

Growing Up in Scotland: Overweight, obesity and activity

TECHNICAL APPENDIX

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CONTENTS

1	MULTIVARIATE ANALYSIS	3
1.1	Description of analysis undertaken	3
1.2	Interpreting the regression results.....	3
1.3	Detailed results of multivariate modelling.....	4
	1.3.1 Models of overweight and/or obesity	4
	1.3.2 Models of children’s physical activity and screen time	5

1 MULTIVARIATE ANALYSIS

1.1 Description of analysis undertaken

Many of the factors we are interested in are related to each other as well as being related to the outcome variables of interest – in this case, the likelihood of a child being overweight (compared to healthy weight) or obese (compared to overweight/healthy weight), the likelihood of a child exercising for less than the recommended 60 minutes every day (compared to exercising for at least 60 minutes daily) and the likelihood of a child using screen entertainment for three hours or more on a weekday (compared to using screens for less than three hours). For example, younger mothers are more likely to have lower qualifications, to be lone parents, and to live in areas of high deprivation. Simple analysis may identify a relationship between maternal age and screen time. However, this relationship may be occurring because of the underlying association between maternal age and education. Thus, it is actually the lower education levels amongst younger mothers which is associated with higher screen time rather than the fact that they are younger in age.

To take these possible confounds into account, multivariate regression analysis was used. This analysis allows the examination of the relationships between an outcome variable and multiple explanatory variables whilst controlling for the inter-relationships between each of the explanatory variables. This means it is possible to identify an *independent* relationship between any single explanatory variable and the outcome variable; to show, for example, that there is a relationship between maternal age and screen time that does not simply occur because both education and maternal age are related.

1.2 Interpreting the regression results

The results of the regression analyses are presented in Tables 1.1 to 1.4, showing odds ratios for the models and associated 95% confidence intervals together with the probability that the association is statistically significant. The predictor variable is significantly associated with the outcome variable if $p < 0.05$. The models show the odds of being in the particular category of the outcome variable (e.g. being overweight or obese) for each category of the independent variable (e.g. parental education categories). Odds are expressed relative to a reference category, which has a given value of 1. Odds ratios greater than 1 indicate higher odds, and odds ratios less than 1 indicate lower odds. Where the 95% confidence interval does not include 1, this category is significantly different from the reference category.

To understand an odds ratio we first need to describe the meaning of odds. The definition of odds is similar but significantly different to that of probability. This is best explained in the form of an example. If 200 individuals out of a population of 1000 experienced persistent poverty, the probability (p) of experiencing persistent poverty is $200/1000$, thus $p=0.2$. The probability of not experiencing persistent poverty is therefore $1-p = 0.8$. The odds of experiencing persistent poverty are calculated as the quotient of these two mutually exclusive events. So, the odds in favour of experiencing persistent poverty to not experiencing persistent poverty, is therefore $0.2/0.8=0.25$. Suppose that 150 out of 300 people living in social rented housing experience persistent poverty compared to 50 out of 150 who live in owner occupied housing. The odds of a person living in social rented housing of experiencing persistent poverty are $0.5/0.5=1.0$. The odds of a person living in owner occupied housing of experiencing persistent poverty is $0.3333/0.6666=0.5$. The odds ratio of experiencing persistent poverty is the ratio of these odds, $1.0/0.5=2.0$. Thus the odds of experiencing persistent poverty are twice as high among people who live in social

rented housing (compared to people who live in owner occupied housing – the ‘reference category’).

1.3 Detailed results of multivariate modelling

The individual models show the effect of different blocks of variables, while the combined model shows all variables entered simultaneously.

1.3.1 Models of overweight and/or obesity

The results of these models are displayed in Tables 1.1 and 1.2. All modelling controlled for the child’s gender and their age in months at the sweep 6 interview, ethnic group, birthweight, and number of children in the family. In respect of these standard controls for child characteristics and family size, all models found a significant effect of:

- higher birthweight on an increased likelihood of overweight or obesity
- being in a family with four or more children on a reduced likelihood of being overweight or obese.

