SUMMARY REVIEW OF THE FACTORS RELATING TO RISK OF CHILDREN EXPERIENCING SOCIAL AND EMOTIONAL DIFFICULTIES AND COGNITIVE DIFFICULTIES.

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EXCECUTIVE SUMMARY

This summary review of the factors relating to risk of children experiencing social and emotional difficulties and cognitive was undertaken to support the development of guidance on two related NICE intervention topics promoting the social and emotional wellbeing of vulnerable pre-school children aged 0-5. The intervention guidance will focus on the effectiveness of specific progressive interventions: home visiting and family based interventions; and early education and child care interventions.

We attempted to map the risk factors associated with children's likelihood of experiencing social and emotional problems and cognitive difficulties using evidence from the most relevant cohort study data. A decision was taken by the PHCC and NICE CPHE teams to focus on Millennium Cohort study (MCS) publications to obtain this data. All publications arising from the Millennium Cohort study are listed in a database maintained by the Centre for Longitudinal Studies (http://www.cls.ioe.ac.uk/).

Work by the National Child and Maternal Health Observatory (ChiMat) on the PREview project aimed to consider maternal and child early life course characteristics (around birth and at nine months and at age three) from the millennium cohort study associated with later child development (at age 5), in order to develop a predictive modelling tools for child health and wellbeing and resources for professionals. Here we report on their work and consider whether other MCS papers reporting on child wellbeing can support and add to their conclusions.

Twenty papers were identified through the database hand searching. We excluded three articles which were obtained as full papers but subsequently found to be outside of the scope of the review.

Unsurprisingly the factors associated with risk of children experiencing difficulties in social and emotional development and cognitive development are very complex and challenging to define. Here we have taken an evidence based approach in order to use the research literature to attempt to define these factors. Kiernan and Mensah (2009) in their PREview work broadly defined three spheres of influence on

emotional and social wellbeing: behavioural development, cognitive development, and health status. Here we have combined their analysis with additional work based on data from the MCS study and found that this data largely supports the PREview work (although some authors report on mental health specifically rather than general health). The factors which impact on each of these spheres are not independent, with many factors having an influence in all three spheres. We have loosely defined the influencing factors as measures of: socio-economic status, income, housing/neighbourhood, early years/child care, parental relationship and marital status, parenting behaviours, child factors, ethnicity and maternal factors.

(When considering ethnicity it is important to note that the relatively small numbers involved in the MCS sample did not allow full detailed analysis of the nature of the relationship between ethnicity and child health outcomes by the ChiMat team. The role of such cultural factors is therefore not well understood.)

From this list of risk factors it is problematic to determine which are most important in identifying children and families at risk who might benefit from home based and early education and child care interventions. However, the most prevalent risk factors in the UK population are low income (around 30% of children) linked directly to being a lone parent (24% of families) and living in social housing (27% of families). Factors relating to ethnicity (minority ethnic 7.9%), child factors (such as low birth weight 7-10%) and maternal factors (such as maternal age and smoking in pregnancy (17%) are less prevalent: however being of low income/socioeconomic status does further increase these additional risk factors.

In addition, data from the PREview project (Kiernan 2009) can be further used to suggests that maternal factors (mother's health, age and education), and housing situation (social housing and high area deprivation) have the greatest effect on the absolute risk that a child will experience any negative outcome relating to social and emotional development and cognitive development. On income, the project found that low household income matters for all the child health outcomes but poverty and benefit receipt matter for some outcomes but not others. This may to be due to the overlaps that exist between for example income level and other measures.

Taking into account the risk factors that are most prevalent in the population and those which appear to have the greatest impact on absolute risk it seems likely that those children at greatest risk of social and emotional problems and cognitive problems will be from lone parent, low income households, living in social housing in areas of high deprivation. Their mothers are likely to be relatively young, poorly educated and in poor health.

EVIDENCE STATEMENTS

Millennium Cohort Study (MCS) Evidence Statement 1:
How can those vulnerable children and families who might benefit from early education and child care interventions be indentified?

It may be possible to identify children and families who might benefit most from early education and child care interventions by considering the factors which research suggests are likely to increase their risk as is discussed in the statements below.

The models for predicting future likely child health outcomes could be used at a population level to direct early intervention investment towards those children and families that are most likely to experience poorest outcomes. However the model is dependent on the robustness of the longitudinal data sets in identifying all the key risk factors, and the availability of local data to map these factors. Certain factors are not well represented including those relating to parenting and parental mental health problems. The relationship between cultural factors and child outcomes is not well understood.)

Also such models cannot be used to predict outcomes at an individual level. The models may inform practitioners about risk factors, however practitioner knowledge will also be vital in validating the model for use for individual risk assessment purposes.

