Intergenerational transmission of worklessness

Technical annex - Evidence from the Millennium Cohort (MCS)

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Evidence from the Millennium Cohort (MCS)

This Technical Report first describes the data source, the Millennium Cohort Study (MCS), and outlines the level of attrition and missing data (which is part of all longitudinal surveys). We then define and report on the prevalence of temporary and repeated or persistent parental worklessness in England, and draw attention to differences in parental worklessness across the UK and its regions. From here we explore the characteristics of families experiencing long-term worklessness and assess to what extent the experience of repeated worklessness can be predicted by additional associated risk factors (i.e. family demographics, parental health, and regional deprivation). We furthermore explore potential protective factors that are available to children and families experiencing repeated worklessness. The remainder of the report examines the relationship between parental worklessness, associated risks and protective factors on a range of children's outcomes comprising academic attainment, cognitive ability, behavioural adjustment, as well as indicators of wellbeing of the child.

M1   Millennium Cohort (MCS)

The Millennium Cohort Study (MCS) is an ongoing survey of 18,818 babies born between September 2000 and January 2002 into 18,551 families living in the UK. It is the most recent of Britain's national longitudinal birth cohort studies. The study has been tracking the Millennium children through their early childhood years and plans to follow them into adulthood (Dex & Joshi, 2005; Hansen, Joshi, & Dex, 2010). Data collections took place at ages 9 months, 3, 5, and 7 years. Data are currently collected for 11 years olds and a future wave is planned to take place at age 14, in 2014.

The sample population for the study was drawn from all live births in the UK over 12 months from 1st September 2000 to 31st August 2001 in England & Wales and from 24th November 2000 to 10th January 2002 in Scotland & Northern Ireland. The sample was selected from a random sample of electoral wards, disproportionately stratified to ensure adequate representation of all four UK countries, deprived areas and areas with high concentrations of Black and Asian families. The sample design of the MCS differs from that of its predecessors (NCDS & BCS70) in that it took a whole year's births, and covers the whole of the United Kingdom for the first time. Survey weights are used to correct for the complex survey design and its clustering into electoral wards, which in turn are characterised by their level of disadvantage at the outset (Plewis, Calderwood, Hawkes, Hughes, & Joshi, 2004; Shepherd, Smith, Joshi, & Dex, 2004). Unless otherwise stated we report weighted data.

Data has been collected from parents, children, teachers and health visitors, using personal interview and self-completion questionnaires. It covers information on

socio-demographic family characteristics, children's cognitive, social, emotional and behavioural development, gender roles, health and well-being. The MCS also provides information on the quality of the relationship between parents and between parents and children, as well as information on parenting styles and housing. Here we focus on children born in England, to make the study more comparative to the LSYPE. Table M1.1. gives an overview of the timings of the survey and ages of the children. The response frequencies for all families and the English sub-sample are unweighted.

Table M1.1. Survey details of the Millennium Cohort

Wave of data collection	Year	Age of child	Families interviewed	English subsample (n)
1	2000/2	9 months	18,551	11,533
2	2003/4	3 years	15,590	10,086
3	2005/6	5 years	15,246	9,759
4	2007/8	7 years	13,857	8,887
Longitudinal Sample (wave 1- 4)			11,647	7,378

The number of families responding at each of the four surveys understates the number of children in the survey, since some families had twins and triplets. In our analysis we include only one child per family (in families with twins and triplets we used information on the first born only).

The longitudinal sample, including all families in England responding at waves 1-4, comprises 7,378 families. For all of these families we have information on employment status at the four waves of data collection. The analytic sample is largely representative of the original sample, although there are greater attrition rates for those experiencing greater socio-economic disadvantage (lower education, living in a flat (Ketende, 2008). Despite sample weights being applied to account for differential selection probabilities and non response bias, response bias at the individual level tends to underestimate the magnitude of effects of social disadvantage, because attrition is greatest among cohort members in more deprived circumstances.

Linking the data longitudinally and taking into account additional variables (such as interlinked risk factors and potential protective factors discussed in more detail in section M3.3 and M3.4) brings with it further sample loss, especially when considering data collected during wave 2. Table M1.2 gives the degree of item non-response for each of the interlinked risks discussed in section M4 and M5 of the report. The largest proportion of missingness is observed for data on income poverty (abut 8%) and long term limiting illness (about 4%).

Table M1.2: Item missing data for risks associated with parental worklessness in England

	Count	%
Associated Risks		
Mean age mother at CM birth (S1)	0	0
Language spoken at home (S1)	0	0
Housing tenure (S1)	13	0.2
Highest qualification (hhold) (S1)	8	0.1
Gained higher qual (hhold) (S1-S4)	8	0.1
Poverty (OECD median) (S1)	578	7.8
Marital status (S1)	2	0.03
Number of marital transitions (S1-S4)	47	0.6
LS limiting illness (S1-S4)	286	3.9
Mother's malaise score (S1)	0	0
Number of children in hhld (S4)	0	0
IMD deprivation (S1)		
n(unweighted)	7,378	100%

Table M1.3 gives the item missingness for the protective factors considered (see also section M6). The largest proportion of missing data is observed for indicators of school characteristics (in particular the mean KS1 point scores over three years: 33%), and parental reports on the quality of the parent-child relationship (Pianta, 1992) at age 3 (19%). Some caution in interpreting the findings is therefore necessary, especially findings including these variables.

Table M1.3: Item missing data for child protective factors for families in England with longitudinal workless information

	Count	%
Child Characteristics		
Birthweight (S1)	19	0.3
Child's gender (S1)	0	0
Child's age at interview (S4)	5	0.07
Child's ethnicity (S1)	23	0.3
Child's General Health (S3)	24	0.3
Child has LS limiting Illness (S4)	30	0.4
Child school experiences		
Whether like school (S4)	513	7.0
Does best at school (S4)	511	6.9
Has a lot of friends (S4)	432	5.9
Likes playing with friends (S4)	419	5.7
Parenting/Family cohesion		
Pianta (Parent-child relationship) (S2)	1,373	18.6
Read to child (S2)	0	0
Take to library (S3)	23	0.3
Number of activities family does together (S3)	34	0.5
Whether disorganised at home (S4)	41	0.6
CM has a regular term-time bedtime (S3)	22	0.3
School engagement / education aspirations		
Parents satisfied with the school? (S3)	114	1.5
Attend parents evening (S4)	41	0.6
Post16/university aspirations (S4)	284	3.8
School characteristics		
% SEN	1,467	19.9
% eligible for free school meals	1,467	19.9
Mean KS1 points score over 3 years	2,421	32.8
n(unweighted)	7,378	100%

Table M1.4 shows the item missingness for the child outcome variables. The largest proportion of missing data among the outcome variables is observed for teacher ratings of the child's behaviour (36%), and the Key Stage 1 results (19%) in reading, writing, maths and science, as well as parental reports on the quality of the parent-child relationship at age 3 (19%). Some caution in interpreting the findings is therefore necessary, especially findings including these variables.

Table M1.4: Item missing data for child outcomes for families in England with longitudinal workless information

	Count	%
Key Stage 1 results		
Key Stage 1 Reading (points score)	1,421	19.3
Key Stage 1 Writing (points score)	1,421	19.3
Key Stage 1 Maths (points score)	1,421	19.3
Key Stage 1 Science (points score)	1,426	19.3
BAS Cognitive Assessments		
BAS Word Reading score	14	0.2
BAS Pattern Construction score	37	0.5
Behaviour (Strengths & Difficulties)		
SDQ (parent rated)	200	2.7
SDQ (teacher rated)	2,652	35.9
Well-being measures		
How often feel unhappy at school?	530	7.2
How often are you bullied at school?	468	6.3
How often are you horrible to others at school?	469	6.4
N (unweighted)	7,378	100%

M2   Prevalence of Parental Worklessness in England

A workless family was defined as a family where no parent living in the household was in work at the time the family was interviewed. We look at worklessness in 2-parent families (both parents are not in work) and single parent families (parent not in work). Information on parental worklessness was collected at each of the four waves of data collection between 2000 and 2008.
Using the data longitudinally allows us to identify families who were:
  * never workless at any of the four assessment points (*continuously working*)
  * those who moved in and out of worklessness (*temporary worklessness*)
  * and those who were workless at all four assessment points (*persistent worklessness*).

Figure M2.1 shows the prevalence of persistent worklessness for the longitudinal sample of 7,378 families in England who participated in each of the four surveys with complete information on their employment and family status across all four waves. In the longitudinal sample we find about 13-15% of workless families at each of the observation points, comprising about 5% two-parent families and 8-10% single parents.

Figure M2.1. Parental worklessness at each wave in England in MCS (ages 9 months to 7 years, 2001/2 to 2007/8)
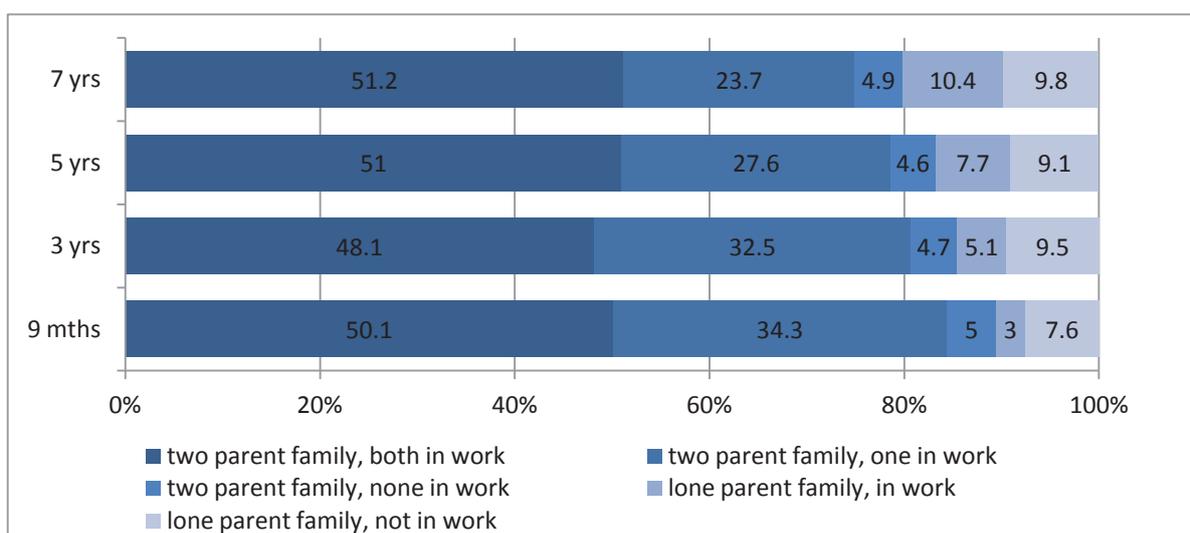
Longitudinal sample (n=7,378)
Note: this pattern reflects the pattern of worklessness in the UK as a whole using weighted data

Linking the data waves longitudinally is associated with some sample loss, especially between wave 1 and 2. Figure M2.2. gives a more detailed picture of missingness among workless families across the 4 waves of data collection. For example, in the original [unweighted] sample the percentage of workless families at wave 1 is 21.2%. When the data is weighted to adjust for oversampling in relative disadvantaged and ethnic minority wards, the percentage of workless families is reduced to 17.2% at

wave 1. When the data is linked longitudinally and thus restricted to families who have participated at all four sweeps, the percentage of workless families at wave 1 is reduced further to 12.6% when the weights are applied (Figure M2.1: two parent and lone parent families combined, wave 1 at age 9 months).

 We saw in table M1.1 that the greatest drop-out of all families participating in MCS occurred between wave 1 and 2, but this sample loss was not random. Workless families at wave 1 [as other disadvantaged families such as single parent families and those in income poverty] were far less likely to participate in later waves than working, and other advantaged, families at wave 1. Figure M2.2 shows that the percentage of workless families who dropped out between MCS1 to MCS2 was 29.4%, much higher than the 16.9% observed for families that were in work at wave 1 (not shown in Figure M2.2). Given this caveat the longitudinal sample is however largely representative of the sample population.

 Looking further at the patterns of participation among the workless families originally in MCS1, Figure M2.2 also shows both working status and drop-out at each subsequent wave of data collection. Among the 21.2% of families who were workless at MCS1, 23.2% were in work at MCS2, 47.4% were again workless and 29.4% had dropped out at MCS2. Within this sample of families who were workless at MCS1, the percentage of families dropping out at each later wave was similar regardless of their workless status. (The percentages included in the boxes in bold show the percentage of workless families at MCS1 who were either in work or workless at later waves, with the missing families now excluded from the calculation.)

 Figure M2.2 also shows the extent of repeated worklessness among the workless families at wave 1. More than two thirds of those workless at wave 1 (67.1%), remained workless at wave 2. Of those who were workless at wave 1 and wave 2, 78.3% remained workless at wave 3, and among those who were workless at waves 1-3, 77.1% remained workless at wave 4.

Figure M2.2 Attrition of workless families in MCS in England: unweighted frequencies and percentages

In work

Not in

missing

239
(66.6%) (82.7%)

359
(63.2%) (76.5%)

50
(13.9%) (17.3%)

70
(19.5%)

568
(23.2%) (32.9%)

32
(29.1%) (34.8%)

110
(19.4%) (23.5%)

60
(54.5%) (65.2%)

99
(17.4%)

18
(16.4%)

2443
(21.2%)

NB: weighting the data reduces the % who are workless to 17.2%

120
(57.7%) (71.9%)

208
(18.0%) (21.7%)

47
(22.6%) (28.1%)

41
(19.7%)

1,157
(47.4%) (67.1%)

139
(18.6%) (22.9%)

749
(64.7%) (78.3%)

467
(62.3%) (77.1%)

200
(17.3%)

143
(19.1%)

MCS1

718
(29.4%)

MCS2

Figures in bold indicate % of families in previous wave who were in work or workless at subsequent wave (missing excluded)

MCS3

MCS4

2000/2   2003/4   2005/6   2007/8

Table M2.3 gives a more detailed analysis of patterns of temporary worklessness for the 19.8% who moved in and out of worklessness over the 4 observations points. Most of the temporary workless families either experienced worklessness after initial employment, or during the first waves and then moved into employment. Fewer families moved in and out of worklessness at alternate waves.

Table M2.3: Pattern of parental worklessness for the temporary workless (2001/2-2007/8)

	Household work status				Per cent (weighted)	N (unweighted)
	2001/2	2003	2005	2007/8		
Workless 1 wave	Working	Working	Working	**Workless**	10.3%	*141*
	Working	**Workless**	Working	Working	4.4%%	*61*
	Working	Working	**Workless**	Working	3.2%	*47*
	Workless	Working	Working	Working	10.8%	*150*
Workless 2 waves	Working	Working	**Workless**	**Workless**	8.9%	*122*
	Working	**Workless**	Working	**Workless**	2.7%	*33*
	Working	**Workless**	**Workless**	Working	3.3%	*48*
	Workless	Working	Working	**Workless**	4.3%	*61*
	Workless	Working	**Workless**	Working	1.9%	*26*
	Workless	**Workless**	Working	Working	6.2%	*86*
Workless 3 waves	Working	**Workless**	**Workless**	**Workless**	15.5%	*239*
	Workless	Working	**Workless**	**Workless**	9.3%	*134*
	Workless	**Workless**	Working	**Workless**	7.8%	*107*
	Workless	**Workless**	**Workless**	Working	11.3%	*171*
Total					100%	*1426*

Regional variations in parental worklessness

Although this report is concentrating on the experience of worklessness in England only, we return briefly to the longitudinal UK sample to show differences across the four countries, before turning to regional differences in England. Table M2.4 shows the proportion of workless families across the four UK countries, differentiating between families that were always in work at the four survey waves, those who were temporarily workless (moved in and out of work), and those who were persistently workless at each of the four survey waves. Compared to other countries, more families with young children in Wales had experienced worklessness, in particular persistent worklessness. Families with young children in Scotland were the least likely to be persistently workless.

Table M2.4: Parental worklessness across the UK

	UK	England	Wales	Scotland	Northern Ireland
Always working	72.8	73.5	68.5	73.2	73.7
In work 3 waves	9.0	8.7	9.8	10.1	8.6
In work 2 waves	5.7	5.4	7.0	5.9	5.7
In work 1 wave	5.7	5.7	6.3	6.0	4.1
Persistent workless	6.8	6.7	8.4	4.7	7.9
Total N	*11,647*	*7,378*	*1,730*	*1,379*	*1,160*

Note: weighted percentages and unweighted n

Regarding regional differences, Figure M2.2 suggest that persistent worklessness was especially prevalent in the North East, North West and in London, while families in the East of England, in the South East and South West are less afflicted, as were (to a certain extent) families living in the East Midlands. However, we will see later in the report (sections M5) region is not a significant predictor of worklessness once other measures (i.e. interlinked risk factors) are controlled for.

Figure M2.2: Parental worklessness by region in England in MCS
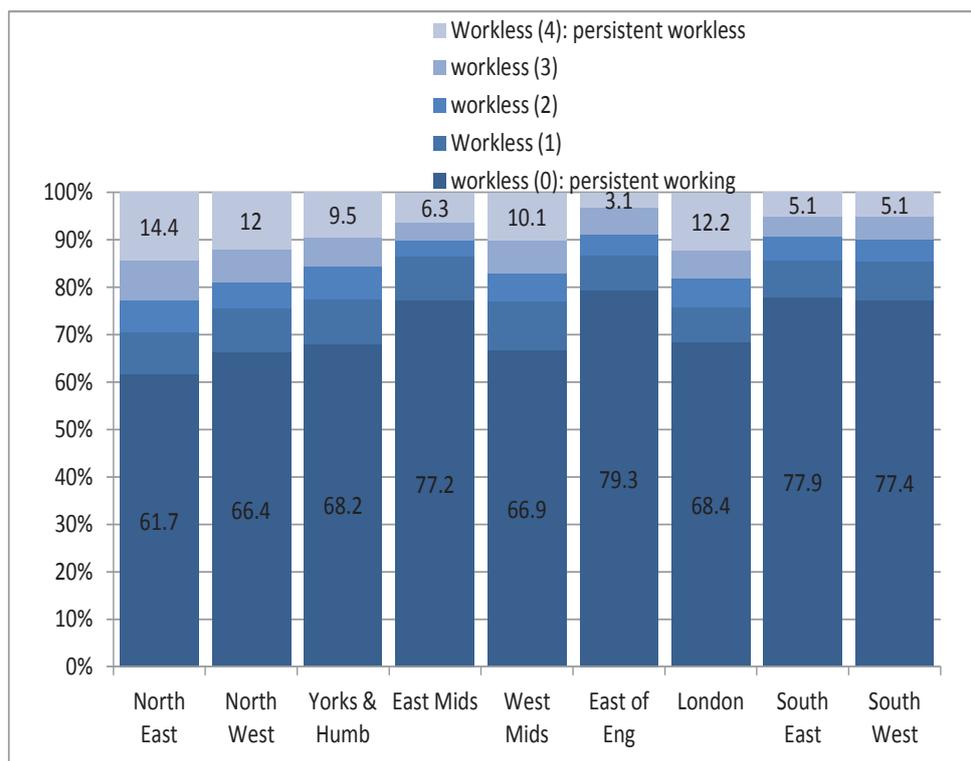
M3   Analytic strategy

The data has been analysed using descriptive statistics and regression models. The analytic strategy adopted in this study proceeded in four steps:

1. We assessed parental worklessness over subsequent measurement points and how it related to a number of other risk factors, such as family socio-demographics, family structure, housing conditions, parental health and area deprivation.
2. We assessed the direct (or bivariate) association between parental worklessness and various child outcomes. This was done to establish whether there was an association or not;
3. Next we controlled for the interlinked risks listed above (table M1.2) to take into account the role of potential confounding factors;
4. Lastly we controlled for potential protective factors to assess whether they could further reduce the association between parental worklessness and child outcomes, after taking into account the interlinked risk factors.