There were no statistically significant differences in overweight or obesity according to the child’s gender, age at sweep 6 interview or ethnic group (white/minority).

At first, models were constructed using selected blocks of variables:

- **Model using distal family and neighbourhood constraints**
Here, mother’s low educational level and poor physical health were significantly associated with both overweight and obesity. There was an additional effect of area deprivation on obesity, but not on overweight.

Other measures of social deprivation (household income, lone parenthood) and maternal smoking during pregnancy were not significantly associated with either obesity or overweight.

- **Model using both distal and proximal family and neighbourhood constraints**
This built on the previous model. Low maternal education and poor physical health were again associated with both overweight and obesity, while the effect of area deprivation became reduced to non-significance. It appeared that the effect of area deprivation in the previous model could be explained by a poor social and physical environment in which to bring up children (low “child friendliness”).

- **Model using parenting example, general patterns of parenting and infant nutrition**
Mother’s BMI classification as overweight or obese and low parental supervision were significantly associated with children’s overweight and obesity. There was an association between longer duration of breastfeeding and children’s obesity, and between later introduction of solids and children’s overweight.

- **Model using all parental factors**
Here, the following factors were significantly associated with both overweight and obesity:
 - Mother’s overweight or obesity
 - Frequency of sweet and crisp consumption as a toddler

Factors significant for one outcome, but reaching only borderline significance for the other were:

- Low parental supervision (obesity model)
- Eating main meal in a room without a dining area (overweight model)

In addition, skipping breakfast was associated with greater obesity (although not important for overweight).

Neither of the infant nutrition measures were associated with children's overweight or obesity once health-related behaviours measured in later sweeps were controlled for. Further exploration suggested that this reduction in the effect of the infant nutrition measures was due to the combined effect of the later health-related behaviour measures, rather than any one such measure.

- **Model controlling for all measures together**

In this combined model the following factors emerged as significantly associated with children's overweight and obesity:

- Mother's overweight or obesity
- Frequency of sweet and crisp consumption as a toddler
- Mother's poor physical health

Additional factors associated with children's overweight (including obesity) were:

- Eating main meal in a room without a dining area

Additional factors associated with children's obesity were:

- Low parental supervision
- Skipping breakfast
- Low child-friendliness of neighbourhood

Once parental factors were allowed for in this combined model, the effect of mother's lower education level (see **Model using both distal and proximal family and neighbourhood constraints** above) was reduced, and became non-significant. Further exploration suggested that this could be attributed to differences in infant feeding and toddler's snacking patterns. Mothers with lower education were less likely to breastfeed their baby for at least 4 months, were more likely to introduce solids to their baby's diet at an early age and were more likely to allow their toddler to snack on sweets and crisps than more highly educated mothers.

1.3.2 Models of children's physical activity and screen time

Results of these analyses are shown in Tables 1.3 and 1.4. All models controlled for the child's gender, ethnic group, the number of children in the family, the child's general health and the season of the year when age 6 interviews took place. For these standard controls in the physical activity models, there were no differences in physical activity according to the child's gender or physical health. However, children from ethnic minority groups were more than twice as likely as white children to have low physical activity. Children from larger families were more active than children with no brothers or sisters. Children were more likely to be active from April to October than in the darker months of the year.

For the standard controls in the screen use models, there were no differences in screen use related to ethnic group, family size or season. Screen use was higher in boys than girls, in all

models. Children with poorer health were more likely to have extended periods of screen time, although the effect of poor health was not significant in the final combined model.

Models with distal family and environmental constraints

There were no clear social inequalities in children's physical activity. Lower family income, low maternal educational level and mother's smoking in pregnancy (all indicative of greater social deprivation) were linked to higher screen use.

Models with proximal and distal family and environmental constraints

These models added neighbourhood factors and mothers' views on children's physical activity to the preceding model. Since many of the neighbourhood measures of safety and child-friendliness were interrelated, preliminary exploration was used to determine which to incorporate in the main model. As for the overweight and obesity models, neighbourhood "child friendliness" was selected.