MCS Evidence Statement 2
What factors increase the risk of children experiencing difficulties in social and emotional development and cognitive development?

Children's social and emotional development and cognitive development are

affected by a wide range of interacting risk factors. Here we have used studies which report on the Millennium Cohort Study to define these risk factors. There is strong evidence to suggest that the following factors were (statistically) significantly associated with child emotional and social development, and cognitive development:

Socio-economic status (positively associated with higher parent's social class, and greater family resources, negatively associated with family socio-economic disadvantage).

Income: (positively associated with family income and number of earners in the household, negatively associated with workless household).
Housing measures: (positively associated with being an owner occupier, negatively associated with social housing, resident in deprived area and experiencing housing difficulties

Early years/child care measures: (positively associated with attendance at any type of early years education, and with non- formal child care compared to formal care; specifically Grandparent care).

Parental relationship and marital status measures (positively associated with having married parents, and parent's relationship at birth positive, negatively associated with being a lone parent an unemployed lone parent, cohabiting, or living with a step father , and if parents had disagreements over parenting the child).

Parenting measures: positive parenting positively associated with child wellbeing. In addition one study also reported a summary measure of aspects of negative parenting (from BAS and FSP scales) specifically: positive home observation (FSP); parental warmth; child is read to/taught alphabet every day; visit library regularly; regular meal times and betimes. A high level of parent child conflict was negatively associated.

Child factors (positively associated with being female, higher birth weight, fewer of siblings, being first born, being older within the academic year, and high BAS scores earlier in life (Hansen 2010).

Ethnicity measures: (positively associated with having a white mother and living in a family where only English was spoken in the household, negatively associated with being of Indian/Pakistani/Bangladeshi or Black African origin. (Pakistani children appear to be at most risk)).

Maternal factors: (positively associated with maternal (and/or parental)

education having an older mother, mother's self rated health, mother ever been in employment, mother was happy about the pregnancy. Negatively associated with maternal depression, maternal psychopathology, alcohol consumption in pregnancy, smoking in pregnancy, if the mother had lived away from home before 17 years old, whether the mothers parents separated before she was seventeen).

MCS Evidence Statement 3:
What is prevalence of risk factors in the UK population?

It is problematic to determine which are most important risk factors in identifying children and families at risk who might benefit from home based and early education and child care interventions. No set of factors stands out as being particularly significant and this problem is augmented by authors choosing to report on particular aspects (particularly cognitive risks) which may be skewing the data.

We therefore looked at the prevalence of these risk factors in the UK population on the premise that those factors which are most prevalent in the population may be said to demonstrate an increased risk over factors which occur less frequently. The most prevalent risk factors in the UK population are low income (around 30% of children) linked directly to being a lone parent (24% of families) and living in social housing (27% of families) with ethnicity (minority ethnic 7.9%), child factors (such as low birth weight 7-10%) and maternal factors (such as smoking in pregnancy (17%) being less prevalent: however being of low income/socioeconomic status does further increase these additional risk factors. It is important the recognise that data on prevalence of major risk factors relating to parenting behaviours could not be found at the national level.

MCS Evidence Statement 4:
What is the absolute risk of children experiencing difficulties relating to these factors and their combination?

Further analysis of data generated by the PREview projects suggests that:
Poor general maternal health increases a child's risk by 26.5% (compared to a child of good general health). There is a 22% increase in risk for children of young (13-19 year old) mothers compared to children of mothers over 35, and

the increase in risk between children of the least qualified mothers (no qualifications) compared to the most qualified mothers (NVQ level 4/5) is 27.5%. A high score for mother's malaise increases risk by 16.9%, and any indication of poor self efficacy increases risk by 18.5%.

Being of low birth weight increases risk by 13.1%, but the gender gap only increases boy's risk by 6.3%, and being a multiple birth increases risk by only 8.7%. Only speaking languages other than English increases risk by 14.3% compared to exclusively English speaking households.

Living in social housing increases risk by 21.6%, compared to children whose parents are owner occupiers, and family experiencing housing difficulties also increases risk by 17.2%. Living in areas of high multiple deprivation increases risk by 22.7% (when comparing the highest to the lowest quintile of deprivation).

This analysis therefore suggests that maternal factors (mother's age, education and general health), and housing situation (social housing and high area deprivation) have the greatest effect on increasing the risk that a child will experience any negative outcome relating to social and emotional development and cognitive development.