Proceeding in these four steps enabled us to:

a. Assess the extent of parental worklessness in families with dependent children and examine how parental worklessnesss relates to other risk factors
b. Assess the strength of the association between parental worklessness and the different child outcomes;
c. Assess whether this association was largely due to the interlinked risk factors (i.e. household demographics, family structure, income poverty, housing conditions, parental health and area deprivation);
d. Gain a better understanding of potential protective factors.

Based on the theory of risk and resilience outlined earlier, we furthermore explored the mechanisms through which parental worklessness affected children's outcomes. In particular we allowed for six different types of mechanisms or set of protective factors:

i. Cumulative risk processes (taking into account the multiple interlinked risks associated with worklessness);
ii. Child characteristics (child gender, age, biological factors, ethnicity);
iii. Warm and engaged parenting behaviour (parent-child interactions);
iv. Parental engagement and support for school related activities (parental aspirations for the child, parental contact with school, parents attend school events)';
v. The child's school experiences (school engagement and attitude to school)
vi. School characteristics (socio-economic characteristics of the school).

For those less familiar with these modelling techniques, Box M3.1 provides further details of how to interpret the findings.

Box M3.1: How to interpret multiple regression results

Multiple Linear regression

The estimated multiple correlation coefficient, R, shows the strength of the relationship between a set of predictor variables (i.e. worklessness and associated risks) and an outcome (i.e. scores on the cognitive assessments). R has a range of 0 to 1. The closer to 1, the stronger the relationship between the predictors and the outcome. R^2 takes this further, giving the actual percentage of variation in the outcome measure that has been explained by the set of predictor variables included in the model.

A standardised regression coefficient [β] is also calculated for each predictor. These give the strength of the relationship between any *one* predictor, i.e., worklessness and the outcome, while holding constant the effect of the other predictors (i.e. the other risk factors). The regression coefficients range between -1 to +1. Using single parenthood as an example, the further from zero that β is, the stronger the relationship between single parenthood and the outcome. A positive score (towards +1) tells us that single parenthood has a positive impact on the outcome, while a negative score (towards –1) indicates a negative impact. Standardised regression coefficients do not directly indicate the effect of a unit change in the outcome, they rather represent change in terms of standard deviations.The predictor with the biggest regression coefficient is the most important predictor of the outcome, regardless of the direction of the relationship.

Multiple Logistic regression

A series of multivariate logistic regression analyses were performed to assess whether the observed differences between groups (i.e. being persistently workless versus temporary worklessness) were statistically significant after taking other characteristics into consideration. The results are discussed in terms of the 'odds ratio' (OR), or the ratio of the odds of an event (e.g. being workless) occurring in one group (e.g. single parents) to the odds of it occurring in another (e.g. two-parent families). The OR for the reference group is set as 1, thus an OR greater than 1 indicates that a characteristic (e.g. single parenthood) has a positive association with worklessness and an OR less than 1 indicates the characteristic has a negative association with worklessness.

Interpreting Odds Ratios (OR): for those who are not familiar with the interpretation of logistic regression models, it is important to clarify the meaning of the odds ratios reported. Using the example of the relative chances of children in a persistent workless household being part of a single parent household (table M4.1), we can see that 58.3% of children in a persistent workless household were part of a single parent household compared with 2.9% children living in a persistently working household. Expressing this in terms of odds rather than probabilities or percentages we obtain odds of 58.3: 41.7 or 1.40:1 that children in a repeated workless household would be part of a single parent household and 2.9:97.1 or 0.03:1 that children living in a persistently working household would be part of a single parent household. The odds of children in a persistent workless household being in a single parent household are therefore nearly 47 times (1.40 / 0.03) that of children living in a persistently working household; however, this does not mean that children in a persistent workless household are 47 times as likely as children living in a persistently working household to be in a single parent household.

M4   Parental worklessness and interlinked risk factors

We first turned to exploring the characteristics of families in the MCS experiencing long-term worklessness, and whether there were differences between persistently workless families and those moving in and out of work between the four waves of data collection (S1-4). We explored a range of additional risk factors that have also been shown to influence child adjustment and attainment, including family characteristics, parental health and living conditions, to gain a better understanding of the additional risks associated with family worklessness.

Table M4.1 shows the bi-variate relationship between exposure to worklessness and the additional risk factors, differentiating between experiences of families who were always in work, those with temporary worklessness (moving in and out), and persistently workless families . There was a clear relationship between worklessness and a number of other risk factors. For example, the majority (91%) of persistent workless families lived in poverty (earning less than 60% of equivalised median income before housing costs) –compared to 12% of families working continuously; 75% of persistent workless families lived in rented social housing compared with 11% of families working continuously; 58% of persistent workless families were single-parent families compared with just 3% of persistently working families; and 41% of persistent workless families had no qualifications compared with 3% of persistently working families.

Two other findings are also worthy of comment. It is striking that being worklessness at only one of the four occasions was associated with a number of additional risk factors, i.e. younger maternal age, living in social housing, lower qualifications, poverty, single parenthood, and relationship breakup in comparison to those persistently employed. Just one period of time spent workless was associated with a different profile of the family when compared to families who were always in work.

It is also interesting to note that those families who experienced temporary worklessness (i.e. worklessness at 1-3 out of the 4 observation points) were more likely to have acquired further qualifications than those persistently working or persistently workless. We might speculate that they took some time out to gain qualifications, and to improve their employment prospects.

Table M4.1: Relationship between linked risks and parental worklessness

	0 Workless %	1 workless %	2 Workless %	3 Workless %	4 Workless %	All %	N (all)
No. times workless (S1-S4)	73.5	8.7	5.4	5.7	6.7	-	7378
<u>Associated Risks</u>							
Mean age mother at CM birth (S1)	30.1	25.9	24.8	25.2	25.4	28.8	7378
Other language spoken at home (S1)	9.7	15.9	13.9	14.4	17.9	11.3	7378
Housing tenure (S1)							
0wn/mortgage	79.2	32.8	17.2	12.5	4.7	63.0	7365
rent (social)	10.7	46.0	54.5	60.5	75.0	23.3	7365
rent (private)	6.0	12.6	18.5	14.5	13.4	8.2	7365
other	4.1	8.5	9.8	12.5	6.9	5.5	7365
Highest qualification (hhold) (S1) NVQ4+	53.9	23.2	12.2	9.6	5.2	43.2	7370
NVQ3	16.2	18.0	17.6	12.5	5.8	15.5	7370
NVQ2	23.0	32.4	31.5	35.7	25.2	25.2	7370
NVQ1/overseas	4.2	13.1	18.4	19.6	22.6	7.8	7370
No qualifications	2.7	13.4	20.3	22.6	41.1	8.3	7370
Gained higher qual (hhold) (S1-S4)	15.7	25.3	28.4	23.0	16.3	17.7	7370
Poverty (OECD median) (S1) below 60%	11.6	53.2	68.4	81.5	91.4	27.4	6800
Marital status (S1)							
married	73.1	41.2	28.0	26.1	20.5	61.7	7376
cohabiting	24.0	33.5	30.1	30.4	21.2	25.3	7376
single parent	2.9	25.4	41.8	43.5	58.3	13.0	7376
Mean number of marital transitions (S1-S4) (range: 0-3)	0.3	0.9	1.0	0.8	0.5	0.4	7331
LS limiting illness (S1-S4) none	74.4	67.2	65.5	56.2	48.3	70.5	7348
at S1 or S4	20.1	24.5	24.7	28.1	30.7	21.9	7348
at S1 and S4	5.5	8.3	9.8	15.7	21.0	7.6	7348
Mother's malaise score [mean] (S1) (range: 0-9)	1.5	1.8	1.9	2.4	2.4	1.6	7092
No. of children in hhld [mean] (S4) (range: 1-13)	2.4	2.6	2.6	2.8	3.0	2.5	7378
Mean IMD deprivation (employment) (S4) (deciles, low dep – high dep)	5.0	6.8	7.1	7.7	8.0	5.6	7378
n(low-high)	*5094-5484*	*583-651*	*331-376*	*367-399*	*425-468*		

Before turning to the multivariate analysis, we first looked at a combination of risk factors linked to worklessness to get an idea of the cumulative risks faced by families experiencing repeated worklessness. We constructed an **index of multiple risks,** including the following measures that were significantly associated with parental worklessness:

- Rented social housing
- Qualifications less than degree level
- Poverty (earning less than 60% of equivalised median income before housing costs)
- Mother's malaise score (4+ was used in the cut-off to indicate depression)
- Number of family/marital transitions (3+ was used in the cut-off)
- A higher number of children in the household (4+ was used in the cut-off)

These risks were summed together, giving a range of 0-6 (the number of risks experienced). The mean number of risks for all families was 1.7. It was highest at 3.4 for families who had been workless on three or four occasions, and lowest at 1.1 for families who had no experience of worklessness. Figure M4.1. shows that the number of risks experienced increased with the number of times a family was worklessness. Compared to families who were continuously working, even those families experiencing worklessness at only one time point had an increased exposure to multiple additional risks. The highest rate for multiple risk exposure was apparent for families experiencing worklessness at three and four subsequent observation points.

Figure M4.1 multiple risks by number of times workless
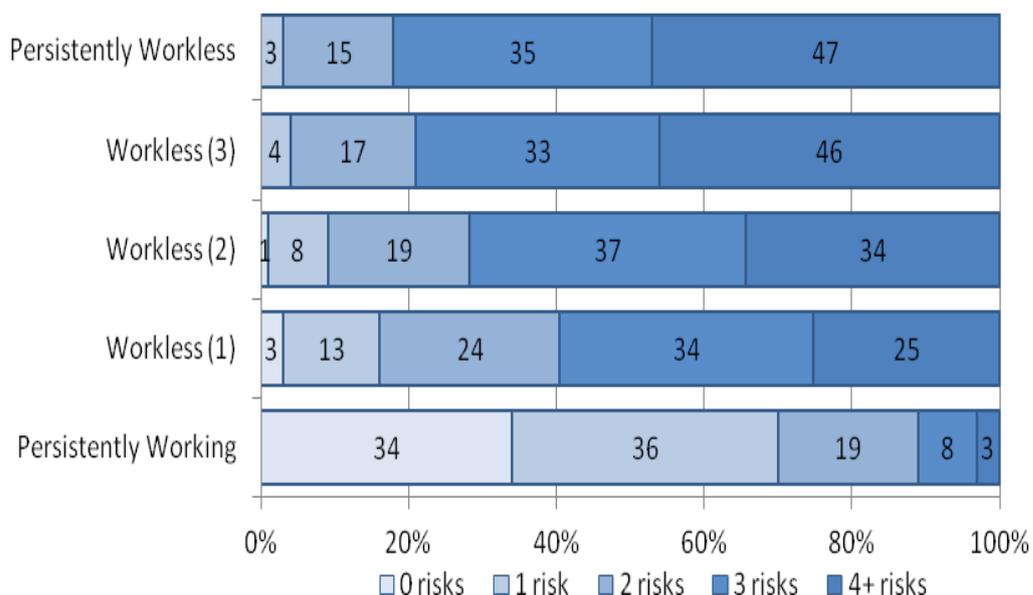
M5   Predicting parental worklessness

We now turn to results from the multivariate analysis. Multiple regression analysis was used to assess to what extent the experience of repeated parental worklessness could be predicted by the additional risk factors. Bivariate correlations between all the variables included in the model vary between -.00 and .61. The highest correlations were found between parental worklessness and poverty (.61), which is however still in the acceptable range to avoid the problem of multicollinearity. The majority of 'high' correlations were .3 or .4, which suggests that multicollinearity was not a problem.

We ran different models to assess the relationship between the associated risk factors and worklessness and to establish whether there were differences between families experiencing persistent versus temporary worklessness.

Linear regression was used to predict the number of times a family was workless. We used the workless variable as a continuous measure with a range 0 to 4[1].

Logistic regression was used to predict
- never being workless versus temporary worklessness (0 v 1-3 periods of worklessness) and
- temporary worklessness versus persistent worklessness (1-3 periods of worklessness v 4 periods of worklessness).

Table M5.1 shows the results from the different multiple regression models, showing the associations between different durations of worklessness and other risk factors that have also been shown to influence child adjustment and attainment. There was considerable consistency across the models, suggesting that there was substantial, yet not complete overlap between the risk factors associated with persistent versus temporary worklessness. Furthermore, most of the different risk factors showed an independent risk effect, i.e. they were associated with worklessness in addition and above the other factors included in the model, suggesting that to understand the experience of worklessness and its impact on child outcomes one has to take into account these multiple interlinked risk factors. In summary, we can see that the experience of worklessness was significantly associated with:

- younger age of the mother
- social housing or private rented accommodation

---

[1]   We are aware that experiences of worklessness are not normally distribution, however, using linear regression allows us to gain an approximate understanding of the factors associated with repeated worklessness.

- lack of or low qualifications (especially among the persistent workless)
- did not gain further qualifications during the four waves of observation
- poverty (which was particularly marked for those experiencing temporary worklessnesss compared to those never workless)
- single parenthood (especially among the temporary workless versus never workless)
- family instability (especially among the temporary workless versus never workless)
- long term limiting illness (especially among the persistent workless versus temporary workless), and
- number of children in the household.

Younger mothers were more likely to experience worklessness, as were those living in rented accommodation, parents with low qualifications, parents with low income, single parents, parents experiencing changes in family composition, parents who suffer from a long-term limiting illness, and families with many children. In the MCS, language spoken in the home, region and area deprivation appeared to have no significant effect on worklessness in addition to and above the other variables included in the model, with the exception of living in the East Midlands and South West England.

The findings also suggested differences between the workless groups. For example, the experience of persistent rather than temporary worklessness appeared to be more likely for those families with lower qualifications, those with a long term limiting illness or maternal depression, while temporary worklessness was more strongly associated with single parenthood, family instability, and poverty than persistent worklessness .

Table M5.1. Predicting worklessness in England 2000-2008 (MCS, S1-4)

	Linear Regression No. of times workless (0 to 4)		Logistic Regression	
			0 workless v 1-3 workless	1-3 workless v 4 workless
	B	SE	Odds Ratio (95% CIs)	Odds Ratio (95% CIs)
Age of mother at birth (years) (S1)	-.07***	.003	0.95*** (0.93-0.97)	0.97* (0.95-1.00)
Language spoken (S1) 0=English, 1=other	-.01	.045	1.07 (0.80- 1.45)	1.35 (0.85-2.15)
Housing tenure (S1)				
0=own, 1=rent (social)	.17***	.049	3.28*** (2.48-4.34)	3.82*** (2.09-6.99)
0=own, 2=rent (private)	.07***	.056	3.18*** (2.34-4.31)	2.56** (1.28-5.14)
0=own, 3=other	.02	.066	1.76** (1.24-2.50)	1.90 (0.88-4.10)
Highest qualification (household) (S1) 0=NVQ4+, 1=NVQ3	-.00	.027	1.56** (1.17-2.08)	0.82 (0.34-1.97)
0= NVQ4+, 2=NVQ2	.04**	.029	1.80*** (1.37- 2.37)	1.60 (0.79-3.22)
0= NVQ4+, 3=NVQ1/overseas	.10***	.067	3.24*** (2.18-4.81)	2.53* (1.23-5.22)
0= NVQ4+, 4= no qualifications	.17***	.082	3.53*** (2.22-5.61)	4.46*** (2.23-5.22)
Not gained higher qualification (h'hold) (S1-S4) 0=yes, 1=no	.08***	.034	1.44** (1.11-1.88)	3.39*** (2.24-8.88)
Poverty (OECD median) (S1) 0=above 60%, 1=below 60%	.26***	.045	4.24*** (3.48-5.15)	2.96*** (1.92-5.58)
Marital status (S1)				
0=married, 1=cohabiting	.01	.025	1.20 (0.96- 1.51)	1.12 (0.65-1.91)
0=married, 2=single parent	.27***	.060	8.30*** (5.79- 11.91)	2.30** (1.33-3.98)
Number of marital transitions (S1-S4) (range: 0-3)	.07***	.020	2.81*** (2.47-3.19)	0.47*** (0.37-0.59)
Long-term limiting illness (S1-S4) 0=no LT illness, 1=at S1 or S4	.05***	.026	1.46** (1.18-1.81)	2.02*** (1.40-2.91)
0=no LT illness, 2=S1 and S4	.11***	.058	3.06*** (2.28-4.12)	3.67*** (2.24-6.03)
Mother's malaise score (S1) (range: 0-9)	.04***	.007	1.04 (0.99- 1.10)	1.08* (1.00-1.17)
Number of children in household (S4)	.06***	.013	1.25*** (1.14- 1.37)	1.15* (1.02-1.29)
IMD deprivation (employment) (S1)	.00	.005	1.04 (1.00-1.09)	1.02 (0.94-1.11)
Region (S1)				
0=London, 1=North East	.00	.078	0.81 (0.50-1.31)	1.34 (0.60-2.99)
0=London, 2=North West	-.01	.052	0.74 (0.48-1.13)	1.09 (0.61-1.92)
0=London, 3=Yorks & Humberside	-.02	.057	0.72 (0.47-1.09)	0.89 (0.56-1.40)
0=London, 4=East Midlands	-.03*	.049	0.69 (0.44-1.09)	0.93(0.47-1.82)
0=London, 5=West Midlands	-.00	.044	1.14 (0.81-1.62)	0.77 (0.45-1.32)
0=London, 6=East of England	-.02	.045	0.98 (0.66-1.47)	0.54 (0.26-1.14)
0=London, 7=South East	-.03	.042	0.80 (0.54-1.20)	0.79 (0.43-1.46)
0=London, 8=South West	-.03*	.040	0.83 (0.52-1.32)	0.45** (0.25-0.83)
R^2	0.56			
F(df)			55.07(27,171)***	9.20(27,159)***
N	6,494		6,127	1,558

M6   Protective Factors

Before detailing the relationship between family worklessness and outcomes for children, we examine a number of potential protective factors available to children and families experiencing repeated worklessness. Based on previous research findings we identified five different areas where we assumed that potential 'protection' against parental worklessness can be found. Box M6.1 gives an overview of the variables used as indicators of the child, of parent-child interactions and parental engagement with the education of the child, the child's school experiences and school characteristics which are assumed to mediate at least some of the association between parental worklessness and the child outcomes (i.e. cognitive and behavioural adjustment and child wellbeing).