In the model of physical activity, the following factors had significant associations with exercising for less than 60 minutes daily:

- no playpark in area
- no swimming pool in area
- a mother's view that less than 60 minutes' daily physical activity was sufficient

In the model of screen time, the following factors had significant associations with using screens for three hours or more on a weekday:

- low household income
- low maternal education
- mother smoking in pregnancy
- poor quality local green spaces

Models with parenting factors

These models did not include health-related behaviours (children's physical activity and sedentary behaviour) measured prior to age 6. The rationale for this was similar to that for children's BMI at age 4, not included in models of overweight and obesity at age 6 (see footnote in section 3.5 of the main report). We have already established that such behaviours "track" well (ie. children's active behaviour in early sweeps is associated with higher levels of physical activity at age 6, and screen time in early sweeps is associated with levels of screen time at age 6, see section 4.6.2 of the main report).

Children whose mothers shared many activities with them were more physically active and used screens less. Children also seemed to be influenced by parental example, being more physically active if their mothers were more active, and using screens for longer if their mothers also did so. Greater warmth in the parent-child relationship was associated with higher levels of child physical activity, while having a bedroom TV and fewer rules to guide behaviour was associated with greater children's screen use.

Table 1.1 Multivariate models of children's overweight (including obesity) at age 6, N=2992

Note: † p<0.1, * p<0.05, **p<0.01, ***p<0.001		Model of distal family and neighbourhood constraints		Model of distal and proximal family and neighbourhood constraints		Model of parental example, general parenting and infant nutrition		Model of all parental factors		Full model	
Measure (reference group)	Effect	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
Child's gender (girl)	Boy	0.94 (0.75 - 1.18)		0.94 (0.75 - 1.17)		0.92 (0.73 - 1.15)		0.91 (0.72 - 1.15)		0.91 (0.72 - 1.15)	
Child's age at interview	months	0.95 (0.78 - 1.16)		0.95 (0.78 - 1.16)		0.96 (0.79 - 1.17)		0.97 (0.80 - 1.18)		0.97 (0.80 - 1.19)	
Child's ethnic group (white)	Minority	1.05 (0.66 - 1.67)		1.03 (0.65 - 1.62)		1.02 (0.64 - 1.63)		1.04 (0.64 - 1.68)		1.02 (0.63 - 1.65)	