ABBREVIATIONS

BAS	British Ability Scale
BMI	Body Mass Index
CARE index	Infant attachment and parent sensitivity measure
CBA	Controlled Before and After study
CI	Confidence Interval
CPHE	Centre for Public Health Excellence
CGS	Community Group Support
EPDS	Edinburgh Postnatal Depression Scale
EPPE	Effective Provision of Pre-school Education
GHQ12	General Health Questionnaire 12
HOME inventory	Home Observation and Measurement of the Environment
LEA	Local Education Authority
MCS	Millennium Cohort Study
NFP	Nurse Family Partnership
OR	Odds Ratio
PND	Post Natal Depression
RCT	Randomised Controlled Trail
RR	Relative Risk
SEN	Special Educational Needs
SHV	Support Health Visitor
SS	Sure Start
SSLP	Sure Start Local Programmes

GLOSSARY OF TERMS

Outcome measures:

Child wellbeing (parent reported).	Includes one validated tool to measure child temperment as reported by parents (Brief Infant and Toddler social and emotional assessment), others measures were not previously validated. Child injury also self reported by the parent.
Child development	Validated scales measuring child development assessed by a professional such as the British Ability Scale.
Child behaviour	Validated scales for measuring child behaviour assessed by a professional such as the Foundation Stage Profile.
ChiMat	Child and Maternal Health Observatory: provides information and intelligence to improve decision-making for high quality, cost effective services
Parent wellbeing (self reported)	Validated scales to measure self reported parental wellbeing such as the Parent Stress Index

Maternal depression /mental health	Validated scale to measure postal natal depression: Edinburgh Postnatal Depression Scale, plus other non validated tools.
Parenting	Both validated and non validated scales assessed by a professional to measure aspects of positive and negative parenting such as the Parenting Risk Index. Also tools allowing parents to self report parenting behaviours.
PREview	Work on the PREview is project being carried out jointly by MIRU and Chimat at the Yorkshire and Humber Public Health Observatory. It is investigating the evidence base and feasibility of a tool which will help health professionals target the Healthy Child Programme effectively so as to optimise child outcomes.
Social support (self reported)	Self reported measures of social support, some validated such as Duke's Functional Support Scale.
Family relationships (self reported)	Validated scales to measure self reported aspects of family relationships such as mother child relationship and father involvement in the family.
Home environment	Validated scales to measure the home environment in terms of its suitability to promote learning and development, such as the HOME Inventory
Parent behaviours (self reported)	Self reported rates of cigarette and alcohol consumption.
Breastfeeding/feeding practices (self reported)	Self reported rate/duration of breast feeding and other infant feeding practices.
Health	Validated tools to measure general health, such as the General Health Questionnaire.
Service use (self reported)	Self reported use of health and/or support services.

Research Terminology:

Effect size	A unit-free effect measure, indicating the size of observed effects. Effect sizes (e.g. Cohen's d) may be interpreted according to the following suggestions provided by Cohen, 1988): 0.2 = small effect, 0.5 = moderate effect, 0.8 = large effect size
Heterogeneity	The degree to which studies under review are different.

Meta-analysis	A statistical method by which the results of a number of studies are pooled to give a combined summary statistic.
Millennium Cohort Study	The Millennium Cohort Study (MCS) is a multi-disciplinary research project following the lives of around 19,000 children born in the UK in 2000/1. 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.
Odds ratio	The ratio of the odds of an outcome in an exposed (or experimental) group to the odds of an outcome in an unexposed (or control) group. (An odds ratio of 1 would mean that the outcome under study is equally likely in both groups; an odds ratio greater than 1 would indicate that the outcome is more likely in the exposed group).
Relative risk	Ratio of the probability of an outcome occurring in an exposed (or experimental) group relative to a non-exposed or control group. (A relative risk value greater than 1 would indicate that the outcome is more likely in the experimental group

1. INTRODUCTION

1.1. Aims and objectives

This summary review of the factors relating to risk of children experiencing social and emotional difficulties and cognitive was undertaken to support the development of guidance on two related NICE intervention topics promoting the social and emotional wellbeing of vulnerable pre-school children aged 0-5. The intervention guidance will focus on the effectiveness of specific progressive interventions: home visiting and family based interventions; and early education and child care interventions.

This summary review work supports three further reports:

- A systematic review of international review level evidence of: Home visiting and family based interventions; and early education and childcare interventions.

- A systematic review of UK evaluation studies which consider the effectiveness of early years programmes and interventions designed to promote social and emotional health, and cognitive ability among vulnerable children and families; and evidence on the factors influencing the effectiveness of delivery and implementation of interventions (including qualitative and process evaluations).

- A systematic review of cost effectiveness of interventions, plus economic and econometric modelling work will be undertaken to support this evidence base.

1.2 Research questions

This summary review aims to address the following key questions:

- How can those vulnerable children and their families who might benefit from home based/early education and childcare interventions be indentified?
- What factors increase the risk of children experiencing social and emotional difficulties?
- What is the absolute risk of children experiencing difficulties relating to these different factors and their combinations?