Box M6.1: Protective Factors used in the modelling of child outcomes

Child Characteristics	**Parent-Child interaction**
Gender	Warm parent-child relationship (Pianta)[2]
Age at assessment (in months)	Number of activities done together as a
Prematurity	family
Birthweight	Parent reading to child
Ethnicity (white versus other)	Visits library
	Has a regular bedtime
School Experiences at age 7	Organised home
Likes school	
Tries to do best at school	**Parent engagement with school at age 7**
Has friends at school	Parent satisfied with school
Likes playing with friends at school	Parents has post16/university aspirations
	for child
School Characteristics at age 7	Attended parents evening
% of pupils in school with SEN	
% of pupils in school receiving FSM	
Average KS1 scores	

Table M6.1 describes the relationship between parental worklessness and the potential protective factors that we included in the regression analyses. We see that at the bivariate level there were no differences across the different workless groups in terms of gender and mean age of the child at time of the interview, or the child's birthweight. However, compared to children not exposed to parental

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[2] *Parent-child relationship* at age 3 years was assessed using maternal reports the Pianta scale (Pianta, 1992), comprising 15 items on a 5-point Likert scale (I share an affectionate, warm relationship with my child; dealing with my child drains my energy). Responses were summed, with a high score indicating a better parent-child relationship (alpha=0.77).

worklessness, children growing up in workless families were more likely to be from an ethnic minority background, reported to be in poor health and to have a limiting illness. On a positive note, the majority of children liked school, and tried to do their best, had many friends and liked to play with them. However, children growing up in repeated (not necessarily persistent) workless households, enjoyed school less than those not exposed to parental worklessness.

Most parents reported a warm and engaged relationship with their child, and there were no real differences between working and non-working parents. Workless parents were however less likely to read to their child on a daily basis, or to take their child to the library, especially persistently workless parents. Workless parents furthermore were more likely to report that their home was disorganised and that they did not observe regular bedtimes for their child, especially persistently workless parents. Regarding their engagement with school, most parents were satisfied with the school their child attended, with no difference of note between the workless groups, and most parents held high educational aspirations for their child: 88% of persistently workless parents wanted their child to go to university, as did 91% of persistently working parents. Persistently workless parents were however significantly less likely to have attended parent's evenings than persistently working parents (89% versus 97%).

Table M6.1: Relationship between Protective Factors and worklessness

	0 Workless %	1 workless %	2 Workless %	3 Workless %	4 Workless %	All %	N (all)
Child Characteristics							
Mean birthweight (kg)	3.4	3.3	3.3	3.2	3.2	3.4	7359
Child's gender (S1) boy	51.0	49.4	50.0	51.3	50.0	50.8	7378
Child's mean age at interview (S4) (range: 6.3-8.4 years)	7.2	7.3	7.3	7.3	7.3	7.2	7373
Child's ethnicity (S1) Non-white	12.0	22.1	23.5	25.2	28.6	15.3	7355
Child's General Health (S3) very poor...	0.3	0.5	1.3	0.9	2.4	0.6	7354
excellent	54.0	43.0	42.2	42.4	38.1	50.7	7354
Child has LS limiting Illness (S4)	5.2	7.0	11.0	10.3	11.9	6.4	7348
Child school experiences							
Whether like school (S4) don't like school	15.1	18.7	21.0	21.7	17.4	16.2	6865
like school sometimes	33.1	26.7	24.6	24.2	25.1	31.2	6865
likes school all the time	51.8	54.6	54.3	54.1	57.5	52.6	6865
Does best at school (S4) never	1.6	3.0	3.2	5.1	4.2	2.2	6867
sometimes	18.0	17.1	18.2	19.9	22.2	18.3	6867
all the time	80.3	79.9	78.9	75.1	73.6	79.5	6867
Has a lot of friends (S4) not many	9.2	15.0	13.7	19.3	14.5	10.8	6946
some friends	27.0	24.9	26.1	22.5	28.6	26.6	6946
a lot of friends	63.8	60.1	60.2	58.2	57.0	62.6	6946
Likes playing with friends (S4) don't like,	0.4	0.8	0.8	1.8	1.9	0.6	6959
likes sometimes	9.4	9.3	14.2	9.6	10.1	9.7	6959
likes all the time	90.1	89.9	85.0	88.6	88.1	89.6	6959
Parent-Child Interaction							
Mean Pianta score: Parent-child relationship (S2) (range: 30-75)	64.8	63.5	62.8	60.5	62.2	64.2	6005
Read to child (S2) not at all….	1.6	2.8	4.1	6.6	11.0	2.8	7378
every day	65.0	47.2	46.5	44.8	37.2	59.4	7378
Take to library (S3) never...	31.2	42.6	45.6	47.4	51.6	35.2	7355
Mean no. of activities family does together (S3)	5.7	5.6	5.5	5.5	5.2	5.7	7344

	0 Workless %	1 workless %	2 Workless %	3 Workless %	4 Workless %	All %	N (all)
(range: 0-6)							
Whether disorganised at home (S4) strongly agree…..	4.0	5.6	9.1	6.8	8.0	4.8	7337
strongly disagree	25.1	21.9	18.4	14.9	11.8	23.0	7337
CM has a regular term-time bedtime (S3) never…..	3.5	5.1	6.3	8.7	10.0	4.5	7356
always	64.9	61.8	62.0	59.8	58.1	63.6	7356
School engagement / education aspirations							
Parents satisfied with the school? (S3) very dissatisfied...	0.1	0.8	0	0.5	0.3	0.3	7264
very satisfied	74.9	69.6	76.3	75.3	72.3	74.4	7264
Attend parents evening (S4) no	1.8	4.6	6.5	7.1	8.0	3.0	7337
none held yet	1.4	2.4	2.2	2.4	3.3	1.7	7337
yes	96.8	93.0	91.3	90.5	88.7	95.3	7337
Post16/university aspirations (S4) leave	1.9	3.0	2.8	1.3	3.1	2.1	7094
post-16 not university	3.2	3.1	2.8	3.9	4.0	3.2	7094
post 16 d/k university	3.8	2.0	3.2	1.7	5.3	3.6	7094
university	91.2	91.9	91.2	93.1	87.6	91.1	7094
n(low-high)	4737-5484	484-651	262-376	258-399	264-468		
School characteristics							
% SEN	16.7	20.1	21.4	22.7	24.8	18.0	5911
% eligible for free school meals	11.0	19.6	22.6	25.2	31.2	14.4	5911
Mean KS1 points score over 3 years	15.4	14.7	14.6	14.3	14.1	15.1	4957
n(low-high)	3617-4477	441-501	270-274	286-306	343-353		

M7   Parental worklessness and children's outcomes

We now turn to main part of this report: the relationship between parental worklessness and child outcomes. We explored a range of outcomes comprising academic attainment, cognitive ability, behavioural adjustment, as well as indicators of wellbeing of the child (happiness at school, being bullied, and bullying others). For each child outcome measure, nine separate multiple linear regression models were carried out. We look at each set of outcomes in turn, firstly describing the bi-variate relationship (Model 1) and then results from the multiple regression analyses. Model 2 assessed the association between family worklessness and child outcomes, controlling for the associated linked risks. Models 3 to 7 than assess the association between family worklessness and child outcomes, controlling for the associated linked risks and the different sets of protective factors. We ran these models to see whether the relationship between parental worklessness and the outcome measure was further mitigated by a particular set of protective factors, after controlling for the linked risk factors. This analysis will give us an idea of the potential protective processes enabling children to achieve, even in the face of cumulative risk experiences. In a final model we included all variables to assess the independent effect of all variables included in the analysis. Due to the large proportion of missing data associated with school level information (see table M1.3 for more details) we ran two final models, one with (Model 8) and one without school characteristics (Model 9).

We again checked for multicollinearity. The bivariate correlations between the variables included in the final model vary between -.00 and .69 (.69 refers to the association between child's ethnicity and language spoken in the home. Higher correlations were also found between worklessness and poverty (.61), % SEN and school level Key Stage 1 scores (-.56), % FSM and school level Key Stage 1 scores (.50), although these correlations still fell within the accepted range. The vast majority of other 'high' correlations were .3 or .4, which suggested that multicollinearity was not a problem.

In summary, our modelling strategy can be summarized as followed:

Model 1: Parental Worklessness

Model 2: Parental Worklessness + Interlinked problems

- Mean age mother at CM birth (S1)
- Other language spoken at home (S1)
- Housing tenure (S1)
- Highest qualification (S1)
- Gained higher qual (S1-S4)
- Poverty (OECD median) (S1)
- Marital status (S1)
- Mean number of marital transitions (S1-S4)
- Mother's malaise score [mean] (S1)
- No. of children in hhld [mean] (S4)
- Mean IMD deprivation (employment) (S4)

Model 3: Worklessness + Interlinked problems + Child characteristics

- Child's birthweight (S1)
- Child's gender (S1)
- Child's age at interview (S4)
- Child's ethnicity (S1)
- Child's General Health (S3)
- Child has LS Illness (S4)

Model 4: Worklessness + Interlinked problems + Child school experiences

- Whether like school (S4)
- Does best at school (S4)
- Has a lot of friends (S4)
- Likes playing with friends (S4)

Model 5: Worklessness + Interlinked problems + Parent-Child Interaction

- PIANTA scale (S2)
- Read to child (S2)
- Take to library (S3)
- Untidy/disorganised home (S4)
- Regular bedtime (S3)
- Activities together scale (S3)

Model 6: Worklessness + Interlinked problems + Parental support for education

- Attend parents evening (S4)
- Are parents satisfied with the school? (S3)
- Combined post16/university aspirations (S4)

Model 7: Worklessness + Interlinked problems + School Characteristics

- %FSM
- %SEN
- % KS1 results

Model 8: Worklessness + Interlinked problems + All measures

Model 9: Worklessness + Interlinked problems + All measures (School characteristics ommitted)

Results are presented in four parts:

1. Key Stage 1 results (four assessments) – section M8,
2. BAS cognitive scores (two assessments) – section M9,
3. Behaviour Adjustment (two assessments) – section M10;
4. Child Wellbeing (three indicators) – section M11

For each child outcome the relationship between parental worklessness and the outcome measure is shown in two graphs. The first shows the bivariate relationship, or rather the average mean scores attained by children by the number of times their parents were workless. (The t-scores and significant differences of mean scores by the number of times workless are given in a supplementary table.) The second graph shows the results from the multivariate regression models (Models 1 to 9 described above) in the form of a bar chart. Furthermore, for each outcome, two additional sets of tables are included.

- The first set of tables gives an overview of the standardised beta coefficient representing the relationship between the temporary and persistent worklessness categories and each child outcome in each of the nine separate multiple regression models carried out.
- The second set of tables gives the results from the final two models for each individual outcome, providing more detail about the relative contributions of each of the variables included in the model in explaining the association between family worklessnes and the child outcomes.

M8   Academic Attainment: Key Stage 1 scores (KS1)

At the end of Key Stage 1 (Year 2, aged 7) children at school were assessed by their teacher, with the help of informal tests, in reading, writing, maths and science. There are eight levels of attainment within each subject. Points are allocated to a child based on their performance, or the 'level' they achieved. Assessments at 'key stages' are used to measure a child's progress compared with other pupils of the same age across the country.

Average point scores range from three (working towards level 1) through to 27 (level 4 or higher). The overall average MCS results at KS1 were slightly higher than the national average for England in 2008[3]. For reading they were 16.0 compared with the national average of 15.6, for mathematics 16.1 as compared with 15.8 and for science 15.9 compared with a national average of 15.5. Only for writing was the average scores the same as the national average, 14.2.

Figure M8.1. shows the average KS1 point scores in the four subjects for MCS children by family workless status. Exposure to repeated worklessness was associated with lower academic attainment across all four assessments, although writing ability appeared to be most strongly affected. Interestingly, as we found for many of the associated risks, the experience of worklessness at only one of the four assessment points was significantly associated with disadvantage – in this case a significant drop in attainment.

Figure M8.1: Average KS1 point scores in the four subjects for MCS children by family workless status
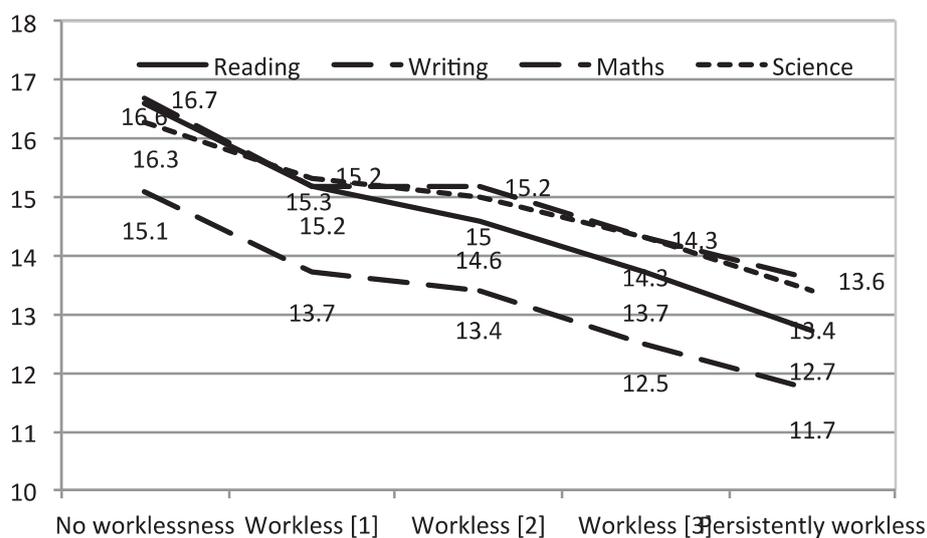
Table M8.1 gives the t-scores and significant differences of mean scores for each child outcome by workless group.

Table M8.1: Relationship between average KS1 assessment scores and number of times workless

	0 Workless %	1 workless %	2 Workless %	3 Workless %	4 Workless %	All %	N (all)
Key Stage 1 results							
Key Stage 1 Reading (points score) (range: 3-27)	16.6	15.2 t=-6.78***	14.6 t=-8.36***	13.7 t=-10.33***	12.7 t=-15.05***	16.0	5954
Key Stage 1 Writing (points score) (range: 3-21)	15.1	13.7 t=-7.16***	13.4 t=-8.12***	12.5 t=-9.96***	11.7 t=-13.35***	14.6	5954
Key Stage 1 Maths (points score) (range: 3-27)	16.7	15.2 t=-8.02***	15.2 t=-6.70***	14.3 t=-10.14***	13.6 t=-13.99***	16.1	5954
Key Stage 1 Science (points score) (range: 3-21)	16.3	15.3 t=-6.29***	15.0 t=-6.86***	14.3 t=-8.48***	13.4 t=-13.91***	15.9	5949
N(low-high)	4505-4508	506	275-276	308-309	355		

Note: mean scores in each workless category compared against '0 workless'

The multiple regression results are now discussed for each KS1 subject in turn and then summarised overall.

For each separate KS1 score, we include a bar chart that gives the standardised beta coefficient representing the relationship between persistent worklessness and the child outcome (e.g. Figure M8.2 is KS1 Reading performance) for each of the nine separate multiple regression models described in section M7. A bar with a value greater than 0 indicates that children with persistently workless parents had higher scores than children living with persistently working parents; a bar with a value less than 0 indicated that children with persistently workless parents had lower scores than children living with persistently working parents. The greater the value of a bar, in either direction, the stronger the association between parental worklessness and the child's outcome was. If a bar had a solid colour it is because this relationship was statistically significant. If the bar was empty (white) the relationship was not statistically significant – in other words, there was no evidence to suggest that young people with persistently workless parents had significantly lower scores (e.g. in the KS1 tests) than children with working parents. Refer back to Box M3.1 for further details on how to interpret these results.

KS1 Reading performance

The findings provided evidence of a relationship between persistent parental worklessness (compared to parent(s) being persistently in work) on Key Stage 1 reading scores (Model 1). Once risk factors linked to parental worklessness, such as parental education, income, health, and area employment rate (IMD) were controlled for (Model 2), the size of the bar was reduced. This indicated that the relationship between parental worklessness and KS1 reading was largely explained by these other risk factors – however parental worklessness retained a significant negative association with KS1 reading. In fact, the association with parental worklessness remained significant (although reduced) in each model including the potential protective factors. Critically the final models suggest an independent risk effect of parental worklessness on KS1 reading scores in addition and above the other risk and protective measures included in the models. Table M8.2 shows the relationship between temporary and persistent worklessness and each child outcome in each of the nine separate multiple regression models and tables M8.6 and M8.7 provide the results for the final models (Model 8 and 9).

Figure M8.2. Predicting KS1 reading scores (Standardised Beta coefficients of the multiple regression models)
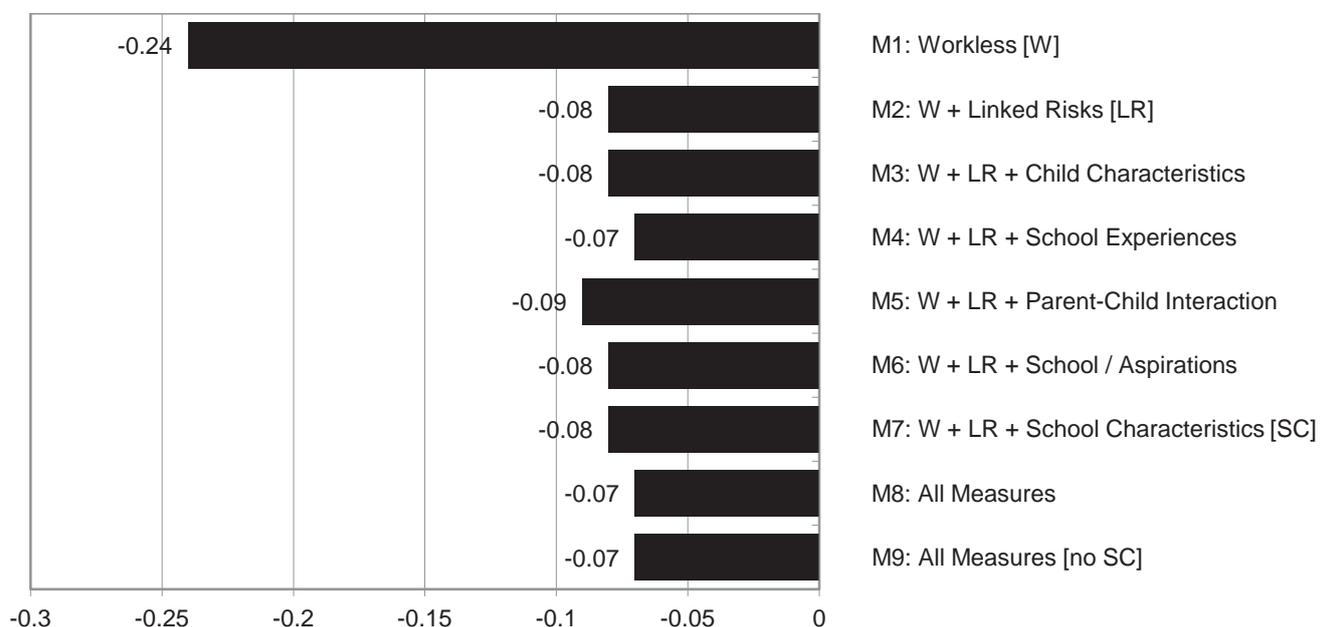
KS1 Writing performance

Figure M8.3 shows the bivariate relationship between persistent parental worklessness and performance in the KS1 writing assessment (Model 1). Once the associated risks were controlled for (Model 2) the relationship was marginally smaller than we saw for KS1 Reading although it is still significantly associated with the outcome. Adding the potential protective factors, we found that some of the factors could remove the significant risk effect. The relationship between parental worklessness and writing was not statistically significant (the bar is empty) when we controlled for the child's school experiences (i.e. whether the child liked school, does his or her best at school, and likes playing with friends at school). We observed a similar effect for school characteristics (% of pupils in school with SEN, % of pupils in school receiving FSM, average KS1 scores). Including them into the model reduced the association between persistent worklessness and writing scores in the KS1 assessment to non-significance. Both findings highlight the potentially beneficial role of the school and school experiences in enabling children experiencing family hardship to achieve to the same or similar levels as their more privileged peers. The final models, both with and without school characteristics, also showed a non-significant association with family worklessness, which suggested that the association between family worklessness and KS1 writing performance could be fully explained by the variables included in the model. Table M8.3 shows the relationship between the temporary and persistent worklessness categories and each child outcome in each of the nine separate multiple regression models carried out and tables M8.6 and M8.7 provide the results for the final models (Model 8 and 9).