Child's birth weight	Increasing	1.47 (1.32 - 1.63)	***	1.47 (1.32 - 1.63)	***	1.38 (1.25 - 1.51)	***	1.40 (1.27 - 1.54)	***	1.41 (1.27 - 1.56)	***
Family size (1 child)	2 children	0.89 (0.69 - 1.16)		0.89 (0.68 - 1.15)		0.84 (0.64 - 1.11)		0.87 (0.66 - 1.15)		0.88 (0.68 - 1.15)	
	3 children	0.83 (0.61 - 1.14)		0.83 (0.61 - 1.13)		0.80 (0.59 - 1.10)		0.81 (0.59 - 1.11)		0.82 (0.60 - 1.12)	
	4 or more children	0.44 (0.25 - 0.75)	**	0.43 (0.25 - 0.74)	**	0.42 (0.24 - 0.74)	**	0.40 (0.23 - 0.69)	***	0.40 (0.23 - 0.69)	***
Mother's education (above HNC/HND)	Below HNC/HND	1.26 (1.03 - 1.54)	*	1.26 (1.03 - 1.53)	*					1.11 (0.89 - 1.39)	
Household income (top 60%)	Bottom 40%	1.06 (0.84 - 1.35)		1.05 (0.82 - 1.34)						0.92 (0.71 - 1.18)	
Lone parent (no)	Yes	1.07 (0.85 - 1.34)		1.04 (0.83 - 1.30)						0.98 (0.77 - 1.25)	
Area deprivation (3 least deprived quintiles)	Two most deprived quintiles	1.16 (0.94 - 1.43)		1.13 (0.92 - 1.38)						1.01 (0.82 - 1.24)	
Mother's physical health (good)	midling	1.19 (0.92 - 1.55)		1.20 (0.92 - 1.56)						1.18 (0.90 - 1.55)	
	poor	1.42 (1.15 - 1.75)	**	1.41 (1.14 - 1.74)	**					1.31 (1.05 - 1.64)	*
Mother smoked in pregnancy (no)	Yes	1.18 (0.92 - 1.51)		1.17 (0.91 - 1.49)						1.12 (0.88 - 1.43)	
Mother's food preparation affected by costs (no)	Yes			1.35 (0.79 - 2.30)						1.35 (0.80 - 2.26)	
Child friendly neighbourhood	Decreasing			1.10 (0.93 - 1.28)						1.06 (0.90 - 1.25)	
Mother's BMI (underweight/healthy)	Overweight					1.44 (1.13 - 1.83)	**	1.40 (1.10 - 1.78)	**	1.40 (1.10 - 1.77)	**
	Obese					2.18 (1.68 - 2.84)	***	1.99 (1.53 - 2.60)	***	1.95 (1.50 - 2.54)	***
Parental supervision (high/medium)	Low					1.37 (1.06 - 1.77)	*	1.29 (1.00 - 1.67)	†	1.28 (0.98 - 1.66)	
Breastfeeding (none)	<4 months					0.93 (0.77 - 1.12)		1.06 (0.87 - 1.29)		1.09 (0.89 - 1.33)	
	4 months or longer					0.91 (0.73 - 1.12)		1.11 (0.89 - 1.39)		1.16 (0.91 - 1.49)	
Introduction of solids (<4 months)	4 months or later					0.74 (0.58 - 0.95)	*	0.79 (0.61 - 1.02)		0.79 (0.61 - 1.04)	†
Sweets and/or crisps at sweep 2 (both more than once a week)	either sweets or crisps once a week or less							0.85 (0.65 - 1.11)		0.86 (0.66 - 1.11)	
	both once a week or less							0.59 (0.39 - 0.91)	*	0.59 (0.39 - 0.91)	*
Skips breakfast sweep 5 (no)	Yes							1.28 (0.82 - 2.01)		1.24 (0.79 - 1.95)	
TV in bedroom sweep 5 (no)	Yes							1.22 (0.97 - 1.53)	†	1.17 (0.94 - 1.47)	
Main meal in room with dining area (yes sweeps 2 and 5)	No for one sweep							1.02 (0.79 - 1.34)		0.99 (0.75 - 1.30)	
	No for both sweeps							1.41 (1.08 - 1.84)	*	1.35 (1.01 - 1.82)	*