- How can interventions reduce vulnerability and build resilience to help achieve positive outcomes? In particular, how can interventions help develop strong and positive child-parent attachment?

2. METHODS

We attempted to map the risk factors associated with children's likelihood of experiencing social and emotional problems and cognitive difficulties using evidence from the most relevant cohort study data. A decision was taken by the PHCC and NICE CPHE teams to focus on Millennium Cohort study (MCS) publications to obtain this data. All publications arising from the Millennium Cohort study are listed in a database maintained by the Centre for Longitudinal Studies (http://www.cls.ioe.ac.uk/).

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2.1 Inclusion criteria

All papers which reported on any aspect of child wellbeing (including child behaviour, child development and mental health) as defined by the PREview projects (see below) were selected for inclusion. All records in this database were hand searched at the title/abstract level to identify publications which considered aspects of social and emotional wellbeing and cognitive development in order to extract data related to the risk factors of children experiencing social and emotional difficulties and cognitive development difficulties. Papers which considered only physical health related issues, without considering social and emotional wellbeing are not reported here, although it is acknowledged that physical health will impact on wellbeing. No date restrictions were imposed.

2.2 Data extraction strategy

Data relating to study aim, measures, and associations were extracted by one reviewer and each extraction was independently checked for accuracy by a second reviewer. Disagreements were resolved by consensus and consulting a third reviewer where necessary. The data extraction tables are presented in Appendix 1.

2.3 Quality appraisal

A quality appraisal was not conducted on the MCS papers as most aspects considered by the appraisal tool (for reporting correlations and associations) would be identical as the studies report on one data set. The tool considers population, methods of selection of exposure, outcomes and analyses, which are identical in each study. The only element of the analysis measures which would vary between studies would be how the associations were reported (as study power, explanatory variables and adjustment for factors such as confounders would be identical).

2.4 Summary of study identification

Twenty papers were identified through the database hand searching. We excluded three articles which were obtained as full papers but subsequently found to be outside of the scope of the review.

3. RESULTS

3.1. Summary of ChiMat PREview work: (Hobcraft and Kiernan 2010, Kiernan and Mensah 2009a; draft reports provided to the review team by the expert reference group)

The preview project aimed to considered early life course characteristics from the millennium cohort study associated with later child development (at age 3 and age 5), in order to develop a predictive tool for child health and wellbeing. Factors were considered in three main spheres: behavioural development, cognitive development, and health status. The three spheres were measured primarily as follows:

- Behaviour development: Strength and Difficulties Questionnaire (SDQ): Completed by the mother (or main carer) at age 5. A twenty five item

behavioural screening questionnaire covering conduct problems, inattention-hyperactivity, emotional symptoms, peer problems and pro-social behaviour.

- Cognitive development: Foundation Stage Profile (FSP): teacher assessment of children's development achievement over the first year of primary school.

- Health status: categorised by mother at 5 years as excellent, very good, good, fair or poor.

In addition explanatory variables were measured including: pre-birth and demographic characteristics, mother's feelings and behaviours during pregnancy, mother's health and wellbeing at 9 months old, socio-economic situation at 9 months old, child gender, and age.

Key indicators which showed significant positive [+ve] and negative [-ve] associations with child wellbeing were identified for the three spheres at age three.

These were:

Behavioural development (SDQ): mothers qualification level higher [+ve], whether mother was happy about pregnancy [+ve], mothers qualification level higher [+ve], smoking in pregnancy [-ve], mothers qualification level higher [-ve], parent's relationship at birth was good [+ve], English only language spoken in the home [+ve], if child was first born [+ve], or multiple birth [-ve], mother's general health [+ve], mother's malaise [-ve], mother's self efficacy [+ve], housing tenure; social housing [-ve], family experiencing housing difficulties [-ve], and living in deprived area [-ve].

Cognitive development (FSP); older mother at first birth [+ve], mothers qualification level higher [+ve], mother ever in employment [+ve], English only language spoken in the home [+ve], greater number of children in the family [+ve], child was not a twin/triplet [+ve], better mother's self rated health [+ve], mother's depression [-ve], living in poverty [-ve], housing tenure; social housing [-ve], and living in a deprived area [-ve].

Child health: older mother [+ve], mother's qualification level higher [+ve], mother lived away from home before age 17 [-ve], English only language spoken in the home [+ve], if mother was happy about pregnancy [+ve], mother's self rated health [+ve], mother's post natal depression [-ve], mother's self efficacy [+ve], and family income [+ve]. There were also negative effects related to low birth weight and ethnic origin (namely being of Pakistani origin).