Figure M8.3. Predicting KS1 writing scores (Standardised Beta coefficients of the multiple regression models
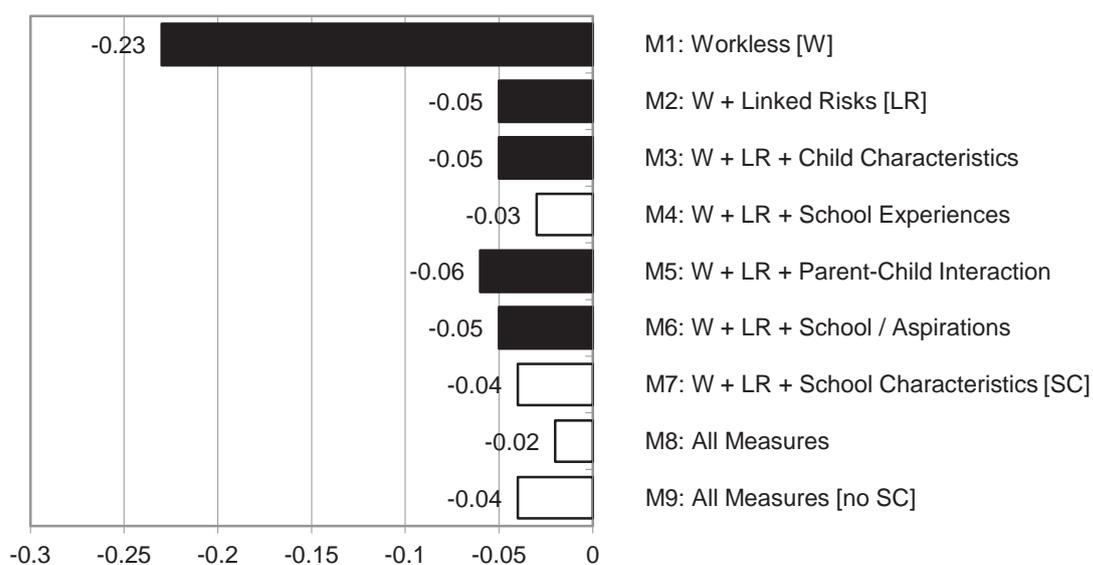
Note: White bars indicates a non-significant relationship

KS1 Maths performance

Figure M8.4. shows a bivariate relationship between persistent parental worklessness and Key Stage 1 Maths scores. Once risk factors linked to parental worklessness were controlled for, the size of the bar was greatly reduced. This indicates that the relationship between parental worklessness and KS1 maths was largely explained by these other risk factors, however parental worklessness retained its significant negative association with KS1 maths. In fact, the association with parental worklessness remains significant (although reduced) in each model, including the final models. The findings suggest an independent risk effect of parental worklessness in addition to and above the other risk and protective measures included in the models. Table M8.4 shows the relationship between the temporary and persistent worklessness categories and each child outcome in each of the nine separate multiple regression models carried out and tables M8.6 and M8.7 provide the results for the final models (Model 8 and 9).

Figure M8.4. Predicting KS1 maths scores (Standardised Beta coefficients of the multiple regression models

Maths
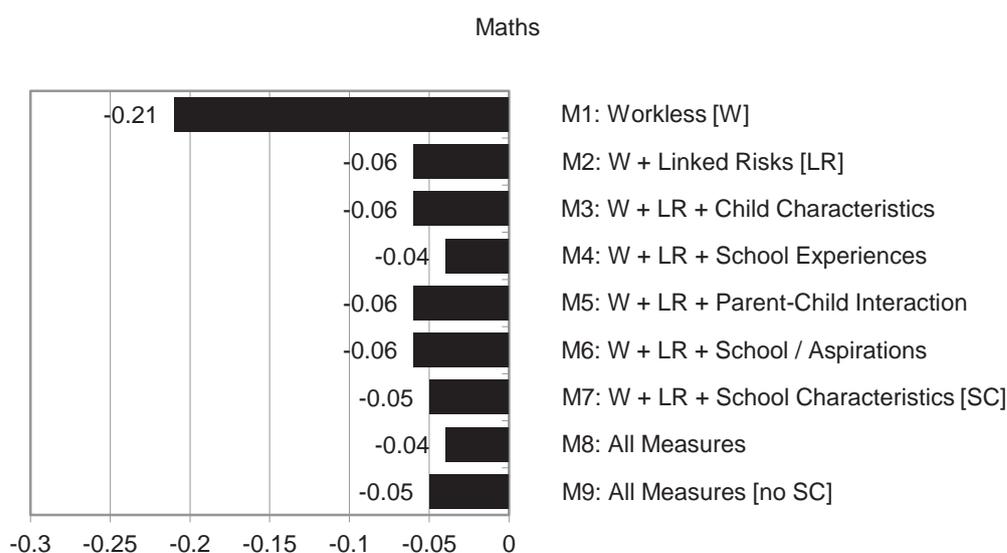
KS1 Science performance

In figure M8.5. we again see a bivariate relationship between persistent parental worklessness and Key Stage 1 Science scores. Once risk factors linked to parental worklessness were controlled for, the size of the bar was greatly reduced. This indicated that the relationship between parental worklessness and KS1 maths was largely explained by these other risk factors, however parental worklessness retained its significant negative association with KS1 science. In fact, the association with parental worklessness remained significant (though smaller) in each model, including the final models, suggesting an independent risk effect of parental worklessness in addition to and above the other risk and protective measures included in the models. Table M8.5 shows the relationship between the temporary and persistent worklessness categories and each child outcome in each of the nine separate multiple regression models carried out and tables M8.6 and M8.7 provide the results for the final models (Model 8 and 9).

Figure M8.5. Predicting KS1 science scores (Standardised Beta coefficients of the multiple regression models

Maths

Beta coefficient	Model
-0.21	M1: Workless [W]
-0.08	M2: W + Linked Risks [LR]
-0.08	M3: W + LR + Child Characteristics
-0.06	M4: W + LR + School Experiences
-0.08	M5: W + LR + Parent-Child Interaction
-0.08	M6: W + LR + School / Aspirations
-0.07	M7: W + LR + School Characteristics [SC]
-0.06	M8: All Measures
-0.07	M9: All Measures [no SC]
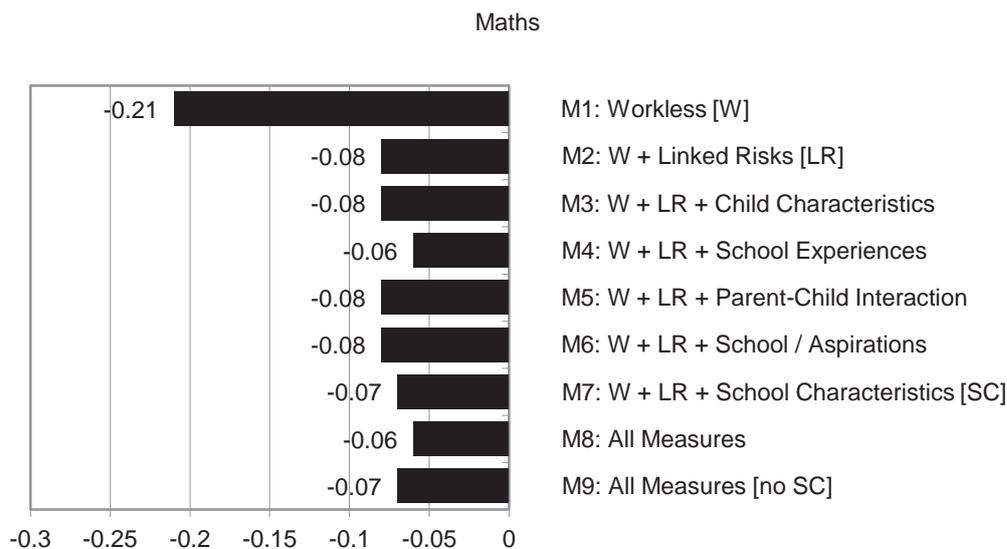
Summary Key Stage results

For all outcomes, except Key Stage 1 Writing, persistent worklessness remained a significant independent risk factor, even after all associated risk and potential protective factors had been included in the model. Child experiences at school and school characteristics removed the significant associated between parental worklessness and KS1 writing scores, but not for the other KS1 scores. However, these two sets of protective factors had most impact on the strength of the relationship between worklessness and KS1 maths and science performance, as indicated by the size of the bars in Model 4 and Model 7. Tables M8.6 and M8.7 show that the potential risk and protective factors which have a significant independent association with KS1 performance in the multivariate regressions, were very similar for the two final models ran for performance in each of the four KS1 assessments, which indicates relative stability of the findings. The specific risk and protective measures that had a significant independent association with KS1 results in the final model (Table M8.7), after controlling for all the other factors (including school characteristics) are described below:

Associated linked risks
Among the associated risks parental education remained significantly associated with the four outcomes, after controlling for all other variables in the model. Household poverty appeared to be an independent risk factor for KS1 writing and science scores, and number of children in the household shows an independent risk effect on KS1 reading, writing, and science attainment. Social housing remained independently associated with KS1 writing scores, and cohabitation with KS1 math scores.

Child characteristics
Higher birth weight, gender, age, and the child's general health were identified as potential protective factors, as they remained statistically associated with KS1 reading, writing and maths scores. Furthermore, whether the child has a long standing illness is independently associated with KS1 writing, maths and science.

Child's school experiences
If the child liked school and aimed to do his or her best at school appeared to act as potential protective factors for performance in all four KS1 assessments, and if the child liked playing with friends at school showed to be a protective factor for KS1 writing and maths.

Parent-Child Interaction
A warm and supportive parent-child relationship and joint family activities appeared to act as an independent protective factor regarding KS1 reading,

writing, and maths scores. Reading to the child remained significantly associated with KS1 reading, writing, and science scores, reducing the risk of low attainment. Taking the child to the library appeared to be protective for KS1 reading, maths and science.

Parental engagement with the school
Parental satisfaction with the school was significantly related to better KS1 performance in addition and above the other variables included in the model, as were high parental educational aspirations for their child, i.e. aspiring the child to go to university.

School Characteristics.
Children attending a school with a lower proportion of children with special educational needs (SEN) had a reduced risk of lower achievement in KS1 reading and writing.

Table M8.2: Regressions on KS1 Reading scores

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	β	β	β	β	β	β	β	β	β
	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)
No. times workless (S1-S4)	***	***	***	*	***	**	**	ns	*
1 workless	-0.096***	-0.008	-0.011	-0.012	-0.004	-0.007	-0.004	-0.001	-0.009
	(0.217)	(0.249)	(0.238)	(0.268)	(0.272)	(0.261)	(0.322)	(0.380)	(0.300)
2 workless	-0.101***	-0.010	-0.016	-0.006	-0.025	-0.018	-0.004	-0.021	-0.023
	(0.236)	(0.279)	(0.290)	(0.292)	(0.285)	(0.297)	(0.319)	(0.386)	(0.323)
3 workless	-0.156***	-0.040*	-0.036*	-0.032	-0.034	-0.047*	-0.045*	-0.033	-0.028
	(0.282)	(0.345)	(0.315)	(0.357)	(0.350)	(0.354)	(0.405)	(0.438)	(0.368)
Persistently workless	**-0.238*****	**-0.084*****	**-0.081*****	**-0.065*****	**-0.085*****	**-0.077*****	**-0.080*****	**-0.073****	**-0.074*****
	(0.259)	(0.336)	(0.333)	(0.335)	(0.378)	(0.350)	(0.416)	(0.526)	(0.416)
R^2	0.083	0.148	0.198	0.165	0.153	0.183	0.156	0.226	0.225
Observations	6453	5796	5767	5474	5016	5598	4193	3373	4591

Standardized beta coefficients; Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table M8.3: Regressions on KS1 Writing scores

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	β	β	β	β	β	β	β	β	β
	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)
No. times workless (S1-S4)	***	*	ns	ns	ns	ns	ns	ns	ns
1 workless	-0.099***	-0.009	-0.012	-0.013	-0.001	-0.008	-0.008	-0.011	-0.010
	(0.200)	(0.226)	(0.213)	(0.241)	(0.255)	(0.236)	(0.287)	(0.354)	(0.272)
2 workless	-0.091***	0.006	0.001	0.007	-0.001	-0.003	0.019	0.007	-0.000
	(0.206)	(0.261)	(0.270)	(0.263)	(0.276)	(0.266)	(0.311)	(0.374)	(0.293)
3 workless	-0.150***	-0.023	-0.018	-0.014	-0.020	-0.031	-0.027	-0.024	-0.013
	(0.265)	(0.318)	(0.295)	(0.326)	(0.328)	(0.322)	(0.391)	(0.409)	(0.342)
Persistently workless	**-0.226*****	**-0.054****	**-0.051****	**-0.033**	**-0.055****	**-0.050***	**-0.040**	**-0.024**	**-0.039**
	(0.261)	(0.323)	(0.313)	(0.311)	(0.364)	(0.330)	(0.391)	(0.436)	(0.361)
R^2	0.076	0.138	0.199	0.165	0.141	0.171	0.149	0.236	0.230
Observations	6453	5796	5767	5474	5016	5598	4193	3373	4591

Standardized beta coefficients; Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table M8.4: Regressions on KS1 Maths scores

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
No. times workless (S1-S4)	***	**	**	ns	**	*	ns	ns	ns
1 workless	-0.108***	-0.028	-0.029	-0.029	-0.023	-0.024	-0.023	-0.010	-0.018
	(0.182)	(0.207)	(0.194)	(0.214)	(0.214)	(0.217)	(0.258)	(0.292)	(0.220)
2 workless	-0.083***	0.004	0.002	0.006	-0.006	-0.003	0.011	-0.002	-0.003
	(0.213)	(0.253)	(0.257)	(0.257)	(0.265)	(0.266)	(0.299)	(0.332)	(0.282)
3 workless	-0.142***	-0.031	-0.024	-0.027	-0.031	-0.036*	-0.026	-0.024	-0.020
	(0.231)	(0.281)	(0.262)	(0.280)	(0.297)	(0.289)	(0.316)	(0.381)	(0.327)
Persistently workless	**-0.209*****	**-0.063*****	**-0.059*****	**-0.040***	**-0.064*****	**-0.059****	**-0.050***	**-0.043***	**-0.052****
	(0.215)	(0.285)	(0.276)	(0.279)	(0.298)	(0.297)	(0.336)	(0.359)	(0.312)
R^2	0.068	0.117	0.158	0.132	0.117	0.144	0.124	0.195	0.193
Observations	*6453*	*5796*	*5767*	*5474*	*5016*	*5598*	*4193*	*3373*	*4591*

Standardized beta coefficients; Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table M8.5: Regressions on KS1 Science scores

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
No. times workless (S1-S4)	***	**	**	*	**	**	*	ns	*
1 workless	-0.081***	-0.012	-0.013	-0.015	-0.006	-0.012	-0.007	-0.001	-0.008
	(0.168)	(0.213)	(0.204)	(0.225)	(0.228)	(0.221)	(0.261)	(0.315)	(0.242)
2 workless	-0.080***	-0.004	-0.007	-0.005	-0.012	-0.013	0.007	-0.007	-0.016
	(0.194)	(0.239)	(0.244)	(0.248)	(0.253)	(0.240)	(0.273)	(0.303)	(0.268)
3 workless	-0.128***	-0.026	-0.023	-0.022	-0.039*	-0.032	-0.031	-0.044	-0.031
	(0.239)	(0.269)	(0.254)	(0.274)	(0.299)	(0.272)	(0.328)	(0.384)	(0.319)
Persistently workless	**-0.214*****	**-0.079*****	**-0.077*****	**-0.059****	**-0.076*****	**-0.077*****	**-0.071****	**-0.061***	**-0.068****
	(0.213)	(0.286)	(0.289)	(0.289)	(0.322)	(0.302)	(0.345)	(0.425)	(0.363)
R^2	0.063	0.118	0.142	0.127	0.118	0.144	0.134	0.178	0.165
Observations	*6448*	*5791*	*5762*	*5470*	*5013*	*5594*	*4190*	*3372*	*4589*

Standardized beta coefficients; Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table M8.6: Final Regressions on KS1 scores (no School characteristics)

	KS1 Reading β (SE)	KS1 Writing β (SE)	KS1 Maths β (SE)	KS1 Science β (SE)
No. times workless (S1-S4)				
1 workless	-0.009	-0.010	-0.018	-0.008
	(0.300)	(0.272)	(0.220)	(0.242)
2 workless	-0.023	-0.000	-0.003	-0.016
	(0.323)	(0.293)	(0.282)	(0.268)
3 workless	-0.028	-0.013	-0.020	-0.031
	(0.368)	(0.342)	(0.327)	(0.319)
Persistently workless	-0.074***	-0.039	-0.052**	-0.068**
	(0.416)	(0.361)	(0.312)	(0.363)
Associated Risks				
Age of mother at birth (S1)	0.042**	0.028	0.029	0.025
	(0.011)	(0.010)	(0.010)	(0.011)
Language spoken (S1)	-0.021	-0.003	-0.024	-0.038*
0=English, 1=other	(0.328)	(0.274)	(0.265)	(0.301)
Housing tenure (S1)				
0=own, 1=rent (social)	-0.067***	-0.078***	-0.061**	-0.039
	(0.193)	(0.202)	(0.194)	(0.186)
0=own, 2=rent (private)	-0.014	-0.009	-0.021	-0.022
	(0.241)	(0.217)	(0.200)	(0.231)
0=own, 3=other	0.000	0.006	0.015	0.026
	(0.308)	(0.326)	(0.338)	(0.266)
Highest qualification (household) (S1)				
0=NVQ4+, 1=NVQ3	-0.074***	-0.076***	-0.075***	-0.066***
	(0.216)	(0.182)	(0.172)	(0.153)
0= NVQ4+, 2=NVQ2	-0.108***	-0.114***	-0.107***	-0.128***
	(0.172)	(0.172)	(0.163)	(0.139)
0=NVQ4+,3=NVQ1/overseas	-0.041*	-0.039*	-0.045*	-0.051**
	(0.309)	(0.279)	(0.308)	(0.245)
0= NVQ4+, 4=NVQ1	-0.051**	-0.060**	-0.049**	-0.045*
	(0.356)	(0.340)	(0.297)	(0.316)
Not gained higher qual (h'hold) (S1-S4)	-0.007	0.000	-0.008	-0.002
0=yes, 1=no	(0.166)	(0.145)	(0.140)	(0.143)
Poverty (OECD median) (S1)	-0.033	-0.054*	-0.031	-0.041*
0=above 60%, 1=below 60%	(0.191)	(0.184)	(0.163)	(0.164)
Marital status (S1)				
0=married, 1=cohabiting	-0.002	-0.011	-0.037*	-0.024
	(0.150)	(0.134)	(0.137)	(0.130)
0=married, 2=single parent	0.016	-0.010	-0.018	-0.012
	(0.292)	(0.244)	(0.233)	(0.238)
No. of marital transitions (S1-S4)	-0.049**	-0.031	-0.018	-0.018
(range: 0-3)	(0.098)	(0.094)	(0.085)	(0.086)
LS limiting illness (S1-S4)				
0=none, 1=at S1 or S4	-0.003	-0.003	-0.003	-0.007
	(0.140)	(0.125)	(0.127)	(0.133)
0=none, 2=S1 and S4	-0.002	-0.023	-0.004	0.021
	(0.230)	(0.203)	(0.222)	(0.208)
Mother's malaise score (S1)	0.043*	0.027	0.032*	-0.010
(range: 0-9)	(0.039)	(0.033)	(0.034)	(0.032)
No. of children in hhld (S4)	-0.078***	-0.055***	-0.018	-0.035*
(range: 1-13)	(0.069)	(0.062)	(0.059)	(0.059)
IMD deprivation (employment) (S4)	-0.026	-0.020	-0.015	-0.027
(deciles, low dep – high dep)	(0.025)	(0.025)	(0.023)	(0.025)
Child Characteristics				
Child's birthweight	0.067***	0.069***	0.085***	0.042*
	(0.134)	(0.113)	(0.099)	(0.101)
Child's gender (S1)	0.107***	0.137***	-0.051**	-0.015
1=boy, 2=girl	(0.134)	(0.116)	(0.112)	(0.112)