Table 1.2 Multivariate models of children's obesity at age 6, N=2992

Note: † p<0.1, * p<0.05, **p<0.01, ***p<0.001		Model of distal family and neighbourhood constraints		Model of distal and proximal family and neighbourhood constraints		Model of parental example, general patterns of parenting and infant nutrition		Model of all parenting		Full model	
Measure (reference group)	Effect	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
Child's gender (girl)	Boy	1.25 (0.92 - 1.71)		1.25 (0.92 - 1.70)		1.21 (0.89 - 1.65)		1.20 (0.87 - 1.65)		1.21 (0.88 - 1.66)	
Child's age at interview	months	0.98 (0.74 - 1.29)		0.99 (0.75 - 1.31)		1.00 (0.76 - 1.31)		1.03 (0.78 - 1.35)		1.02 (0.77 - 1.35)	
Child's ethnic group (white)	Minority	1.47 (0.82 - 2.61)		1.39 (0.80 - 2.42)		1.36 (0.81 - 2.30)		1.34 (0.76 - 2.36)		1.27 (0.72 - 2.25)	
Child's birth weight	Increasing	1.30 (1.11 - 1.53)	**	1.30 (1.11 - 1.53)	**	1.19 (1.02 - 1.38)	*	1.20 (1.03 - 1.40)	*	1.24 (1.05 - 1.45)	*
Family size (1 child)	2 children	0.87 (0.62 - 1.22)		0.85 (0.61 - 1.20)		0.79 (0.56 - 1.11)		0.80 (0.57 - 1.14)		0.84 (0.58 - 1.21)	
	3 children	0.87 (0.55 - 1.39)		0.85 (0.54 - 1.35)		0.83 (0.54 - 1.27)		0.80 (0.51 - 1.24)		0.82 (0.51 - 1.31)	
	4 or more children	0.38 (0.19 - 0.75)	**	0.37 (0.18 - 0.73)	**	0.37 (0.18 - 0.75)	**	0.32 (0.16 - 0.67)	**	0.32 (0.15 - 0.67)	**
Mother's education (above HNC/HND)	Below HNC/HND)	1.42 (1.07 - 1.90)	*	1.41 (1.06 - 1.87)	*					1.17 (0.86 - 1.61)	
Household income (top 60%)	Bottom 40%	1.10 (0.83 - 1.47)		1.05 (0.78 - 1.41)						0.93 (0.69 - 1.26)	
Lone parent (no)	Yes	1.16 (0.83 - 1.63)		1.07 (0.76 - 1.50)						1.06 (0.75 - 1.50)	
Area deprivation (3 least deprived quintiles)	Two most deprived quintiles	1.29 (1.02 - 1.65)	*	1.18 (0.92 - 1.52)						1.04 (0.79 - 1.35)	
Mother's physical health (good)	middling	1.32 (0.92 - 1.87)		1.35 (0.95 - 1.92)						1.37 (0.95 - 1.98)	†
	poor	1.60 (1.14 - 2.27)	**	1.58 (1.12 - 2.22)	**					1.48 (1.06 - 2.08)	*
Mother smoked in pregnancy (no)	Yes	1.29 (0.90 - 1.85)		1.26 (0.89 - 1.78)						1.18 (0.84 - 1.65)	
Mother's food preparation affected by costs (no)	Yes			1.93 (0.98 - 3.80)	†					1.93 (0.99 - 3.76)	†
Child friendly neighbourhood	Decreasing			1.31 (1.09 - 1.58)	**					1.26 (1.05 - 1.52)	*
Mother's BMI (underweight/healthy)	Overweight					2.03 (1.38 - 2.97)	***	1.98 (1.36 - 2.90)	***	2.02 (1.38 - 2.96)	***
	Obese					3.06 (1.94 - 4.83)	***	2.75 (1.74 - 4.35)	***	2.65 (1.67 - 4.20)	***
Parental supervision (high/medium)	Low					1.90 (1.35 - 2.68)	***	1.80 (1.27 - 2.54)	***	1.73 (1.21 - 2.46)	**
Breastfeeding (none)	<4 months					0.79 (0.60 - 1.06)		0.90 (0.66 - 1.23)		0.97 (0.70 - 1.34)	
	4 months or longer					0.63 (0.46 - 0.87)	**	0.79 (0.55 - 1.12)		0.88 (0.59 - 1.31)	
Introduction of solids (<4 months)	4 months or later					0.80 (0.56 - 1.15)		0.85 (0.59 - 1.21)		0.88 (0.61 - 1.27)	
Sweets and/or crisps at sweep 2 (both more than once a week)	either sweets or crisps once a week or less							0.56 (0.39 - 0.79)	***	0.56 (0.40 - 0.80)	**
	both once a week or less							0.37 (0.19 - 0.74)	**	0.37 (0.19 - 0.75)	**
Skips breakfast sweep 5 (no)	Yes							1.84 (1.13 - 3.01)	*	1.77 (1.12 - 2.80)	*
TV in bedroom sweep 5 (no)	Yes							1.01 (0.73 - 1.41)		0.91 (0.65 - 1.27)	
Main meal in room with dining area (yes sweeps 2 and 5)	No for one sweep							0.86 (0.53 - 1.38)		0.77 (0.48 - 1.23)	
	No for both sweeps							1.50 (0.99 - 2.29)	†	1.31 (0.82 - 2.07)	

Table 1.3 Multivariate models of children's failure to meet daily 60 minute physical activity target at age 6, N=2992

