	N	***β***	**S.E**	**OR**	**95% CI**	**p**	**N**	***β***	**S.E**	**OR**	**95% CI**	**p**
8 weeks pp												
Partner smokes	1382	.616	.208	1.851	1.230 – 2.785	**.003**	1175	.009	.352	1.009	.506 – 2.012	.980
8 months pp												
Partner smokes	1370	.486	.217	1.626	1.063 – 2.486	**.025**	1197	-.239	.383	.787	.371 – 1.668	.532
21 months pp												
Partner drinks alcohol	1351	-.277	.412	.758	.338 – 1.699	.501						
Partner smokes	1341	.337	.234	1.400	.884 – 2.217	.151						
33 months pp												
Partner drinks alcohol	1259	.101	.530	1.107	.391 – 3.128	.848						
Partner smokes	1258	.696	.216	2.006	1.313 – 3.064	**.001**	1258	.696	.216	2.006	1.313 – 3.064	**.001**
47 months pp												
Partner drinks alcohol	1253	.766	.729	2.152	.515 – 8.987	.293						
Partner smokes	1241	.150	.249	1.162	.713 – 1.893	.547						

Table 36. Univariable associations and intra-block analysis of child variables

	Univariable				Intra-block				Inter-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
Cigarettes at 8	1450	6.621	3.419 – 12.819	**.000**	1381	5.609	2.786 – 11.295	**.000**	1154	7.241	3.374 – 15.543	**.000**
Alcohol at 8	1450	3.437	1.651 – 7.153	**.001**	1381	2.253	.974 – 9.984	.058				
Cigarettes at 10	1533	9.502	3.391 – 26.626	**.000**	1381	6.666	1.921 – 23.133	**.003**	1154	9.332	2.202 – 39.552	**.002**
Alcohol at 10	1534	5.807	2.536 – 13.294	**.000**	1381	4.029	1.567 – 10.361	**.004**	1154	3.977	1.416 – 11.165	**.009**
Overt victim	1434	1.270	.871 – 1.850	.214								
Overt bully	1433	2.114	1.178 – 3.796	**.012**	1433	2.114	1.178 – 3.796	**.012**	1130	1.605	.774 – 3.329	.203
Relational victim	1412	1.346	.853 – 2.127	.202								
Relational bully	1409	2.814	1.199 – 6.602	**.017**	1408	1.961	.759 – 5.066	.164				
Low Global self worth (sd)	1626	1.435	.555 – 3.706	.456								
Low Scholastic competence	1626	1.767	.676 – 4.620	.246								
SDQ 47m Antisocial	1346	.870	.535 – 1.414	.573								
SDQ 47m Hyperactive	1346	1.202	.708 – 2.043	.496								
SDQ 47m Emotionality	1346	.651	.200 – 2.122	.477								
SDQ 47m Conduct problems	1346	.921	.504 – 1.683	.789								
SDQ 47m Peer problems	1346	.483	.193 – 1.209	.120								
SDQ 81m Antisocial	1325	.865	.440 – 1.700	.674								
SDQ 81m Hyperactive	1328	2.154	1.279 – 3.627	**.004**	1322	1.812	1.046 – 3.138	**.034**	1154	2.340	1.322 – 4.142	**.004**
SDQ 81m Emotionality	1324	.465	.167 – 1.290	.141								
SDQ 81m Conduct problems	1324	2.423	1.400 – 4.195	**.002**	1322	2.041	1.146 – 3.636	**.015**	1149	1.461	.725 – 2.942	.289
SDQ 81m Peer problems	1324	.707	.280 – 1.787	.464								
WISC HighVerbal IQ	1451	.471	.113 – 1.966	.302								
WISC Low Verbal IQ	1451	2.316	.775 – 6.918	.133								
WISC High Performance IQ	1308	.000	.000 -	.997								
WISC Low Performance IQ	1308	1.598	.358 – 7.127	.539								
WISC High Total IQ	1302	.263	.036 – 1.930	.189								
WISC Low Total IQ	1302	2.814	.782 – 10.130	.113								
ADHD	1342	2.034	.688 – 6.009	.199								
CD	1342	2.082	.786 – 5.517	.140								
Anxiety	1343	.373	.050 – 2.767	.335								
Depression	1533	2.470	1.215 – 5.023	**.013**	1533	2.470	1.215 – 5.023	**.013**	1142	2.298	.981 – 5.383	.055