	KS1 Reading β (SE)	KS1 Writing β (SE)	KS1 Maths β (SE)	KS1 Science β (SE)
Child's age at interview (S4)	0.121***	0.122***	0.158***	0.112***
Range: 6.3-8.4 years	(0.275)	(0.228)	(0.213)	(0.225)
Child's ethnicity (S1)	-0.032	-0.033	-0.017	-0.013
0=other, 1=white	(0.257)	(0.227)	(0.235)	(0.222)
Child's General Health (S3)	0.041*	0.051**	0.030	0.034*
1=very poor/poor/okay, 2=good/excellent	(0.191)	(0.187)	(0.164)	(0.157)
Child has LS Illness (S4)	0.032	0.039*	0.046*	0.042*
1=yes, 2=no	(0.150)	(0.132)	(0.121)	(0.113)
Child school experiences				
Whether like school (S4)				
1=don't like, 2= sometimes,	0.082***	0.085***	0.109***	0.080***
	(0.191)	(0.184)	(0.163)	(0.173)
1=never, 3=all the time	0.111***	0.115***	0.134***	0.095***
	(0.191)	(0.183)	(0.169)	(0.166)
Does best at school (S4)				
1=never, 2=sometimes	0.102*	0.095	0.085	0.148*
	(0.512)	(0.516)	(0.423)	(0.559)
1=never, 3=all the time	0.142**	0.155**	0.142**	0.193**
	(0.515)	(0.499)	(0.421)	(0.554)
Has a lot of friends (S4)	0.011	0.044**	0.011	0.004
1=not many, 2=some/a lot of friends	(0.208)	(0.179)	(0.169)	(0.167)
Likes playing with friends (S4)	0.030*	0.037**	0.047**	0.029
1=don't like, 2=sometimes/all the time	(0.829)	(0.750)	(0.803)	(0.744)
Parent-Child Interaction				
Parent-child relationship (Pianta) (S2)	0.057***	0.051**	0.067***	0.035*
Range: 30-75	(0.009)	(0.009)	(0.008)	(0.008)
Read to child (S2)	0.075***	0.059*	0.052*	0.058**
Range: 1=not at all….6=every day	(0.080)	(0.074)	(0.073)	(0.064)
Take to library (S3)	0.066***	0.016	0.060***	0.051**
Range: 1=never...7=everyday	(0.044)	(0.042)	(0.041)	(0.042)
Activities together scale (S3)	0.049***	0.068***	0.042**	0.017
Range: 0-6	(0.088)	(0.090)	(0.084)	(0.083)
Whether disorganised at home (S4)	0.031	0.037*	0.012	0.008
1=strongly agree…..5=strongly disagree	(0.061)	(0.051)	(0.054)	(0.047)
CM has a regular term-time bedtime (S3)	0.008	0.002	0.000	0.002
1=never/sometimes, 2=usually/always	(0.123)	(0.121)	(0.119)	(0.106)
School engagement / education aspirations				
Parents satisfied with the school? (S3)	0.087***	0.074***	0.072***	0.086***
Range: 1=very dissatisfied – 5=very satisfied	(0.104)	(0.108)	(0.099)	(0.094)
Attend parents evening (S4)				
1=no,2=none held yet	-0.021	-0.019	-0.016	-0.033
	(0.572)	(0.624)	(0.651)	(0.655)
1=no, 3=yes	0.028	0.027	0.041	0.013
	(0.407)	(0.391)	(0.386)	(0.315)
Post16/university aspirations (S4)				
1=leave, 2=post-16 not university	0.055*	0.042	0.062*	0.028
	(0.579)	(0.568)	(0.557)	(0.465)
1=leave, 2=post 16 d/k university	0.063*	0.052	0.072*	0.041
	(0.569)	(0.550)	(0.548)	(0.417)
1=leave, 4 university	0.146***	0.136***	0.150***	0.122***
	(0.474)	(0.485)	(0.472)	(0.365)
R^2	0.225	0.230	0.193	0.165
Observations	*4591*	*4591*	*4591*	*4589*

*Standardized beta coefficients; Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*

Table M8.7: Final Regressions on KS1 scores (inc. school characteristics)

	KS1 Reading β (SE)	KS1 Writing β (SE)	KS1 Maths β (SE)	KS1 Science β (SE)
No. times workless (S1-S4)				
1 workless	-0.001	-0.011	-0.010	-0.001
	(0.380)	(0.354)	(0.292)	(0.315)
2 workless	-0.021	0.007	-0.002	-0.007
	(0.386)	(0.374)	(0.332)	(0.303)
3 workless	-0.033	-0.024	-0.024	-0.044
	(0.438)	(0.409)	(0.381)	(0.384)
Persistently workless	-0.073[**]	-0.024	-0.043[*]	-0.061[*]
	(0.526)	(0.436)	(0.359)	(0.425)
Associated Risks				
Age of mother at birth (S1)	0.012	0.002	0.009	0.013
	(0.013)	(0.011)	(0.012)	(0.013)
Language spoken (S1)	-0.009	0.012	-0.005	-0.047[*]
0=English, 1=other	(0.401)	(0.306)	(0.293)	(0.352)
Housing tenure (S1)				
0=own, 1=rent (social)	-0.044	-0.066[**]	-0.039	-0.015
	(0.235)	(0.220)	(0.235)	(0.226)
0=own, 2=rent (private)	-0.024	-0.008	-0.024	-0.008
	(0.273)	(0.273)	(0.237)	(0.294)
0=own, 3=other	-0.002	0.000	0.005	0.017
	(0.374)	(0.370)	(0.406)	(0.301)
Highest qualification (household) (S1)				
0=NVQ4+, 1=NVQ3	-0.074[**]	-0.078[***]	-0.082[***]	-0.056[**]
	(0.258)	(0.208)	(0.204)	(0.178)
0= NVQ4+, 2=NVQ2	-0.116[***]	-0.118[***]	-0.114[***]	-0.113[***]
	(0.219)	(0.196)	(0.202)	(0.173)
0=NVQ4+,3=NVQ1/overseas	-0.031	-0.034	-0.054[*]	-0.041
	(0.415)	(0.364)	(0.363)	(0.329)
0= NVQ4+, 4=NVQ1	-0.032	-0.054[*]	-0.036	-0.030
	(0.418)	(0.383)	(0.337)	(0.344)
Not gained higher qual (h'hold) (S1-S4)	0.006	0.010	-0.003	-0.003
0=yes, 1=no	(0.201)	(0.177)	(0.174)	(0.168)
Poverty (OECD median) (S1)	-0.039	-0.063[*]	-0.034	-0.046[*]
0=above 60%, 1=below 60%	(0.233)	(0.219)	(0.215)	(0.189)
Marital status (S1)				
0=married, 1=cohabiting	-0.020	-0.029	-0.053[**]	-0.036
	(0.181)	(0.155)	(0.150)	(0.157)
0=married, 2=single parent	0.003	-0.011	-0.024	-0.021
	(0.347)	(0.272)	(0.273)	(0.287)
No. of marital transitions (S1-S4)	-0.033	-0.018	-0.005	-0.020
(range: 0-3)	(0.127)	(0.117)	(0.100)	(0.102)
LS limiting illness (S1-S4)				
0=none, 1=at S1 or S4	-0.009	-0.005	-0.004	-0.006
	(0.174)	(0.147)	(0.160)	(0.143)
0=none, 2=S1 and S4	0.008	-0.017	-0.014	0.017
	(0.281)	(0.231)	(0.260)	(0.243)
Mother's malaise score (S1)	0.034	0.027	0.034	0.004
(range: 0-9)	(0.044)	(0.039)	(0.041)	(0.037)
No. of children in hhld (S4)	-0.085[***]	-0.060[**]	-0.033	-0.044[*]
(range: 1-13)	(0.085)	(0.075)	(0.075)	(0.071)
IMD deprivation (employment) (S4)	-0.036	-0.038	-0.025	-0.031
(deciles, low dep – high dep)	(0.035)	(0.033)	(0.030)	(0.030)
Child Characteristics				
Child's birthweight	0.068[**]	0.058[**]	0.075[***]	0.039
	(0.160)	(0.135)	(0.126)	(0.121)
Child's gender (S1)	0.092[***]	0.127[***]	-0.061[**]	-0.028
1=boy, 2=girl	(0.155)	(0.135)	(0.131)	(0.124)

	KS1 Reading β (SE)	KS1 Writing β (SE)	KS1 Maths β (SE)	KS1 Science β (SE)
Child's age at interview (S4)	0.120***	0.113***	0.151***	0.096***
Range: 6.3-8.4 years	(0.322)	(0.269)	(0.253)	(0.238)
Child's ethnicity (S1)	-0.022	-0.034	0.007	-0.019
0=other, 1=white	(0.299)	(0.272)	(0.255)	(0.270)
Child's General Health (S3)	0.056**	0.063**	0.044*	0.035
1=very poor/poor/okay, 2=good/excellent	(0.228)	(0.204)	(0.184)	(0.187)
Child has LS Illness (S4)	0.043	0.047*	0.068***	0.048*
1=yes, 2=no	(0.179)	(0.158)	(0.136)	(0.147)
Child school experiences				
Likes school (S4): 1=never, 2=sometimes	0.085**	0.084**	0.124***	0.077**
	(0.235)	(0.213)	(0.207)	(0.191)
1=don't like, 3=all the time	0.114***	0.095***	0.127***	0.064*
	(0.220)	(0.200)	(0.200)	(0.179)
Do best at school (S4): 1=never, 2=sometimes	0.118	0.119	0.093	0.165*
	(0.649)	(0.610)	(0.569)	(0.653)
1=never, 3=all the time	0.152*	0.180**	0.151	0.225**
	(0.655)	(0.599)	(0.564)	(0.652)
Has a lot of friends (S4)	0.004	0.035	0.000	0.007
1=not many, 2=some/a lot of friends	(0.258)	(0.223)	(0.218)	(0.198)
Likes playing with friends (S4)	0.025	0.037*	0.036*	0.011
1=don't like, 2=sometimes/all the time	(0.887)	(0.830)	(0.780)	(0.594)
Parenting-Child Interaction				
Parent-child relationship (Pianta) (S2)	0.047*	0.045*	0.062**	0.034
Range: 30-75	(0.011)	(0.010)	(0.010)	(0.009)
Read to child (S2)	0.076***	0.065*	0.042	0.057**
Range: 1=not at all….6=every day	(0.092)	(0.090)	(0.087)	(0.075)
Take to library (S3)	0.048*	0.005	0.045*	0.043*
Range: 1=never...7=everyday	(0.056)	(0.054)	(0.050)	(0.051)
Activities together scale (S3)	0.054**	0.067***	0.052**	0.040*
Range: 0-6	(0.106)	(0.108)	(0.105)	(0.091)
Whether disorganised at home (S4)	0.033	0.041	0.021	0.019
1=strongly agree…..5=strongly disagree	(0.081)	(0.063)	(0.068)	(0.059)
CM has a regular term-time bedtime (S3)	0.008	0.006	0.009	-0.001
1=never/sometimes, 2=usually/always	(0.153)	(0.141)	(0.142)	(0.123)
School engagement / education aspirations				
Parents satisfied with the school? (S3)	0.088***	0.086***	0.076***	0.098***
Range: 1=very dissatisfied – 5=very satisfied	(0.118)	(0.117)	(0.116)	(0.110)
Attend parent evening (S4) 1=no,2=not held	-0.040	-0.045	-0.046	-0.043
	(0.695)	(0.752)	(0.768)	(0.720)
1=no, 3=yes	0.006	-0.009	0.001	-0.003
	(0.519)	(0.515)	(0.494)	(0.390)
Post16/university aspirations (S4)				
1=leave, 2=post-16 not university	0.079*	0.065*	0.097**	0.039
	(0.782)	(0.681)	(0.704)	(0.561)
1=leave, 2=post 16 d/k university	0.073*	0.067*	0.101**	0.043
	(0.754)	(0.658)	(0.693)	(0.561)
1=leave, 4 university	0.170***	0.155***	0.193***	0.134***
	(0.600)	(0.545)	(0.577)	(0.461)
School characteristics				
% SEN	-0.085**	-0.085**	-0.049	-0.040
	(0.013)	(0.014)	(0.012)	(0.012)
% eligible for free school meals	0.041	0.044	0.042	0.009
	(0.010)	(0.010)	(0.009)	(0.008)
Mean KS1 points score over 3 years	0.013	0.015	0.032	0.048
	(0.094)	(0.093)	(0.082)	(0.083)
R^2	0.226	0.236	0.195	0.178
Observations	*3373*	*3373*	*3373*	*3372*

Standardized beta coefficients; Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

M9   Cognitive Ability

In addition to the measures of academic attainment, MCS includes information about general cognitive ability, as assessed by the British Ability Scale (BAS). At age 7 each child was directly assessed by specially trained interviewers using two subscales of the British Ability Scales Second Edition (BAS II): Word Reading and Pattern Construction, capturing core aspects of verbal and nonverbal abilities (Elliott, 1996; Hill, 2005). Table M9.1 provides more details about the assessments. Both assessments make use of age-related starting points, decision points, and alternative stopping points to ensure that a) the motivation and self-esteem of the child were protected, and that b) the testing focuses on the most suitable items for the child thus ensuring the assessment time was kept to a minimum (Hill, 2005).

Table M9.1: Cognitive assessments carried out with MCS children at age 7

Assessment name	Assesses	Method
BAS – Word Reading	Indicates whether the child can recognise some words instantly and comprehend other words, which they may be unfamiliar with.	Child reads aloud words on a printed list. The words increase in difficulty. This assessment can be used with children from age 5 until 17 years and 11 months. There are a total of 90 items in the assessment and all the children began at item 1
BAS – Pattern Construction	Non-verbal reasoning and spatial visualisation	Using black and yellow squares and cubes, the child attempts to recreate patterns. Different numbers of squares and cubes are needed for different items. Each item is timed with a stop watch and each item has a specific time limit. This assessment can be used with children from age 3 until 17 years 11 months. There are 23 scored items and 4 example items in the assessment. All the children start the assessment at the beginning.

Within the MCS the BAS Word Reading ability scores have a range between ten and 222 and the Pattern Construction ability scores have a range of ten to 211. For MCS children in England, the average Word Reading ability score was 105.8 (sd 0.56), the average Pattern Construction score was 116.6 (sd 0.28). Figure M9.1 shows the average ability scores for the MCS children by exposure to worklessness. Children growing up with parents who experienced repeated worklessness achieved lower levels in the Word Reading and Pattern Construction assessments than those not exposed to parental worklessness by age 7. The differences were especially stark for verbal skills, i.e. word reading, and less so for non-verbal skills, i.e. pattern construction. The average scores for children in a family experiencing any worklessness were significantly lower than the average scores for children in a family who had not experienced worklessness at any of the observation points.

Figure M9.1: average BAS Word Reading and Pattern Construction ability scores for MCS children at age 7 by family workless status
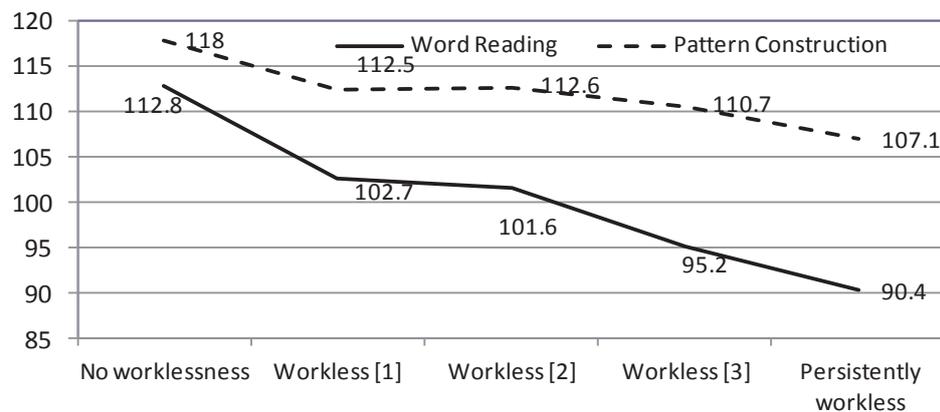
Table M9.2 gives the t-scores and significant differences of mean scores for each child outcome by workless group.

Table M9.2: Relationship between average BAS Cognitive Assessment scores and number of times workless

	0 Workless %	1 workless %	2 Workless %	3 Workless %	4 Workless %	All %	N (all)
BAS Cognitive Assessments							
BAS Word Reading score (range: 10-222)	112.8	102.7 t=-6.81***	101.6 t=-6.92***	95.2 t=-9.42***	90.4 t=-11.55***	108.9	7274
BAS Pattern Construction score (range: 10-211)	118.0	112.5 t=-5.78***	112.6 t=-5.00***	110.7 t=-6.80***	107.1 t=-11.73***	116.1	7252
N(low-high)	5427-5434	638-639	363-366	387-391	437-444		

Note: T-tests were used to test mean score differences for each workless category compared against '0 workless', i.e. never workless.

The multiple regression results are now discussed for each BAS assessment in turn, and then similarities and differences are summarised.