Note: † p<0.1, * p<0.05, **p<0.01, ***p<0.001		Model of distal family and environmental constraints		Model of distal and proximal family and environmental constraints		Model of all parental factors		Full model	
Measure (reference group)	Effect	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
Child's gender (male)	female	1.05 (0.82 - 1.34)		1.02 (0.79 - 1.30)		1.10 (0.86 - 1.41)		1.07 (0.84 - 1.36)	
Child's ethnic group (white)	minority	2.56 (1.57 - 4.19)	***	2.49 (1.59 - 3.90)	***	2.41 (1.48 - 3.91)	***	2.27 (1.43 - 3.60)	***
Family size (1 child)	2 children	0.62 (0.46 - 0.85)	**	0.61 (0.46 - 0.83)	**	0.64 (0.46 - 0.89)	**	0.61 (0.44 - 0.85)	**
	3 children	0.66 (0.46 - 0.95)	*	0.65 (0.45 - 0.94)	*	0.67 (0.45 - 1.00)		0.65 (0.43 - 0.97)	*
	4 or more children	0.56 (0.32 - 0.98)	*	0.54 (0.30 - 0.96)	*	0.57 (0.30 - 1.09)		0.51 (0.27 - 0.99)	*
Child's health (excellent)	very good	1.26 (0.89 - 1.78)		1.30 (0.90 - 1.86)		1.30 (0.91 - 1.87)		1.26 (0.87 - 1.84)	
	good	1.07 (0.75 - 1.51)		1.06 (0.74 - 1.52)		1.08 (0.76 - 1.52)		0.99 (0.69 - 1.43)	
	fair	1.38 (0.92 - 2.07)		1.36 (0.89 - 2.07)		1.45 (1.01 - 2.09)		1.31 (0.86 - 2.01)	
	poor	1.29 (0.70 - 2.39)		1.14 (0.59 - 2.18)		1.22 (0.64 - 2.35)		0.99 (0.51 - 1.92)	
Season (first quarter of year)	second quarter	0.24 (0.16 - 0.36)	***	0.26 (0.17 - 0.38)	***	0.25 (0.17 - 0.36)	***	0.26 (0.18 - 0.38)	***
	third quarter	0.37 (0.26 - 0.51)	***	0.41 (0.30 - 0.57)	***	0.38 (0.28 - 0.53)	***	0.43 (0.31 - 0.59)	***
	fourth quarter	1.01 (0.79 - 1.29)		1.02 (0.80 - 1.30)		1.05 (0.82 - 1.34)		1.05 (0.83 - 1.34)	
Urban-rural classification (urban/small town)	rural	1.16 (0.86 - 1.58)		1.12 (0.82 - 1.52)				1.13 (0.82 - 1.55)	
Mother's education (above HNC/HND)	Below HNC/HND	1.14 (0.90 - 1.45)		1.11 (0.86 - 1.43)				1.06 (0.80 - 1.39)	
Area deprivation (3 least deprived quintiles)	Two most deprived quintiles	0.93 (0.71 - 1.22)		0.86 (0.65 - 1.14)				0.90 (0.69 - 1.18)	
Household income (top 60%)	Bottom 40%	1.28 (0.99 - 1.65)	†	1.23 (0.95 - 1.58)				1.21 (0.94 - 1.55)	
Lone parent (no)	Yes	0.82 (0.60 - 1.12)		0.79 (0.57 - 1.09)				0.82 (0.59 - 1.14)	
Mother's physical health (good)	midling	1.27 (0.93 - 1.75)		1.27 (0.92 - 1.74)				1.26 (0.91 - 1.74)	
	poor	1.13 (0.81 - 1.57)		1.10 (0.78 - 1.55)				1.10 (0.77 - 1.56)	
Mother's mental health (good)	midling	1.11 (0.84 - 1.48)		1.10 (0.83 - 1.46)				1.08 (0.80 - 1.45)	
	poor	1.27 (0.95 - 1.69)	†	1.24 (0.93 - 1.66)				1.20 (0.89 - 1.63)	
Mother smoked in pregnancy (no)	Yes	0.92 (0.66 - 1.29)		0.91 (0.65 - 1.26)				0.91 (0.65 - 1.29)	
Access to garden (yes)	No			0.84 (0.57 - 1.25)				0.82 (0.54 - 1.25)	
Play park in area (yes)	No			1.69 (1.06 - 2.69)	*			1.61 (0.98 - 2.64)	
Pool in area age 6 (yes)	No			1.35 (1.04 - 1.75)	*			1.33 (1.02 - 1.75)	*
Rating of local green spaces to walk/sit age 6	Less favourable			1.03 (0.95 - 1.11)				1.02 (0.94 - 1.10)	
Child friendliness of neighbourhood sweep 3	Decreasing			1.10 (0.89 - 1.35)				1.09 (0.89 - 1.33)	
Mother's views on child PA time (60 mins daily)	Less than 60 mins daily			2.11 (1.56 - 2.84)	***			2.01 (1.50 - 2.69)	***
Mother's physical activity sweep 5	Increasing					0.89 (0.85 - 0.94)	***	0.90 (0.86 - 0.94)	***
Mother's screen time sweep 5	Increasing					1.02 (0.97 - 1.07)		1.02 (0.97 - 1.06)	
TV in child's bedroom age 4 (no)	Yes					0.99 (0.76 - 1.29)		0.97 (0.73 - 1.29)	
Parenting - conflict	Increasing					1.00 (0.92 - 1.08)		1.00 (0.92 - 1.09)	
Parenting - warmth	Increasing					0.80 (0.68 - 0.95)	*	0.83 (0.70 - 0.98)	*
Parenting - number of rules	Increasing					1.03 (0.93 - 1.14)		1.04 (0.93 - 1.15)	
Parenting - activities with child	Increasing					0.89 (0.79 - 1.00)	*	0.91 (0.81 - 1.02)	
Parenting - home chaos	Increasing					0.96 (0.88 - 1.05)		0.96 (0.87 - 1.06)	