Table 36. CIGARETTES at 12 final inter block model

	N	*β*	S.E	OR	95% CI	p
cannabis in first 3 months of pregnancy	1054	-.363	.885	.696	1.385 0- 4.693	.682
Smoking at 32 weeks a.n	1014	.156	.331	1.169	.611 – 2.234	.637
Smoking at 21 months pp	1117	-.268	.288	.765	.435 – 1.344	.351
Cannabis at 21 months pp	1117	1.522	.486	4.581	1.766 – 11.885	**.002**
Partner smokes at 33m	999	.471	.270	1.601	.944 – 2.717	.081
Cigarettes at 8	1117	2.154	.422	8.617	3.767 – 19.707	**.000**
Cigarettes at 10	1117	2.471	.732	11.833	2.819 – 49.677	**.001**
Alcohol at 10	1117	.805	.597	2.236	.694 – 7.201	.177
Hyperactivity at 81months	1117	.802	.308	2.229	1.220 – 4.075	**.009**
FAI 0 – 2 years	1117	.905	.308	2.472	1.353 – 4.518	**.003**

Interpretation of data.

Five variables from the dataset predict smoking at age 12. Of these, the strongest predictor was smoking at age 10, which increased the risk of smoking at age 12 by nearly 12 times. Smoking by age 8 also increased the risk of smoking at age 12 by over 8 times. Other contributory factors included maternal cannabis use when the child was 21 months which increased the risk of smoking at 12 by 4.5 times. Children with high levels of hyperactivity at 81 months were also over twice as likely to smoke at age 12 than those with low hyperactivity. Finally, high levels of family adversity between the ages of 0 – 2 years increased the likelihood of smoking at age 12 by nearly 2.5 times.

Cannabis at 12 YEARS

Table 37. Maternal antenatal univariable associations and intra-block analysis.

	univariable				Intra-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
FAI Pregnancy	1326	3.914	1.285 – 11.927	**.016**	1298	1.345	.283 – 6.392	.709
FAI 0 - 2	1314	3.484	1.243 – 9.762	**.018**	1314	3.484	1.243 – 9.762	**.018**
8 weeks gestation								
Mother smoked	1321	1.385	.401 – 4.784	.606				
Mother drank	1277	1.060	.408 – 2.755	.904				
First 3 months of pregnancy								
Mother smoked	1309	1.552	.566 – 4.255	.393				
Mother drank alcohol	1313	.958	.411 – 2.232	.920				
Mother smoked cannabis	1251	.000	.000 -	.997				
18 weeks gestation.								
Mother smokes	1310	2.231	.811 – 6.136	.120				
Mother drinks	1283	1.814	.732 – 4.496	.198				
Mother smoked cannabis	1251	.000	.000 -	.999				
Last 2 months of pregnancy								
Mother smoked	1256	1.932	.633 – 5.899	.247				
Mother drank alcohol	1252	1.107	.442 – 2.772	.828				
Mother smoked cannabis	1150	4.363	.545 – 34.915	.165				
32 weeks gestation.								
Mother smokes	1194	1.252	.358 – 4.372	.725				

Table 38. Maternal postpartum substance use univariable associations

	N	OR	95% CI	p
8 weeks postpartum				
Mother smokes	1253	2.520	.946 – 6.712	.064
Mother drank alcohol	1248	.525	.187 – 1.474	.221
Mother smokes cannabis	1150	4.363	.545 – 34.915	.165
8 months postpartum				
Mother smokes	1246	2.004	.762 – 5.274	.159
Mother drinks	1254	.987	.226 – 4.306	.987
Maternal cannabis use	1257	5.175	1.141 – 23.465	.033
21 months postpartum				
Mother smokes	1475	1.629	.726 – 3.656	.236
Mother drinks alcohol	1236	1.315	.301 – 5.742	.716
Maternal cannabis	1240	2.284	.295 – 17.687	.429
33 months postpartum				
Mother smokes	1147	2.156	.751 – 6.194	.154
Mother drinks	1168	.793	.179 – 3.511	.759
Maternal cannabis	1175	4.040	.891 – 18.310	.070
47 months postpartum				
Mother smokes	1171	1.820	.648 – 5.112	.256
Mother drinks alcohol	1187	1.524	.506 – 4.594	.454
Mother smokes cannabis	1187	2.708	.610 – 12.018	.190

As none of these associations were significant no further analyses were conducted on the maternal postpartum substance use variables.