BAS Word Reading

In figure M9.2, Model 1 suggests that there was a significant bivariate association between parental worklessness and cognitive ability at age 7 years. As we saw for KS1 results, this association reduced considerably when the linked risks were added into the model (Model 2), yet it remained significant. Characteristics of the school were an important potential protective factor that reduced the association between persistent parental worklessness and word reading to non-significance. This finding highlights again the important role of the school as a potential protective factor in supporting the attainment of disadvantaged children. It should be considered however that there was a high level of missingness in the data regarding school characteristics. Model 9, which included all variables except school characteristics still showed a significant association between parental worklessness and word reading.

Figure M9.2. Predicting BAS word reading ability scores (Standardised Beta coefficients of the multiple regression models
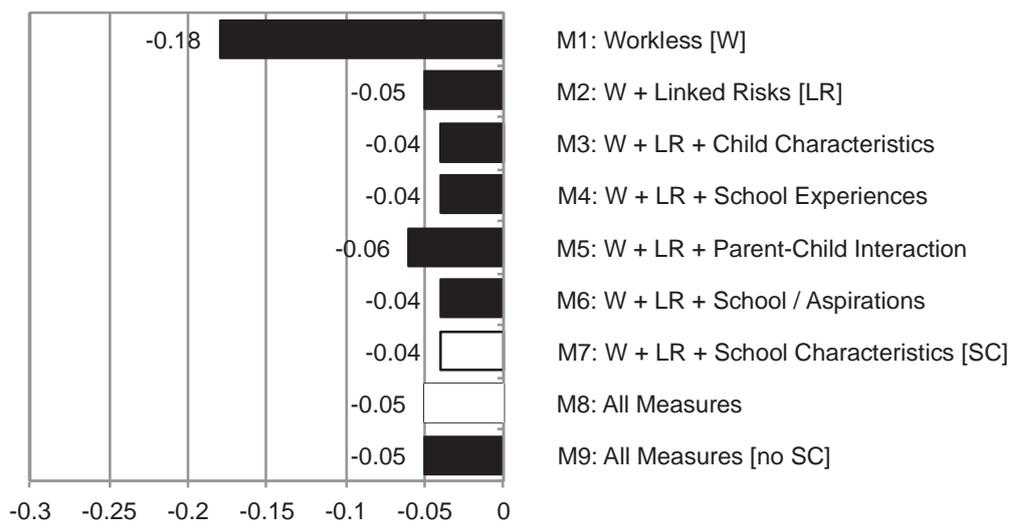
Table M9.3 shows the relationship between the temporary and persistent worklessness categories and each child outcome in each of the nine separate multiple regression models carried out and table M9.5 provides the results for the final models (Model 8 and 9).

BAS Pattern Construction

The bivariate relationship between parental worklessness and BAS pattern construction scores was the weakest of all four KS1 academic and the two BAS cognitive assessments. However, figure M9.3 shows that it was still significant and remained so after taking into account the associated risk factors. As we found for KS1 writing, the school experiences of the child and the characteristics of the school they attend both reduced the association between parental worklessness and pattern construction scores to a non-significant level. Both of the final models, as found for KS1 writing, also showed a non-significant association with persistent worklessness once all variables were included, This suggests that worklessness is not a key driver of non verbal skills as measured by the BAS pattern construction task, after accounting for all the variables included in the model.

Figure M9.3. Predicting BAS pattern construction ability scores (Standardised Beta coefficients of the multiple regression models
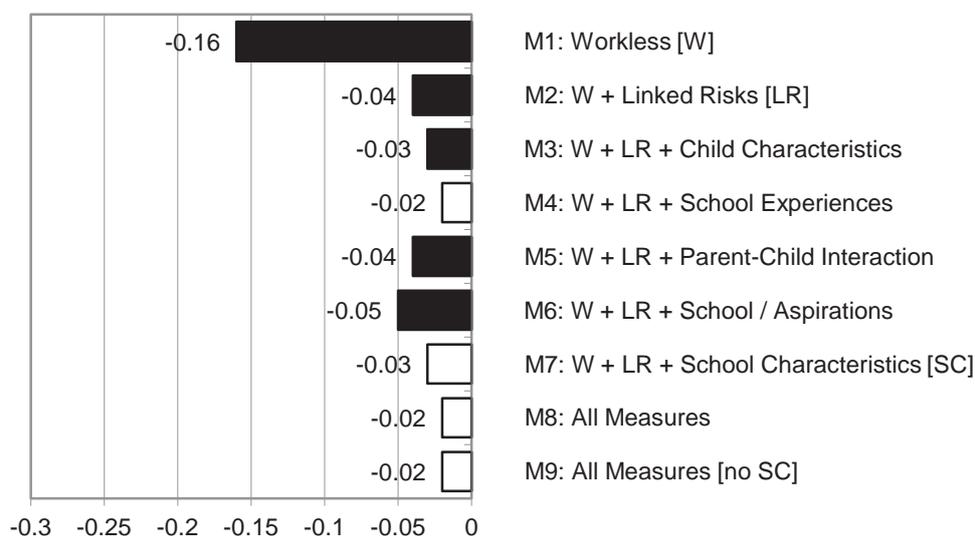
Table M9.4 shows the relationship between the temporary and persistent worklessness categories and each child outcome in each of the nine separate multiple regression models carried out and table M9.5 provides the results for the final models (Model 8 and 9).

Summary BAS cognitive assessment results

Regarding the predictors of cognitive ability we found that persistent worklessnes showed an independent risk effect, in addition to and above all other variables included in the model for verbal ability (word reading) but not for nonverbal ability (pattern construction). School characteristics removed the significant association between parental worklessness and both BAS scores in both the separate and final models, as did the child's experiences at school for pattern construction scores. Table M9.5 shows that the potential risk and protective factors which have a significant association with cognitive ability are similar for the two final models, indicating relative stability of the findings. The specific risk and protective measures that had a significant association with performance in the verbal and nonverbal BAS assessments after controlling for all the other factors in the model (including school characteristics) are now summarised.

Associated linked risks
Parental education qualifications remained significantly associated with both outcomes. Furthermore, poverty and the number of children in the household are both independent risk factors for word reading.

Child characteristics
Higher birth weight and a child's long standing illness were independently associated with pattern construction, and child's ethnicity and general health were significantly associated with word reading scores, in addition and above the other variables included in the model. Age had a significant association with both scores, whereas gender was non-significant for both scores.

Child's school experiences
Whether the child liked school appeared to act as a potential protective factor for performance in both assessments. If the child aimed to do his or her best at school all of the time this was positively associated with word reading, and if a child liked playing with friends at school showed a beneficial effect for pattern construction scores.

Parent-Child Interaction
In the final model, a warm parent-child relationship, reading to the child, taking the child to the library and joint family activities were all found to be potential protective factors, reducing the risk of low attainment in the word reading assessment in addition and above the other variables included in the model. However, none of these variables acted as a potential protective factor for performance in the non-verbal pattern construction assessment.

Parental engagement with the school
Parental satisfaction with the school was significantly related to both the verbal (reading test) and non-verbal assessment (pattern construction) in addition and

above the other variables included in the model. A parents educational aspirations for their child, i.e. aspiring that their child would attend university, was a potential protective factor for pattern construction.

School Characteristics.
Attending a school with a high proportion of students with special educational needs (% SEN) was an independent risk factor, reducing the attainment in both the verbal and non-verbal assessments. This effect was significant after controlling for all the other variables in the model.

Table M9.3: Regression on BAS Word Reading score

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	β	β	β	β	β	β	β	β	β
	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)
No. times workless (S1-S4)	***	ns	ns	ns	*	ns	ns	ns	ns
1 workless	-0.095***	-0.011	-0.012	-0.013	-0.018	-0.008	-0.001	-0.007	-0.015
	(1.449)	(1.631)	(1.613)	(1.675)	(1.899)	(1.723)	(2.199)	(2.764)	(2.031)
2 workless	-0.085***	-0.001	-0.004	-0.007	-0.015	-0.003	0.025	0.005	-0.024
	(1.560)	(2.006)	(2.025)	(2.034)	(2.189)	(2.143)	(2.413)	(2.930)	(2.358)
3 workless	-0.136***	-0.027	-0.025	-0.020	-0.017	-0.029	-0.025	-0.008	-0.007
	(1.861)	(2.187)	(2.104)	(2.328)	(2.359)	(2.262)	(3.021)	(3.228)	(2.380)
Persistently workless	**-0.183*****	**-0.050***	**-0.044***	**-0.040***	**-0.059****	**-0.041***	**-0.043**	**-0.045**	**-0.047***
	(2.019)	(2.449)	(2.450)	(2.396)	(2.684)	(2.450)	(2.909)	(3.758)	(2.813)
R^2	0.056	0.111	0.142	0.127	0.116	0.132	0.115	0.159	0.163
Observations	*7274*	*6913*	*6864*	*6496*	*5926*	*6628*	*4160*	*3364*	*5366*

Standardized beta coefficients; Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table M9.4: Regression on BAS Pattern Construction score

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	β	β	β	β	β	β	β	β	β
	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)	(SE)
No. times workless (S1-S4)	***	ns	ns	ns	ns	*	ns	ns	ns
1 workless	-0.092***	-0.031	-0.028	-0.026	-0.025	-0.031	-0.029	-0.009	-0.018
	(0.978)	(1.000)	(0.999)	(1.029)	(1.038)	(1.045)	(1.389)	(1.605)	(1.120)
2 workless	-0.071***	-0.008	-0.003	-0.012	-0.013	-0.007	0.002	-0.018	-0.008
	(1.053)	(1.168)	(1.174)	(1.214)	(1.245)	(1.273)	(1.493)	(1.664)	(1.350)
3 workless	-0.100***	-0.010	-0.005	-0.007	-0.021	-0.016	-0.026	-0.034	-0.017
	(1.014)	(1.251)	(1.245)	(1.259)	(1.551)	(1.277)	(1.787)	(2.213)	(1.674)
Persistently workless	**-0.156*****	**-0.042***	**-0.033***	**-0.015**	**-0.038***	**-0.048****	**-0.026**	**-0.016**	**-0.023**
	(1.056)	(1.167)	(1.141)	(1.175)	(1.319)	(1.155)	(1.661)	(1.799)	(1.415)
R^2	0.039	0.071	0.097	0.074	0.056	0.081	0.077	0.096	0.093
Observations	*7252*	*6893*	*6844*	*6480*	*5909*	*6608*	*4148*	*3354*	*5353*

Standardized beta coefficients; Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table M9.5: Final Regression Models: Cognitive attainment

	BRITISH ABILITY SCALES (no school characteristics)		BRITISH ABILITY SCALES (incl. school characteristics)	
	Word Reading β (SE)	Pattern Construction β (SE)	Word Reading β (SE)	Pattern Construction β (SE)
No. times workless (S1-S4)				
1 workless	-0.015	-0.018	-0.007	-0.009
	(2.031)	(1.120)	(2.764)	(1.605)
2 workless	-0.024	-0.008	0.005	-0.018
	(2.358)	(1.350)	(2.930)	(1.664)
3 workless	-0.007	-0.017	-0.008	-0.034
	(2.380)	(1.674)	(3.228)	(2.213)
Persistently workless	-0.047*	-0.023	-0.045	-0.016
	(2.813)	(1.415)	(3.758)	(1.799)
Associated Risks				
Age of mother at birth (S1)	0.027	0.025	0.005	0.019
	(0.078)	(0.050)	(0.094)	(0.066)
Language spoken (S1): 0=English, 1=other	0.030	-0.006	0.024	0.012
	(2.135)	(1.109)	(3.190)	(1.332)
Housing tenure (S1)				
0=own, 1=rent (social)	-0.050*	-0.037	-0.048	-0.023
	(1.382)	(0.889)	(1.864)	(1.037)
0=own, 2=rent (private)	-0.020	-0.001	-0.032	0.018
	(1.683)	(0.897)	(2.140)	(1.127)
0=own, 3=other	-0.011	0.015	0.002	0.027
	(2.180)	(1.205)	(3.011)	(1.797)
Highest qualification (household) (S1)				
0=NVQ4+, 1=NVQ3	-0.080***	-0.058***	-0.080***	-0.053*
	(1.364)	(0.707)	(1.544)	(0.864)
0= NVQ4+, 2=NVQ2	-0.109***	-0.105***	-0.102***	-0.091***
	(1.136)	(0.630)	(1.406)	(0.872)
0=NVQ4+,3=NVQ1/overseas	-0.067***	-0.066***	-0.060*	-0.066**
	(2.066)	(1.238)	(3.164)	(1.474)
0= NVQ4+, 4=NVQ1	-0.049**	-0.082***	-0.017	-0.075**
	(2.371)	(1.468)	(3.047)	(1.760)
Not gained higher qual (h'hold) (S1-S4) 0=yes, 1=no				
	-0.005	-0.014	-0.013	-0.011
	(1.010)	(0.624)	(1.412)	(0.874)
Poverty (OECD median) (S1) 0=above 60%, 1=below 60%	-0.039	-0.007	-0.055*	0.009
	(1.375)	(0.721)	(1.737)	(0.871)
Marital status (S1): 0=married, 1=cohabiting	0.013	-0.009	0.006	-0.032
	(0.978)	(0.592)	(1.284)	(0.748)
0=married, 2=single parent	0.025	0.009	0.003	-0.019
	(1.836)	(0.936)	(2.183)	(1.276)
No. of marital transitions (S1-S4)	-0.022	0.029	0.008	0.018
(range: 0-3)	(0.703)	(0.355)	(0.891)	(0.494)
LS limiting illness (S1-S4)				
0=none, 1=at S1 or S4	0.003	0.010	-0.013	0.036
	(0.996)	(0.568)	(1.297)	(0.740)
0=none, 2=S1 and S4	0.003	0.021	0.020	0.050*
	(1.586)	(0.909)	(2.013)	(1.186)
Mother's malaise score (S1)	0.033*	0.007	0.033	-0.007

	BRITISH ABILITY SCALES (no school characteristics)		BRITISH ABILITY SCALES (incl. school characteristics)	
	Word Reading β (SE)	Pattern Construction β (SE)	Word Reading β (SE)	Pattern Construction β (SE)
(range: 0-9)	(0.260)	(0.147)	(0.316)	(0.183)
No. of children in hhld (S4)	-0.048**	0.000	-0.067**	-0.030
(range: 1-13)	(0.486)	(0.240)	(0.624)	(0.320)
IMD deprivation (employment) (S4)	-0.024	-0.041	-0.042	-0.038
(deciles, low dep – high dep)	(0.180)	(0.119)	(0.258)	(0.154)
Child Characteristics				
Child's birthweight	0.047**	0.099***	0.031	0.084***
	(0.794)	(0.448)	(1.108)	(0.584)
Child's gender (S1)	0.022	0.004	0.007	0.010
1=boy, 2=girl	(0.794)	(0.463)	(1.126)	(0.594)
Child's age at interview (S4)	0.095***	0.094***	0.088***	0.072***
Range: 6.3-8.4 years	(1.824)	(1.010)	(2.182)	(1.184)
Child's ethnicity (S1)	-0.061***	0.035	-0.050*	0.040
0=other, 1=white	(1.748)	(1.013)	(2.528)	(1.316)
Child's General Health (S3)	0.052***	0.015	0.053*	0.033
1=very poor/poor/okay, 2=good/excellent	(1.166)	(0.806)	(1.536)	(1.113)
Child has LS Illness (S4)	0.013	0.050*	0.024	0.041*
1=yes, 2=no	(0.886)	(0.510)	(1.195)	(0.591)
Child school experiences				
Whether like school (S4)				
1=never, 2= sometimes,	0.124***	0.079**	0.114***	0.074**
	(1.127)	(0.804)	(1.499)	(0.936)
1=never, 3=all the time	0.138***	0.073**	0.108***	0.050
	(1.229)	(0.781)	(1.396)	(0.899)
Does best at school (S4)				
1=never, 2=sometimes	0.073	0.055	0.108	0.052
	(3.290)	(2.326)	(4.295)	(2.500)
1=never, 3=all the time	0.121*	0.065	0.142*	0.055
	(3.372)	(2.226)	(4.429)	(2.446)
Has a lot of friends (S4)	0.003	0.004	-0.009	0.016
1=not many, 2=some/a lot of friends	(1.455)	(0.688)	(1.973)	(0.957)
Likes playing with friends (S4)	0.021	0.040**	0.037	0.047***
1=don't like, 2=sometimes/all the time	(7.059)	(2.864)	(9.707)	(2.573)
Parent-Child Interaction				
Parent-child relationship (Pianta) (S2)				
	0.047**	0.034	0.045*	0.038
Range: 30-75	(0.067)	(0.042)	(0.081)	(0.055)
Read to child (S2)	0.071***	0.016	0.071**	0.011
Range: 1=not at all….6=every day	(0.542)	(0.277)	(0.730)	(0.353)
Take to library (S3)	0.040*	0.008	0.043*	0.004
Range: 1=never...7=everyday	(0.332)	(0.174)	(0.407)	(0.206)
Activities together scale (S3)	0.046***	0.035	0.055*	0.018
Range: 0-6	(0.603)	(0.446)	(0.767)	(0.567)
Whether disorganised at home (S4)	0.020	-0.001	0.017	0.022
1=strongly agree…..5=strongly disagree	(0.401)	(0.201)	(0.517)	(0.275)
CM has a regular term-time bedtime (S3)	-0.003	0.002	-0.002	0.017
1=never/sometimes, 2=usually/always	(0.861)	(0.475)	(1.164)	(0.657)
School engagement / education aspirations				
Parents satisfied with the school? (S3)	0.066***	0.045**	0.084***	0.072***
Range: 1=very dissatisfied – 5=very	(0.780)	(0.425)	(0.986)	(0.489)

	BRITISH ABILITY SCALES (no school characteristics)		BRITISH ABILITY SCALES (incl. school characteristics)	
	Word Reading β (SE)	Pattern Construction β (SE)	Word Reading β (SE)	Pattern Construction β (SE)
satisfied				
Attend parents evening (S4)				
1=no,2=none held yet	0.008	0.010	-0.001	-0.013
	(4.612)	(2.199)	(5.996)	(2.752)
1=no, 3=yes	0.038*	0.018	0.030	-0.018
	(2.495)	(1.367)	(3.667)	(1.523)
Post16/university aspirations (S4)				
1=leave, 2=post-16 not university	0.030	0.049	0.031	0.066*
	(4.229)	(2.342)	(6.002)	(3.053)
1=leave, 2=post 16 d/k university	0.021	0.067*	0.042	0.062
	(4.049)	(2.511)	(5.264)	(3.232)
1=leave, 4 university	0.114**	0.076	0.127**	0.070
	(3.508)	(2.215)	(4.475)	(2.856)
<u>**School characteristics**</u>				
% SEN			-0.059*	-0.054*
			(0.088)	(0.049)
% eligible for free school meals			0.083*	0.008
			(0.081)	(0.037)
Mean KS1 points score over 3 years			0.051	-0.006
			(0.739)	(0.402)
R^2	0.163	0.093	0.159	0.096
Observations	5366	5353	3364	3354

Standardized beta coefficients; Standard errors in parentheses. * p < 0.05, ** p < 0.01, *** p < 0.001

M10 Behaviour Adjustment

Behavioural adjustment at age 7 years was measured with the Strength and Difficulties Questionnaire (SDQ). The SDQ is a behavioural screening questionnaire for 3 to 16 years olds (Goodman & Goodman, 2009; Goodman, 1997, 2001). It consists of 25 items,is assessed via parental or teacher report, and has been shown to have very good reliability and validity (Stone et al., 2010). The 25 items generate scores for five subscales measuring conduct problems, hyperactivity, emotional symptoms, peer problems and pro-social behaviour (each scale score ranging between 0 and 10). Scores from the conduct problems, hyperactivity, emotional symptoms and peer problems subscales are summed to create a Total Difficulties scores (range 0-40). In MCS at age 7 we have ratings of the child's behaviour from both a parent (mostly from the mother) as well as the teacher.