Table 1.4 Multivariate models of children's weekday screen use for 3 hours or more at age 6, N=2992

<i>Note: † p<0.1, * p<0.05, **p<0.01, ***p<0.001</i>		Model of distal family and environmental constraints		Model of distal and proximal family and environmental constraints		Model of all parental factors		Full model	
Measure (reference group)	Effect	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
Child's gender (male)	female	0.71 (0.58 - 0.87)	***	0.70 (0.58 - 0.86)	***	0.75 (0.61 - 0.92)	**	0.72 (0.59 - 0.89)	**
Child's ethnic group (white)	minority	1.31 (0.76 - 2.24)		1.34 (0.78 - 2.32)		1.40 (0.82 - 2.40)		1.44 (0.82 - 2.51)	
Family size (1 child)	2 children	0.95 (0.74 - 1.21)		0.93 (0.73 - 1.20)		0.83 (0.64 - 1.08)		0.93 (0.71 - 1.23)	
	3 children	0.92 (0.66 - 1.28)		0.91 (0.65 - 1.26)		0.83 (0.58 - 1.17)		0.91 (0.64 - 1.29)	
	4 or more children	0.94 (0.61 - 1.45)		0.92 (0.59 - 1.43)		0.89 (0.57 - 1.38)		0.92 (0.58 - 1.46)	
Child's health (excellent)	very good	1.33 (0.99 - 1.79)	†	1.29 (0.96 - 1.74)		1.33 (0.97 - 1.81)		1.25 (0.91 - 1.72)	
	good	1.27 (0.92 - 1.75)		1.24 (0.90 - 1.70)		1.31 (0.95 - 1.81)		1.16 (0.84 - 1.60)	
	fair	1.70 (1.11 - 2.60)	*	1.61 (1.05 - 2.48)	*	1.79 (1.18 - 2.72)	**	1.47 (0.95 - 2.27)	
	poor	1.79 (1.02 - 3.15)	*	1.68 (0.93 - 3.02)		1.88 (1.06 - 3.33)	*	1.48 (0.81 - 2.71)	
Season (first quarter of year)	second quarter	0.90 (0.70 - 1.17)		0.90 (0.69 - 1.17)		0.92 (0.70 - 1.19)		0.94 (0.71 - 1.24)	
	third quarter	1.22 (0.95 - 1.57)		1.21 (0.93 - 1.57)		1.28 (1.00 - 1.65)	†	1.26 (0.96 - 1.66)	
	fourth quarter	1.25 (0.94 - 1.65)		1.23 (0.93 - 1.63)		1.23 (0.92 - 1.64)		1.22 (0.91 - 1.63)	
Urban-rural classification (urban/small town)	rural	0.85 (0.64 - 1.13)		0.92 (0.69 - 1.23)				0.99 (0.74 - 1.33)	
Mother's education (above HNC/HND)	Below HNC/HND	1.78 (1.36 - 2.33)	***	1.74 (1.32 - 2.28)	***			1.50 (1.14 - 1.98)	**