The effects associated with of some of these variables were attenuated by age five, but the authors state that "it is clear that there are legacies of episodic poverty, worklessness, maternal depression, and poor health on children's wellbeing at age 5, but persistence of these attributes tends to be more deleterious" (Hobcraft and Kiernan 2010). Therefore, the measures at age 3 have a profound effect on the likely outcome at age 5.

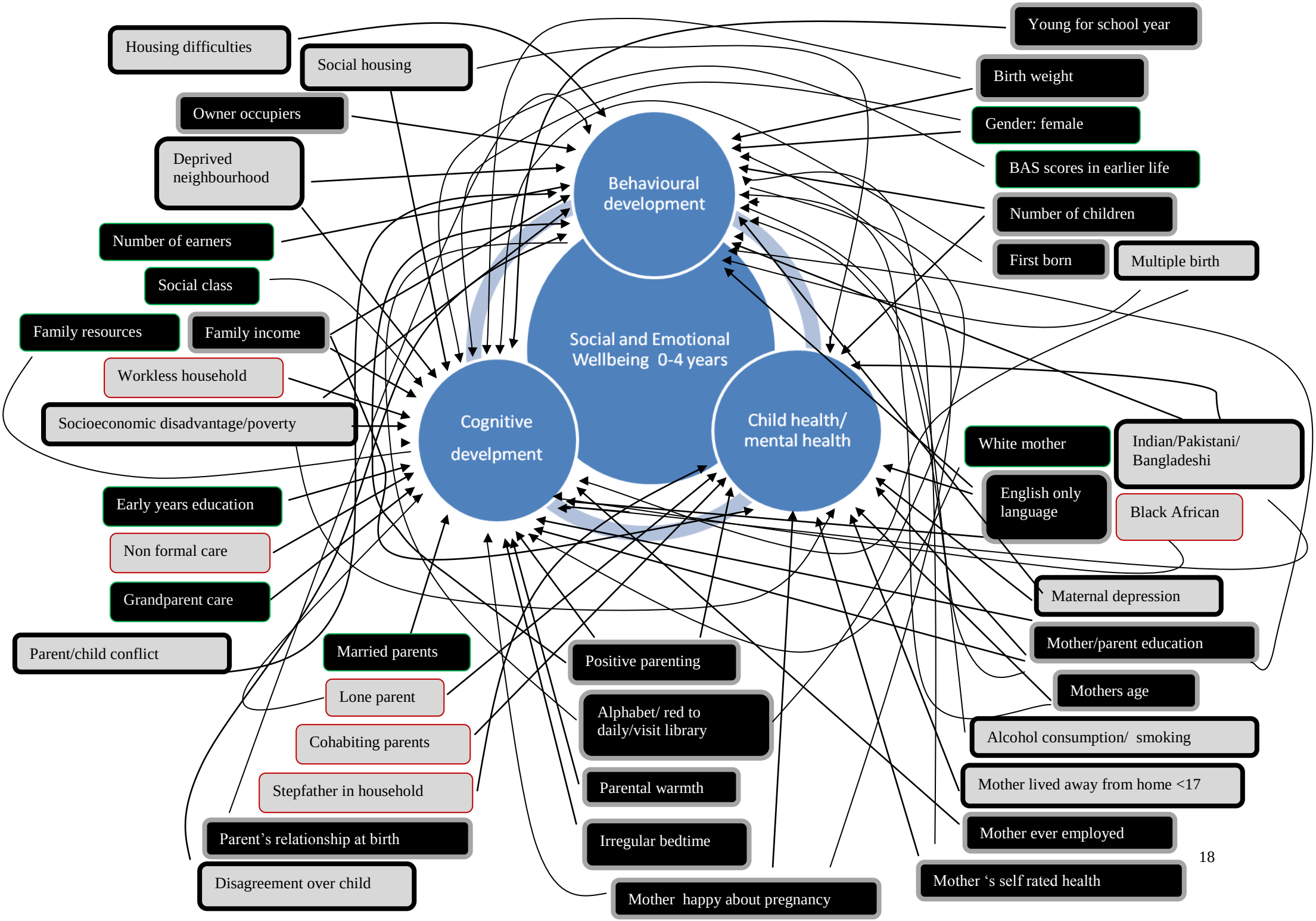
3.2 Associations reported in the Millennium Cohort Study papers

Table 1. shows the risk factors which the authors of each paper reported to be significantly associated with child wellbeing measures (behaviour, cognitive development, and (mental) health), together with the measures used to obtain them, and the number of papers which reported on that association. The factors are listed as reported by the authors of each paper. Further grouping of the factors is provided in Figure 1. Circular associations, i.e. associations between the individual factors will be considerable, but these are not reported here as we attempt to identify the risk factors for experiencing poor social and emotional health and cognitive difficulty only, without commenting on the interrelations between them. The majority of reported factors related to cognitive development, with fewer for behavioural development or measures of child health. The majority of factors reported were measured using one of four instruments; the Foundation Stage Profile (FSP), British Ability Scales (BAS), Bracken School Readiness Assessment (BSRA) and the Strengths and Difficulties Questionnaire (SDQ).