Figure M10.1 shows both parents and teachers ratings of children's behaviour problems by the experience of worklessness. A higher score indicates more behaviour problems. Parents experiencing repeated worklessness reported higher behavioural problems of their children than parents who are continuously in work. Likewise teacher reported more behaviour problems among children who grew up in workless families than for children growing up with working parents. The average scores for children in a family experiencing any worklessness were significantly higher than the average scores for children in a family who had not experienced worklessness.

Figure M10.1: Average total SDQ score for MCS children at age 7 by family workless status
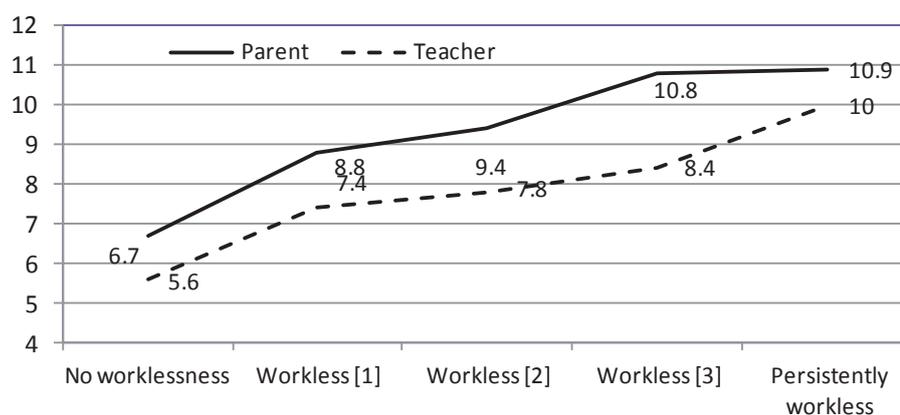
Plotting the four (parent rated) subscales on one graph showed that the highest problem scores relate to hyperactivity, as this subscale produces the highest average scores. Figure M10.2 also showed that hyperactivity was most strongly associated with the experience of parental worklessness.

Figure M10.2: Average SDQ sub-scale scores (parent rating) for MCS children at age 7 by family workless status
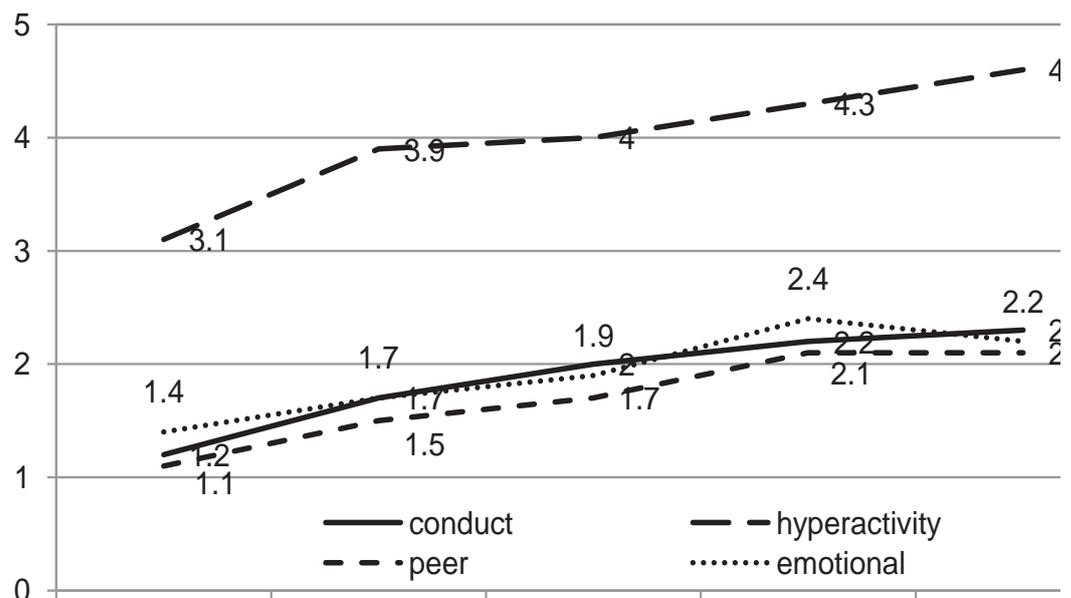
Table M10.1 gives the t-scores and significant differences of mean scores for each parent rated child behaviour outcome by workless group.

Table M10.1: Relationship between average parent rated SDQ scores and number of times workless

	0 Workless %	1 workless %	2 Workless %	3 Workless %	4 Workless %	All %	N (all)
Behaviour (Strengths & Difficulties)							
SDQ overall score (parent rated) (range: 0-40)	6.7	8.8 t=7.54***	9.5 t=7.54***	10.9 t=11.36***	11.1 t=14.47***	7.6	7096
SDQ sub-scale: conduct (range: 0-10)	1.2	1.7 t=6.44***	2.0 t=8.06***	2.2 t=9.47***	2.3 t=9.71***	1.4	7164
SDQ sub-scale: hyperactivity (range: 0-10)	3.1	3.9 t=5.67***	4.0 t=5.56***	4.3 t=7.90***	4.6 t=9.59***	3.4	7133
SDQ sub-scale: peer (range: 0-10)	1.1	1.5 t=5.62***	1.7 t=6.17***	2.1 t=10.05***	2.1 t=9.67***	1.2	7149
SDQ sub-scale: emotional (range: 0-10)	1.4	1.7 t=4.39***	1.9 t=4.24***	2.4 t=7.79***	2.2 t=7.97***	1.5	7141
n	5350-5368	608-613	348-354	375-377	415-421		

Note: T-tests were used to test mean score differences for each workless category compared against '0 workless', i.e. never workless.

A similar pattern emerged for teacher ratings of a child's behaviour (Figure M10.3): namely that the strongest relationship was found between parental worklessness and rating of hyperactivity of the child. Interestingly the teachers appeared to report fewer problems than the parent.

Figure M10.3: average SDQ sub-scale scores (teacher rated) for MCS children at age 7 by family workless status
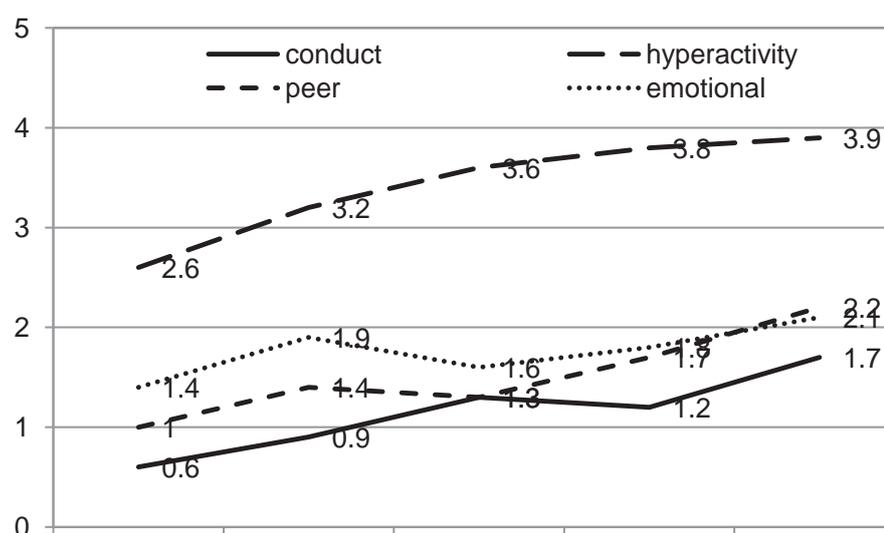
Table M10.2 gives the t-scores and significant differences of mean scores for each teacher rated child behaviour outcome by workless group.

Table M10.2: Relationship between average teacher-rated SDQ scores and number of times workless

	0 Workless %	1 workless %	2 Workless %	3 Workless %	4 Workless %	All %	*N (all)*
Behaviour (Strengths & Difficulties)							
SDQ overall score (teacher rated) (range: 0-40)	5.6	7.4 t=4.72***	7.9 t=5.02***	8.5 t=5.92***	10.0 t=9.55***	6.2	*4727*
SDQ sub-scale: conduct (range: 0-10)	0.6	0.9 t=2.85**	1.3 t=4.25***	1.2 t=4.23***	1.7 t=8.29***	0.8	*4728*
SDQ sub-scale: hyperactivity (range: 0-10)	2.6	3.2 t=3.32**	3.6 t=4.23***	3.8 t=5.39***	4.1 t=7.27***	2.9	*4728*
SDQ sub-scale: peer (range: 0-10)	1.0	1.4 t=3.30**	1.3 t=2.56*	1.7 t=4.62***	2.2 t=7.75***	1.3	*4727*
SDQ sub-scale: emotional (range: 0-10)	1.4	1.9 t=4.42***	1.6 t=1.90	1.8 t=2.76**	2.1 t=4.70***	1.5	*4727*
n	*3584*	*390*	*211*	*223*	*319-320*		

Note: T-tests were used to test mean score differences for each workless category compared against '0 workless', i.e. never workless.

The multiple regression results are now discussed for the SDQ total scores, differentiating between ratings by parent and teacher.

SDQ total scores: parent-rated and teacher-rated
Figures M10.4 and M10.5 show a bivariate relationship between persistent parental worklessness and behaviour problems reported by parents and teachers. Once risk factors linked to parental worklessness were controlled for, the size of the bar was greatly reduced, especially for parent rated behaviour problems. This indicated that the relationship between persistent worklessness and behaviour problems was largely explained by these other risk factors.

Regarding parental reports of behaviour problems (Figure M10.4) persistent worklessness did not remain as an independent risk factor once the different sets of protective factors were controlled for. However, quite the opposite was found for teacher-rated behaviour adjustment. Figure M10.5 shows that in every model, including the final models, persistent worklessness remained as independent risk factors for increased behaviour problems. Further to this, table M10.5 shows that temporary workless also remained an independent risk factor for increased behavioural problems reported by a teacher, but not by a parent.

Figure M10.4. Predicting parent-rated SDQ total scores (Standardised Beta coefficients of the multiple regression models
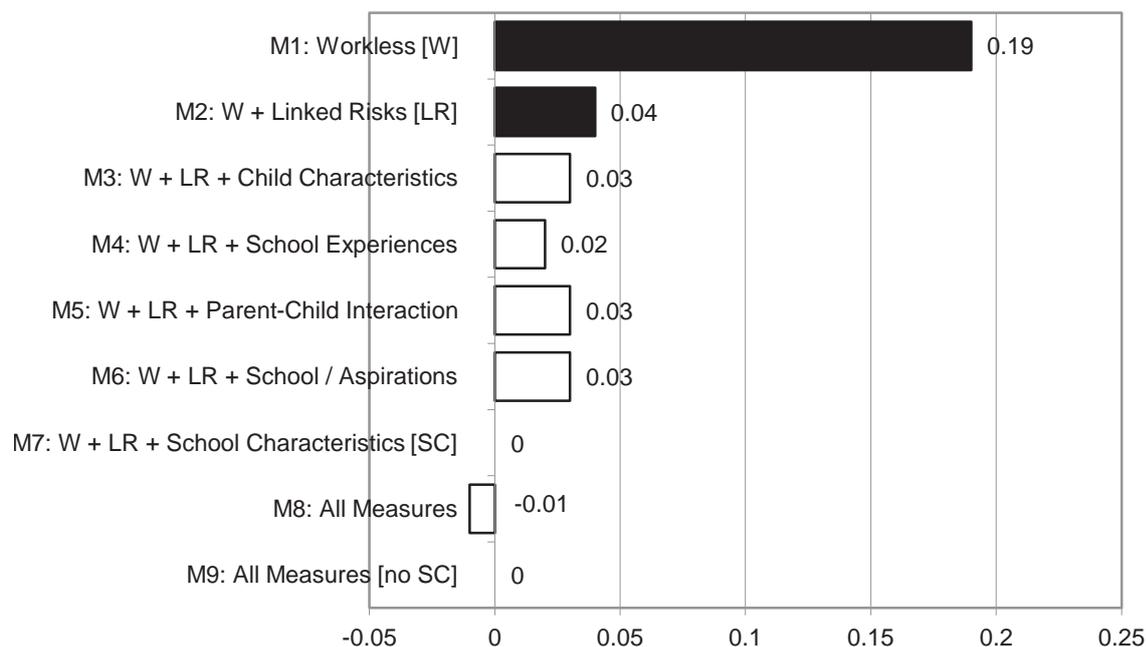
Figure M10.5. Predicting teacher-rated SDQ total scores (Standardised Beta coefficients of the multiple regression models
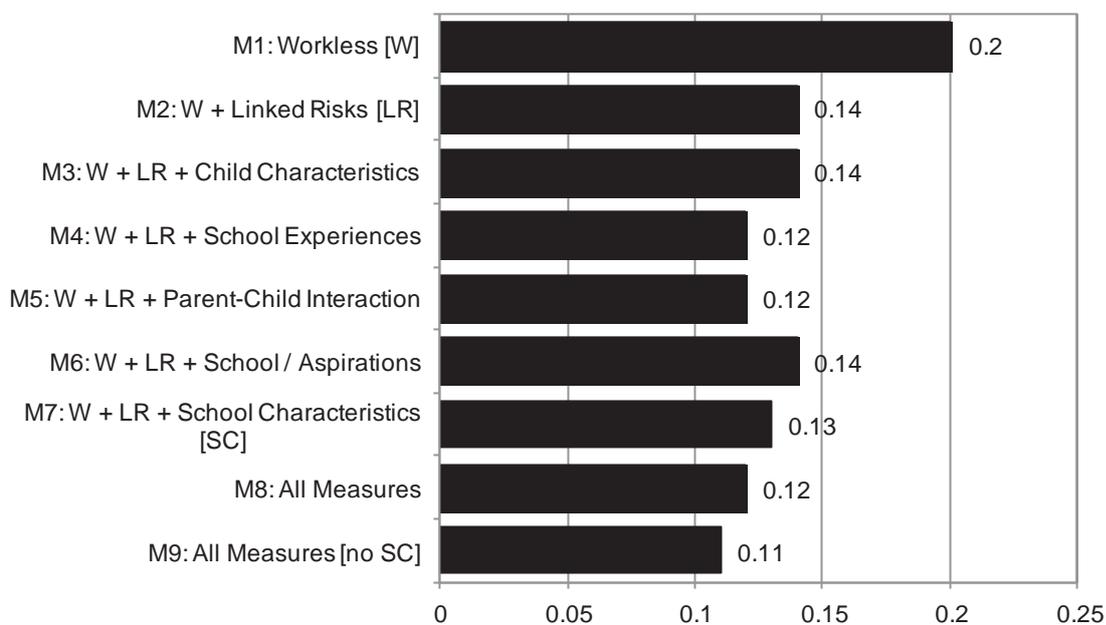
Tables M10.3 and M10.4 show the relationship between temporary and persistent worklessness and parent and teacher rated behaviour (respectively) in each of the

nine separate multiple regression models carried out and table M10.5 provides the results for the final models (Model 8 and 9).

Summary SDQ total score regression results

Regarding the predictors of behaviour adjustment we found that temporary and persistent worklessness shows an independent risk effect in addition to and above all other variables included in the model for teacher-rated but not parent-rated behaviour adjustment. While most of the association between parental worklessness and parental rating of behaviour adjustment of their child could be explained by the interlinked risk factors, the risk factors explained less of the association between parental worklessness and teacher rating of behaviour. Adding the different sets of protective factors removed the significant association between parental worklessness and parent-rated behaviour. The protective factors however showed little impact on the association between parental worklessness and teacher-rated behaviour - even in the final models. Table M10.5 shows that the individual potential risk and protective factors which had a significant association with cognitive performance were broadly similar for the two final models ran for parent and teacher rated behaviour adjustment, which again indicates relative stability of the findings. The specific risk and protective measures that had a significant independent association with behaviour adjustment after controlling for all the other factors in the model are now described.

Associated linked risks
Among the associated risks being a younger mother, parental long-standing illness and mother's malaise score remains significantly associated with parent rated behaviouradjustment of the child, after controlling for all the other factors in the model. Rented social housing and a low level qualifictions were independent risk factors for teacher-rated behaviour.

Child characteristics
Being a boy with a higher birthweight were each identified as potential protective factors for both parent and teacher reported behaviour scores. Being in good health and no long standing illness were both identified as additional potential protective factor for parent-rated behaviour. Being older was a protective factor for teacher-rated behaviour.

Child's school experiences
Positive school experiences, i.e. if the child liked school appeared to act as a potential protective factors for both parent and teacher rated behaviour scores. Enjoying playing with friends was a protective factor for teacher rated behaviour scores.

Parent-Child Interaction

A warm parent-child relationship and living in an organised home played a protective role for both teacher and parent rated behaviour adjustment. Parent-child activities reduced the association between parental worklessness and parent-rated behaviour..

Parental engagement with the school

Another set of potential protective factors include parental engagement with the school, and parental satisfaction with the school was significantly related to parent rated behaviour scores. High parental educational aspirations for their child, i.e. aspiring the child to go to university was an additional measure for parent-rated behaviour.

School Characteristics.

None of the school characteristics were found to be independently associated with either parent or teacher rated behaviour scores.