Area deprivation (3 least deprived quintiles)	Two most deprived quintiles	1.26 (0.99 - 1.62)	†	1.15 (0.89 - 1.48)				1.05 (0.81 - 1.36)	
Household income (top 60%)	Bottom 40%	1.45 (1.13 - 1.85)	**	1.40 (1.09 - 1.80)	**			1.20 (0.93 - 1.54)	
Lone parent (no)	Yes	1.16 (0.90 - 1.49)		1.12 (0.87 - 1.44)				1.05 (0.80 - 1.37)	
Mother's physical health (good)	middling	0.85 (0.66 - 1.10)		0.86 (0.67 - 1.10)				0.83 (0.64 - 1.08)	
	poor	0.99 (0.76 - 1.28)		0.98 (0.75 - 1.27)				0.92 (0.70 - 1.22)	
Mother's mental health (good)	middling	0.96 (0.74 - 1.24)		0.95 (0.73 - 1.23)				0.90 (0.69 - 1.18)	
	poor	1.04 (0.82 - 1.33)		1.03 (0.80 - 1.32)				0.95 (0.73 - 1.24)	
Mother smoked in pregnancy (no)	Yes	1.61 (1.23 - 2.11)	***	1.59 (1.21 - 2.10)	***			1.44 (1.09 - 1.92)	*
Access to garden (yes)	No			0.86 (0.59 - 1.26)				0.86 (0.58 - 1.25)	
Play park in area (yes)	No			0.91 (0.58 - 1.42)				0.81 (0.52 - 1.28)	
Pool in area age 6 (yes)	No			1.03 (0.82 - 1.31)				1.00 (0.78 - 1.28)	
Rating of local green spaces to walk/sit age 6	Less favourable			1.10 (1.04 - 1.17)	***			1.08 (1.02 - 1.14)	*
Child friendliness of neighbourhood sweep 3	Decreasing			1.06 (0.92 - 1.22)				1.10 (0.95 - 1.27)	
Mother's views on child PA time (60 mins daily)	Less than 60 mins daily			0.94 (0.78 - 1.13)				0.90 (0.74 - 1.10)	
Mother's physical activity sweep 5	Increasing					1.01 (0.97 - 1.06)		1.00 (0.96 - 1.04)	
Mother's screen time sweep 5	Increasing					1.14 (1.10 - 1.18)	***	1.12 (1.08 - 1.16)	***
TV in child's bedroom age 4 (no)	Yes					1.77 (1.42 - 2.20)	***	1.32 (1.05 - 1.67)	*
Parenting - conflict	Increasing					1.05 (0.97 - 1.14)		1.06 (0.98 - 1.15)	
Parenting - warmth	Increasing					0.93 (0.81 - 1.07)		0.97 (0.85 - 1.12)	
Parenting - number of rules	Increasing					0.80 (0.71 - 0.89)	***	0.80 (0.72 - 0.90)	***
Parenting - activities with child	Increasing					0.88 (0.82 - 0.96)	**	0.92 (0.84 - 1.00)	*
Parenting - home chaos	Increasing					1.01 (0.94 - 1.10)		0.99 (0.91 - 1.07)	