Figure 1. shows the risk factors described in the papers and their relationship to measures of behavioural and cognitive development and child (mental) health, as described in the papers. The diagram show factors which are positively (green) and negatively (red) associated with child wellbeing (i.e. more, or the presence of a

positive factor leads to better child wellbeing, where as less, or the absence of a negative factor leads to better child wellbeing). Associations which were reported by the ChiMat team have a black outline; additional factors reported only by other authors do not. As the authors reported these factors as having an effect on one or more of child behavioural development, cognitive development and (mental) health (all of which then impact on wellbeing), this distinction is maintained within the diagram.

Figure 1. Reported risk factors significantly associated with child wellbeing.
Positive factors (black): more, or the presence of a positive factor leads to better child wellbeing. Negative factors (grey): less, or the absence of a negative factor leads to better child wellbeing. Associations which were reported by the ChiMat team have a thick outline, additional factors reported only by other authors do not.


Housing difficulties
Social housing
Owner occupiers
Deprived neighbourhood
Number of earners
Social class
Family resources
Family income
Workless household
Socioeconomic disadvantage/poverty
Early years education
Non formal care
Grandparent care
Parent/child conflict
Married parents
Lone parent
Cohabiting parents
Stepfather in household
Parent's relationship at birth
Disagreement over child
Behavioural development
Social and Emotional Wellbeing 0-4 years
Cognitive develpment
Child health/ mental health
Young for school year
Birth weight
Gender: female
BAS scores in earlier life
Number of children
First born
Multiple birth
White mother
Indian/Pakistani/ Bangladeshi
English only language
Black African
Maternal depression
Mother/parent education
Mothers age
Alcohol consumption/ smoking
Mother lived away from home <17
Mother ever employed
Mother 's self rated health
Positive parenting
Alphabet/ red to daily/visit library
Parental warmth
Irregular bedtime
Mother happy about pregnancy

The factors can be loosely grouped as follows:

Socio-economic status: Overall socio-economic status was reported as family socio-economic disadvantage (Flouri 2010a), poverty (Bradshaw 2008, Goodman 2010, Kiernan 2009b, Kiernan 2009a), higher parent's social class (Goodman 2009), and better family resources (Kiernan 2010), with low status associated with measures of poor child wellbeing (behaviour, cognitive development, and (mental) health).

Income: Family income was reported in terms of a direct measure of level of income (Hansen 2010, Cullis 2008, Ermisch 2010, Kiernan 2009a, Kiernan 2009b, Mensah 2010a, Hobcraft 2010) as well as indirectly by the number of earners in the household (Bradshaw 2008) and whether the child was resident in a workless household (Mensah 2010a, Hobcraft 2010). Higher income was positively associated with measures of child wellbeing (behaviour, cognitive development, and (mental) health).

Housing measures: Four different measures of housing and neighbourhood were reported. Six authors reported on social housing which was negatively associated with measures of child wellbeing (Bradshaw 2008, Hansen 2010, Goodman 2009, Mensah 2010a, Kiernan 2009a, Cullis 2008), and furthermore two authors reported on the positive association between the family being owner occupiers and measures of child wellbeing (Goodman 2009, Hobcraft 2010). Three authors also reported that families resident in deprived neighbourhoods were more likely to experience poor child wellbeing (Goodman 2009, Mensah 2010a, Kiernan 2009a) and one also reported a negative association with families who had experienced housing difficulties (Kiernan 2009a).

Early years/child care measures: Attendance at any type of early years education (compared to never attended) was a positive measures in two studies (Hopkins 2009, Hobcraft 2010), where as non formal child care (compared to formal care), and specifically Grandparent care was shown to

be positively associated with measures of child wellbeing by a further study (Hansen 2009).

Parental relationship and marital status measures: Having married parents was reported as a positive factor for measures of child wellbeing for two studies (Goodman 2009, Mensah 2010a), whilst being a lone parent (Goodman 2009), an unemployed lone parent (Bradshaw 2008), cohabiting (Bradshaw 2008), or living with a step father (Bradshaw 2008, Cullis 2008) were all negatively associated with measures of child wellbeing (behaviour, cognitive development and (mental) health). A good parental relationship at birth was positively factor (Kiernan 2009a) and whether the parents had disagreement over parenting the child was a negative factor (Hobcraft 2010).