Table M10.3: Regression on SDQ (Parent) score

	Model 1 β (SE)	Model 2 β (SE)	Model 3 β (SE)	Model 4 β (SE)	Model 5 β (SE)	Model 6 β (SE)	Model 7 β (SE)	Model 8 β (SE)	Model 9 β (SE)
No. times workless (S1-S4)	***	*	*	ns	ns	**	*	ns	ns
1 workless	0.106***	0.011	0.010	0.017	0.020	0.004	0.008	0.027	0.019
	(0.270)	(0.279)	(0.277)	(0.284)	(0.297)	(0.292)	(0.441)	(0.421)	(0.309)
2 workless	0.114***	0.002	0.002	-0.009	0.018	-0.005	-0.021	0.001	0.001
	(0.349)	(0.416)	(0.418)	(0.404)	(0.386)	(0.425)	(0.515)	(0.476)	(0.397)
3 workless	0.175***	0.047**	0.043**	0.038*	0.039*	0.045**	0.054**	0.041	0.027
	(0.359)	(0.382)	(0.363)	(0.410)	(0.428)	(0.393)	(0.487)	(0.528)	(0.465)
Persistently workless	**0.192*****	**0.042***	**0.031**	**0.019**	**0.025**	**0.027**	**0.004**	**-0.010**	**-0.000**
	(0.332)	(0.447)	(0.427)	(0.456)	(0.479)	(0.441)	(0.565)	(0.644)	(0.501)
R^2	0.075	0.152	0.198	0.184	0.262	0.182	0.157	0.314	0.314
Observations	7079	6834	6788	6391	5920	6544	4129	3355	5339

Standardized beta coefficients; Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table M10.4: Regression on SDQ (Teacher) score

	Model 1 β (SE)	Model 2 β (SE)	Model 3 β (SE)	Model 4 β (SE)	Model 5 β (SE)	Model 6 β (SE)	Model 7 β (SE)	Model 8 β (SE)	Model 9 β (SE)
No. times workless (S1-S4)	***	***	***	***	***	***	**	**	**
1 workless	0.089***	0.039*	0.042*	0.044*	0.042	0.035	0.061*	0.074*	0.049*
	(0.390)	(0.387)	(0.384)	(0.401)	(0.457)	(0.385)	(0.536)	(0.638)	(0.472)
2 workless	0.084***	0.047*	0.045*	0.044*	0.063**	0.055**	0.050*	0.067*	0.047*
	(0.446)	(0.488)	(0.498)	(0.476)	(0.563)	(0.512)	(0.631)	(0.769)	(0.583)
3 workless	0.110***	0.066**	0.062**	0.048*	0.060*	0.072**	0.085**	0.078*	0.044
	(0.477)	(0.593)	(0.600)	(0.592)	(0.644)	(0.592)	(0.715)	(0.861)	(0.684)
Persistently workless	**0.200*****	**0.143*****	**0.134*****	**0.123*****	**0.116*****	**0.137*****	**0.132*****	**0.127****	**0.113*****
	(0.463)	(0.723)	(0.709)	(0.738)	(0.758)	(0.708)	(0.950)	(1.133)	(0.866)
R^2	0.056	0.080	0.120	0.123	0.091	0.100	0.083	0.170	0.166
Observations	5222	4701	4673	4443	4142	4537	3001	2490	3795

Standardized beta coefficients; Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table M10.5: Final Regression: SDQ toal scores (Parent and Teacher rated)

	Behaviour (SDQ) (no School characteristics)		Behaviour (SDQ) (School characteristics)	
	Parent β (SE)	Teacher β (SE)	Parent β (SE)	Teacher β (SE)
No. times workless (S1-S4)				
1 workless	0.019	0.049[*]	0.027	0.074[*]
	(0.309)	(0.472)	(0.421)	(0.638)
2 workless	0.001	0.047[*]	0.001	0.067[*]
	(0.397)	(0.583)	(0.476)	(0.769)
3 workless	0.027	0.044	0.041	0.078[*]
	(0.465)	(0.684)	(0.528)	(0.861)
Persistently workless	-0.000	0.113[***]	-0.010	0.127[**]
	(0.501)	(0.866)	(0.644)	(1.133)
Associated Risks				
Age of mother at birth (S1)	-0.083[***]	-0.053[**]	-0.070[***]	-0.042
	(0.013)	(0.019)	(0.018)	(0.024)
Language spoken (S1): 0=English, 1=other	-0.014	-0.014	-0.019	-0.022
	(0.318)	(0.423)	(0.416)	(0.520)
Housing tenure (S1)				
0=own, 1=rent (social)	0.019	0.072[**]	0.032	0.091[**]
	(0.244)	(0.363)	(0.347)	(0.453)
0=own, 2=rent (private)	0.004	0.029	0.005	0.032
	(0.306)	(0.485)	(0.409)	(0.605)
0=own, 3=other	-0.002	-0.020	0.009	-0.002
	(0.389)	(0.559)	(0.512)	(0.829)
Highest qualification (household) (S1)				
0=NVQ4+, 1=NVQ3	0.009	-0.013	-0.002	0.009
	(0.211)	(0.265)	(0.257)	(0.346)
0= NVQ4+, 2=NVQ2	0.024	0.013	0.012	0.031
	(0.191)	(0.262)	(0.250)	(0.312)
0=NVQ4+,3=NVQ1/overseas	0.010	-0.040[*]	-0.038	-0.050[*]
	(0.384)	(0.480)	(0.514)	(0.613)
0= NVQ4+, 4=NVQ1	0.025	-0.013	0.006	-0.052
	(0.428)	(0.775)	(0.613)	(0.903)
Not gained higher qual (h'hold) (S1-S4)	0.009	-0.024	0.013	-0.030
0=yes, 1=no	(0.187)	(0.266)	(0.210)	(0.322)
Poverty (OECD median) (S1)	0.025	-0.017	0.054[*]	-0.013
0=above 60%, 1=below 60%	(0.207)	(0.367)	(0.273)	(0.479)
Marital status (S1): 0=married, 1=cohabiting	0.013	-0.013	0.030	-0.009
	(0.173)	(0.230)	(0.211)	(0.319)
0=married, 2=single parent	0.028	-0.014	0.018	-0.024
	(0.359)	(0.530)	(0.440)	(0.714)
No. of marital transitions (S1-S4)	0.043[*]	0.034	0.034	0.029
(range: 0-3)	(0.118)	(0.143)	(0.160)	(0.183)
LS limiting illness (S1-S4)				
0=none, 1=at S1 or S4	0.056[***]	0.035	0.051[**]	0.043
	(0.165)	(0.239)	(0.231)	(0.293)
0=none, 2=S1 and S4	0.046[**]	0.021	0.028	0.040
	(0.291)	(0.386)	(0.388)	(0.517)
Mother's malaise score (S1)	0.063[***]	0.026	0.064[**]	0.024
(range: 0-9)	(0.050)	(0.067)	(0.067)	(0.084)
No. of children in hhld (S4)	-0.011	-0.055[*]	-0.039[*]	-0.023
(range: 1-13)	(0.079)	(0.127)	(0.092)	(0.179)
IMD deprivation (employment) (S4)	0.008	-0.003	0.016	0.005
(deciles, low dep – high dep)	(0.026)	(0.043)	(0.041)	(0.056)

	Behaviour (SDQ) (no School characteristics)		Behaviour (SDQ) (School characteristics)	
	Parent β (SE)	Teacher β (SE)	Parent β (SE)	Teacher β (SE)
Child Characteristics				
Child's birthweight	-0.033*	-0.053*	-0.032*	-0.054*
	(0.121)	(0.193)	(0.141)	(0.250)
Child's gender (S1)	-0.062***	-0.141***	-0.040*	-0.151***
1=boy, 2=girl	(0.145)	(0.195)	(0.191)	(0.245)
Child's age at interview (S4)	-0.036*	-0.051**	-0.019	-0.060*
Range: 6.3-8.4 years	(0.308)	(0.432)	(0.379)	(0.521)
Child's ethnicity (S1)	-0.007	0.014	-0.027	0.030
0=other, 1=white	(0.264)	(0.408)	(0.359)	(0.520)
Child's General Health (S3)	-0.063***	-0.022	-0.061**	-0.031
1=very poor/poor/okay, 2=good/excellent	(0.224)	(0.302)	(0.312)	(0.359)
Child has LS Illness (S4)	-0.083***	-0.010	-0.062**	0.004
1=yes, 2=no	(0.158)	(0.222)	(0.209)	(0.267)
Child school experiences				
Whether like school (S4)				
1=never, 2= sometimes,	-0.055*	-0.057*	-0.058*	-0.041
	(0.238)	(0.318)	(0.302)	(0.406)
1=never, 3=all the time	-0.099***	-0.116***	-0.134***	-0.111**
	(0.235)	(0.289)	(0.272)	(0.392)
Does best at school (S4)				
1=never, 2=sometimes	-0.074	-0.031	-0.012	-0.029
	(0.736)	(0.830)	(1.037)	(1.127)
1=never, 3=all the time	-0.146*	-0.120	-0.086	-0.079
	(0.732)	(0.854)	(1.033)	(1.169)
Has a lot of friends (S4)	-0.038**	-0.045*	-0.030	-0.045
1=not many, 2=some/a lot of friends	(0.213)	(0.321)	(0.284)	(0.459)
Likes playing with friends (S4)	-0.002	-0.051**	-0.001	-0.074***
1=don't like, 2=sometimes/all the time	(1.065)	(1.499)	(1.215)	(1.625)
Parent-Child Interaction				
Parent-child relationship (Pianta) (S2)	-0.278***	-0.083***	-0.274***	-0.088***
Range: 30-75	(0.011)	(0.014)	(0.013)	(0.017)
Read to child (S2)	-0.043*	0.018	-0.030	0.008
Range: 1=not at all….6=every day	(0.093)	(0.113)	(0.123)	(0.159)
Take to library (S3)	-0.032*	-0.004	-0.033	0.005
Range: 1=never...7=everyday	(0.047)	(0.067)	(0.063)	(0.086)
Activities together scale (S3)	-0.022	-0.036*	-0.035*	-0.041
Range: 0-6	(0.114)	(0.149)	(0.139)	(0.206)
Whether disorganised at home (S4)	-0.133***	-0.081***	-0.134***	-0.081***
1=strongly agree…..5=strongly disagree	(0.074)	(0.102)	(0.090)	(0.120)
CM has a regular term-time bedtime (S3)	-0.015	-0.020	-0.028	-0.017
1=never/sometimes, 2=usually/always	(0.151)	(0.196)	(0.173)	(0.277)
School engagement / education aspirations				
Parents satisfied with the school? (S3)	-0.095***	-0.053**	-0.097***	-0.045
Range: 1=very dissatisfied – 5=very satisfied	(0.138)	(0.201)	(0.167)	(0.235)
Attend parents evening (S4)				
1=no,2=none held yet	0.014	-0.009	0.011	0.041
	(0.859)	(1.155)	(1.042)	(1.375)
1=no, 3=yes	-0.031	-0.071*	-0.008	-0.015
	(0.563)	(0.844)	(0.797)	(1.024)
Post16/university aspirations (S4)				
1=leave, 2=post-16 not university	-0.036	-0.038	-0.075*	-0.054
	(0.795)	(1.163)	(1.051)	(1.495)

	Behaviour (SDQ) (no School characteristics)		Behaviour (SDQ) (School characteristics)	
	Parent β (SE)	Teacher β (SE)	Parent β (SE)	Teacher β (SE)
1=leave, 2=post 16 d/k university	-0.038 (0.680)	-0.024 (1.146)	-0.053 (0.905)	-0.034 (1.462)
1=leave, 4 university	-0.097** (0.611)	-0.060 (1.026)	-0.156*** (0.810)	-0.097 (1.253)
School characteristics				
% SEN			0.005 (0.014)	0.047 (0.023)
% eligible for free school meals			-0.002 (0.012)	-0.051 (0.016)
Mean KS1 points score over 3 years			-0.042 (0.102)	0.031 (0.147)
R^2	0.314	0.166	0.314	0.170
Observations	5339	3795	3355	2490

*Standardized beta coefficients; Standard errors in parentheses. * p < 0.05, ** p < 0.01, *** p < 0.001*

M11 Child well-being measures

In addition to cognitive and behavioural adjustment, we examined the association between repeated worklessness and indicators of child wellbeing. In particular we focused on whether the child had been bullied by other children ('How often do other children bully you?'), whether the child had bullied other children ('How often are you horrible to other children at school?'), and whether children were happy in the school environment. The association between parental worklessness and these well-being outcomes was weaker than we found for academic, cognitive and behaviour outcomes. After controlling for the associated linked links, the significant association between the individual well-being outcomes and parental worklessness at the bivariate level was no longer significant. We do not, therefore, include the full set of tables containing the multiple regression results.

Figure M11.1 shows that children growing up in workless families were more likely to be bullied by other children than those growing up in persistent working families (F(3.91,1519.61) = 18.72 (p<.000).

Figure M11.1: Child being bullied ('How often do other children bully you?') by parental worklessness
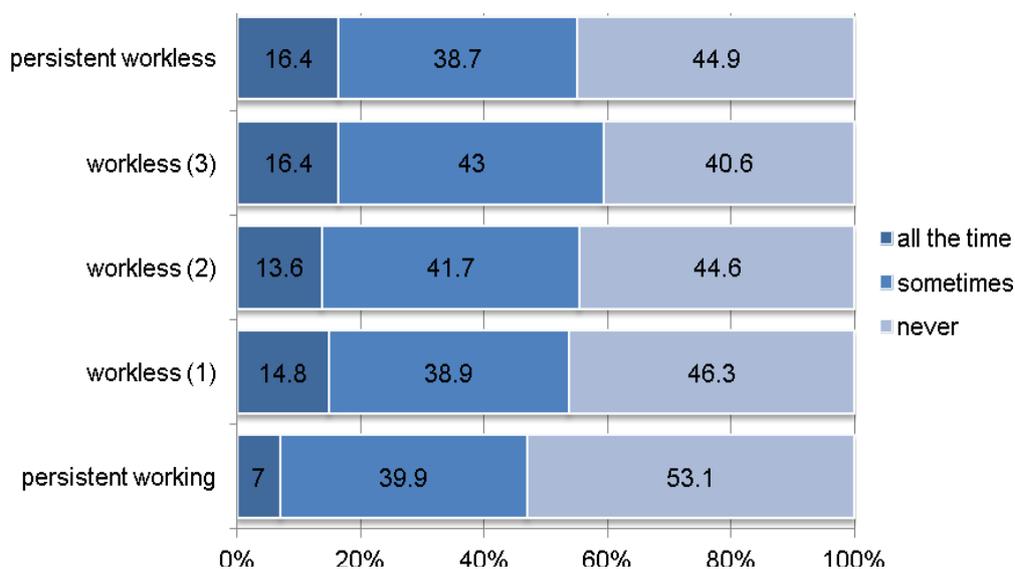
Table M11.1 gives the results of a logistic regression linking worklessness to being bullied (Model 1). After we controlled for the interlinked risk factors associated with worklessness (Model 2) the association between parental workless and being bullied did not remain significant, suggesting that parental worklessness is not a key driver of being bullied. We therefore did not examine the role of potential protective factors, as the association between parental worklessness and bullying was fully explained by the interlinked risk factors.

Table M11.1 : Logistic Regression odds ratios for 'never or sometimes' v 'always' bullied?

	Model 1 [W]	Model 2 [W + LR]
	OR (95% CIs)	OR (95% CIs)
No. times workless (S1-S4)	2.31***	1.16
1 workless v persistent working	(1.76-3.05)	(0.85-1.59)
2 workless v persistent working	2.10***	0.94
	(1.41-3.13)	(0.59-1.49)
3 workless v persistent working	2.67***	1.07
	(1.84-3.87)	(0.71-1.62)
Persistently workless v persistent	2.48***	0.92
working	(1.81-3.38)	(0.60-1.43)
Observations	*6992*	*6123*

Next we look at the association between parental worklessness and whether the child bullied other children, or specifically, how often were they horrible to other children. The data presented in Figure M11.2 furthermore suggests, that children growing up with workless parents were also more likely to bully other children when compared to children with parents who were persistently working ($F_{(7.66, 2980.98)}$ = 7.66; $p<.000$).

Figure M11.2. Bullying other children ('How often are you horrible to other children at school?') by parental worklessness

Table M11.2 gives the results of a logistic regression linking worklessness to being horrible to others (Model 1). After controlling for the interlinked risk factors the association between being horrible to other children and worklessness is no longer significant, suggesting that parental worklessness is not a key driver of a child being

horrible to others. We therefore did not examine the role of potential protective factors, as the association between parental worklessness and bullying was fully explained by the interlinked risk factors.

Table M11.2: Logistic Regression odds ratios for 'never' v' sometimes or always' horrible to others

	Model 1 [W]	Model 2 [W + LR]
	OR (95% CIs)	OR (95% CIs)
No. times workless (S1-S4)	1.33*	0.99
1 workless v persistent working	(1.02-1.73)	(0.72-1.36)
2 workless v persistent working	1.51**	1.11
	(1.13-2.00)	(0.77-1.60)
3 workless v persistent working	1.21	0.75
	(0.89-1.65)	(0.51-1.11)
Persistently workless v persistent working	1.92***	1.08
	(1.46-2.52)	(0.73-1.60)
Observations	*6993*	*6120*

We finally looked at whether children growing up in repeated and persistent workless households reported that they felt unhappy at school more often than children with working parents ($F_{(7.46, 2901.42)} = 10.96$; $p<.000$). Figure M11.3 suggests that children growing up with repeatedly workless parents feel more often unhappy at school.

Figure M11.3. 'How often do you feel unhappy at school?'
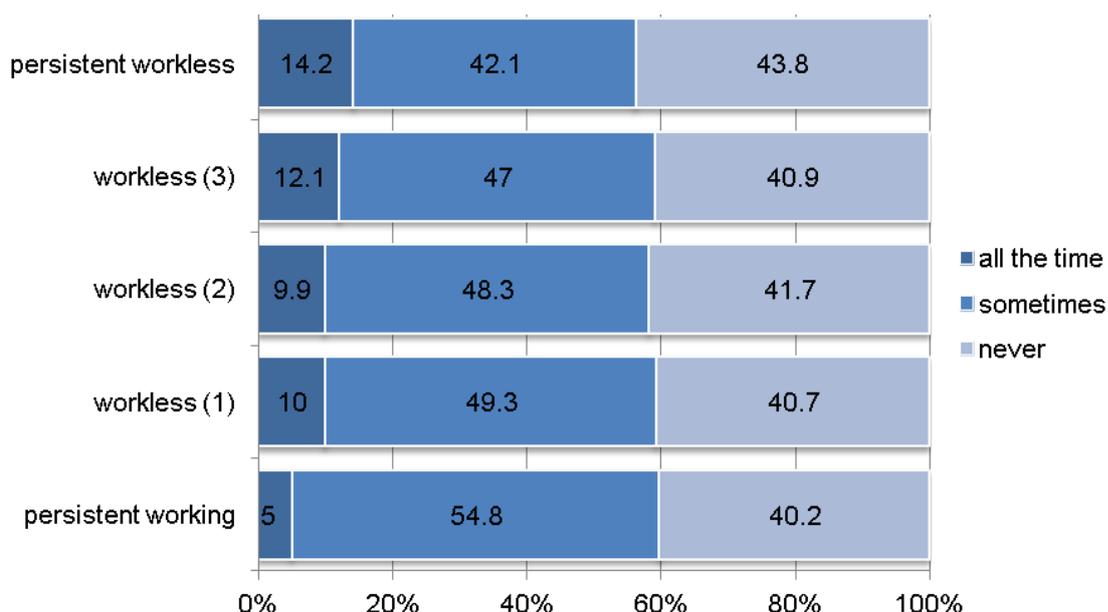
Table M11.3 gives the results of a logistic regression linking worklessness to feeling unhappy at school (Model 1). As in the previous models, the association between worklessness and happiness at school was no longer significant after controlling for the interlinked risk factors associated with worklessness, suggesting that parental worklessness is not a key driver of children's happiness at school. We therefore did not examine the role of potential protective factors, as the association between parental worklessness and happiness at school was fully explained by the interlinked risk factors.

Table M11.3: Logistic Regression odds ratios for 'never or sometimes' v 'always' unhappy?

	Model 1 [W]	Model 2 [W + LR]
	OR (95% CIs)	OR (95% CIs)
No. times workless (S1-S4) 1 workless v persistent working	2.10*** (1.50-2.92)	1.29 (0.86-1.93)
2 workless v persistent working	2.09*** (1.35-3.23)	1.26 (0.75-2.12)
3 workless v persistent working	2.59*** (1.72-3.90)	1.57 (0.99-2.52)
Persistently workless v persistent working	3.18*** (2.32-4.37)	1.63 (0.95-2.79)
Observations	*6933*	*6066*

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