Table 39. Univariable associations and inter-block analysis of partner substance use.

		Univariable				
	N	***β***	**S.E**	**OR**	**95% CI**	**p**
8 weeks pp						
Partner smokes	1210	.287	.531	1.332	.47 – 3.771	.589
8 months pp						
Partner smokes	1202	.342	.531	1.408	.497 – 3.987	.519
21 months pp						
Partner drinks alcohol	1189	-.775	.761	.470	.106 – 2.088	.321
Partner smokes	1178	-.120	.641	.887	.253 – 3.111	.851
33 months pp						
Partner drinks alcohol						
Partner smokes	1109	.517	.544	1.678	.577 – 4.876	.342
47 months pp						
Partner drinks alcohol						
Partner smokes	1093	.878	.522	2.406	.865 – 6.692	.093

As none of these associations were significant no further analyses were conducted on the partner data.

Table 40. Univariable associations and intra-block analysis of child variables

	Univariable				Intra-block			
	N	**OR**	**95% CI**	**p**	**N**	**OR**	**95% CI**	**p**
Cigarettes at 8	1273	6.530	1.819 – 23.442	**.004**	1213	5.516	1.446 – 21.048	**.012**
Alcohol at 8	1273	3.665	.818 – 16.417	.090				
Cigarettes at 10	1348	19.725	5.044 – 77.136	**.000**	1213	6.602	1.025 – 42.516	**.047**
Alcohol at 10	1349	13.083	4.096 – 41.784	**.000**	1213	10.821	2.893 – 40.473	**.000**
Overt victim	1255	2.053	.828 – 5.091	.120				
Overt bully								
Relational victim	1236	1.286	.423 – 3.914	.658				
Relational bully	1233	2.353	.303 – 18.247	.413				
Low Global self worth (sd)	1426							
Low Scholastic competence								
SDQ 47m Antisocial	1180	1.011	.330 – 3.099	.985				
SDQ 47m Hyperactive	1180	1.200	.344 – 4.190	.775				
SDQ 47m Emotionality	1180	3.333	.742 – 14.967	.116				
SDQ 47m Conduct problems	1180	.394	.052 – 2.981	.367				
SDQ 47m Peer problems								
SDQ 81m Antisocial	1164	1.903	.542 – 6.676	.315				
SDQ 81m Hyperactive	1165	.528	.070 – 4.003	.537				
SDQ 81m Emotionality	1163	1.664	.376 – 7.365	.502				
SDQ 81m Conduct problems	1163	.707	.093 – 5.372	.737				
SDQ 81m Peer problems								
WISC HighVerbal IQ								
WISC Low Verbal IQ								
WISC High Performance IQ								
WISC Low Performance IQ								
WISC High Total IQ								
WISC Low Total IQ	1141	6.631	.806 – 54.529	.078				
ADHD	1178	3.190	.406 – 25.094	.270				
CD								
Anxiety								
Depression								

Table 41. Cannabis at 12 years final inter block model

	N	*B*	S.E	OR	95% CI	p
FAI 0 – 2	1096	.840	.688	2.315	.601 – 8.921	.222
Cigarettes at 8 years	1213	1.708	.683	5.516	1.446 – 21.048	**.012**
Cigarettes at 10 years	1213	1.887	.950	6.602	1.025 – 42.516	**.047**
Alcohol at 10 years	1213	2.382	.673	10.821	2.893 – 40.473	**.000**

Interpretation of data.

The data in table 54 indicate that prior substance use at 8 and 10 are the most strongly associated predictors of cannabis use at age 12. Of these variables, children who reported drinking alcohol at 10 years of age are 10 times more likely to smoke cannabis at age 12 than those who abstained at age 10. In addition, smoking at age 10 increased the likelihood of Cannabis use at age 12 by over 6.5 times, and smoking by age 8 was associated with a 5.5 fold increase in the chance of cannabis use at age 12.

However, these data need to be interpreted with caution as so few children at age 12 reported ever having used cannabis (25). In addition, these data had not been cleaned and therefore may over or under-represent the real prevalence of substance use at this period. In addition, the initial comparisons with the 8/10 year sample indicated that this sample were not truly representative of the cohort as a whole.