Parenting measures: Two studies reported on summary measures of aspects of positive parenting (from BAS and FSP scales), positively associated with child wellbeing (Kiernan 2010, Flouri 2010a), in addition one study also reported a summary measure of aspects of negative parenting (from BAS and FSP scales) which was negatively associated with child wellbeing (Hobcraft 2010). Authors also reported on specific two aspects of positive parenting from the BAS and FSP scales including having a positive home observation (FSP) which was positively associated with child wellbeing, as was a measure of parental warmth (Hobcraft 2010), child is read to/taught alphabet every day (Hansen 2010, Cullis 2008, Ermisch 2010, Hobcraft 2010), visit library (Ermisch 2010). There were also two negative aspects; irregular bedtimes (Hobcraft 2010) and irregular meal times (Hobcraft 2010). A high level of parent child conflict also had a negative effect on child wellbeing (Hobcraft 2010).

Child factors. Specific characteristics relating to the child were also positively associated with measures of child wellbeing including gender (female) (Hansen 2010, Cullis 2008, Goodman 2009, Hansen 2009, Mensah 2010a, Hobcraft 2010), higher birth weight (Hansen 2010, Cullis 2008), a greater number of siblings (Bradshaw 2008), being first born (Hansen 2009, Mensah 2010a, Kiernan 2009a) not being a twin/triplet (Kiernan 2009a), being

older within the academic year (Hobcraft 2010), and high BAS scores earlier in life (Hansen 2010).

Ethnicity measures: Two ethnicity factors were positively associated with measures of child wellbeing; having a white mother (Hansen 2009) and living in a family where only English was spoken in the household (Hansen 2009, Kiernan 2009a). However, being of Indian/Pakistani/Bangladeshi (Goodman 2009, Mensah 2010a, Hobcraft 2010, Bradshaw 2008, Cullis 2008) or Black African (Goodman 2009) origin was negatively associated with measures of child wellbeing (behaviour, cognitive development, and (mental) health).

Maternal factors: Two of the most frequently reported factors associated with child wellbeing were a high level of maternal (and/or parental) education (Cullis 2008, Kiernan 2009a, Hobcraft 2010, Bradshaw 2008, Hansen 2009) and having an older mother (Ermsich 2010, Goodman 2009, Mensah 2010a, Kiernan 2009a, Hobcraft 2010, Cullis 2008). Mother's self rated health (Kiernan 2009a, Hobcraft 2010) if the mother had ever been in employment (Kiernan 2009a) and if the mother was happy about the pregnancy (Kiernan 2009a) were also positively associated with child wellbeing. Conversely, maternal depression (Cullis 2008, Mensah 2010a, Mensah 2010b, Kiernan 2009a, Kiernan 2009b, Hobcraft 2010), poor maternal psychopathology (Flouri 2010a), alcohol consumption in pregnancy (Kelly 2009), smoking in pregnancy (Kiernan 2009a) and if the mother had lived away from home before 17 years old (Kiernan 2009a) were all negatively associated with measures of child wellbeing (behaviour, cognitive development, and (mental) health).

Table 1. Reported risk factors significantly associated with child wellbeing.

* FSP: Foundation Stage Profile; BAS: British Ability Scales; BSRA: Bracken School Readiness Assessment; SDQ: Strengths and Difficulties Questionnaire.

Outcome measure	Measure*	Factors	1st Author (year)
Cognitive development (achievement)	BAS FSP	Poverty [-ve]	Bradshaw 2008 Goodman 2010 Kiernan 2009b Kiernan 2009a
	BAS	Parent's "social class" [+ve]	Goodman 2009
	BAS FSP FSP	Deprived neighbourhood [-ve]	Goodman 2009 Mensah 2010a Kiernan 2009a
	Parenting index	Better family resources [+ve]	Kiernan 2010
	BAS BAS/FSP BAS/BSRA BAS FSP FSP	Family income[+ve]	Hansen 2010 Cullis 2008 Ermisch 2010 Kiernan 2009b Mensah 2010a Hobcraft 2010
	BRSA FSP	Workless household [-ve]	Mensah 2010a Hobcraft 2010
	BAS BAS FSP FSP	Social housing[-ve]	Hansen 2010 Goodman 2009 Mensah 2010a Kiernan 2009a
	BAS FSP	Owner occupied housing [+ve]	Goodman 2009 Hobcraft 2010
	BSRA Vocabulary scores	Grandparent care (compared to formal child care) [+ve]	Hansen 2009
	BSRA	Non formal child care (compared to formal child care) [-ve]	Hansen 2009
	BRSA FSP	Early years education [+ve]	Hopkins 2009 Hobcraft 2010
	BAS	Lone parent [-ve]	Goodman 2009
	BAS FSP	Married parents [+ve]	Goodman 2009 Mensah 2010a
	Parenting index	Positive parenting [+ve]	Kiernan 2010
	FSP	Parental warmth [+ve]	Hobcraft 2010
	FSP	Positive home observation [+ve]	Hobcraft 2010
	BAS BAS/FSP BAS/BSRA FSP	Read to/taught alphabet every day [+ve]	Hansen 2010 Cullis 2008 Ermisch 2010 Hobcraft 2010
	BAS/BSRA	Visit library [+ve]	Ermisch 2010
	FSP	Irregular bedtimes	Hobcraft 2010
	FSP	Child age (in school year)	Hobcraft 2010
	BAS	BAS scores earlier in life [+ve]	Hansen 2010
	BAS BAS/FSP BAS BRSA Vocabulary scores FSP	Gender (Female [+ve])	Hansen 2010 Cullis 2008 Goodman 2009 Hansen 2009 Mensah 2010a Hobcraft 2010

	FSP		
	BAS BAS/FSP	Birth weight (Higher [+ve])	Hansen 2010 Cullis 2008
	Vocabulary scores FSP FSP	First born child [+ve]	Hansen 2009 Mensah 2010a Kiernan 2009a
	FSP	Multiple birth [-ve]	Kiernan 2009a
	BAS FSP FSP	Indian/Pakistani/Bangladeshi [-ve]	Goodman 2009 Mensah 2010a Hobcraft 2010
	BAS	Black African [-ve]	Goodman 2009
	BSRA Vocabulary scores FSP	Only household language English [+ve]	Hansen 2009 Kiernan 2009a
	Vocabulary scores	White mother [+ve]	Hansen 2009
	BAS/FSP FSP FSP FSP	Maternal depression [-ve]	Cullis 2008 Mensah 2010b Mensah 2010b Kiernan 2009a
	FSP	Mother's self rated health [+ve]	Kiernan 2009a Hobcraft 2010
	BAS/BSRA BAS FSP FSP Hobcraft 2010	Older mother [+ve]	Ermsich 2010 Goodman 2009 Mensah 2010a Kiernan 2009a Hobcraft 2010
	BRSA	Parents education level [+ve]	Hansen 2009
	FSP	Mother ever in employment [+ve]	Kiernan 2009a
Child's behavioural development	SDQ	Poverty	Kiernan 2009b
	SDQ	Family income[+ve]	Cullis 2008 Kiernan 2009b Ermisch 2010 Hobcraft 2010
	SDQ	Number of earners [+ve]	Bradshaw 2008
	SDQ SDQ	Social housing [-ve]	Cullis 2008 Kiernan 2009a
	SDQ	Housing difficulties [-ve]	Kiernan 2009a
	SDQ	Deprived neighbourhood [-ve]	Kiernan 2009a
	SDQ	Disagreement over child	Hobcraft 2010
	SDQ	Parent's relationship at birth [+ve]	Kiernan 2009a
	SDQ	Parent/child conflict [-ve]	Hobcraft 2010
	SDQ	Negative parenting (incl. shouting at child daily) [-ve	Hobcraft 2010
	SDQ	Read to/taught alphabet every day [+ve]	Cullis 2008 Ermisch 2010
	SDQ	Visit library [+ve]	Ermisch 2010
	SDQ	Irregular meal times	Hobcraft 2010
	SDQ	Number of children [+ve]	Bradshaw 2008
	SDQ	Gender (Female [+ve])	Cullis 2008 Hobcraft 2010
	SDQ	Birth weight (Higher [+ve])	Cullis 2008
	SDQ	First born child [+ve]	Kiernan 2009a
	SDQ	Multiple birth [-ve]	Kiernan 2009a
	SDQ	Indian/Pakistani/Bangladeshi [-ve]	Cullis 2008 Hobcraft 2010
	SDQ	Only household language English [+ve]	Kiernan 2009a

	SDQ SDQ	Mother's education level [+ve]	Cullis 2008 Kiernan 2009a Hobcraft 2010
	SDQ	Older mother [+ve]	Ermsich 2010
	SDQ	Mother's self rated health [+ve]	Kiernan 2009a
	SDQ	Maternal depression [-ve]	Cullis 2008 Kiernan 2009b Hobcraft 2010
	SDQ	Mother happy about pregnancy [+ve]	Kiernan 2009a
	SDQ	Mother's alcohol consumption in pregnancy [-ve]	Kelly 2009
	SDQ	Smoking in pregnancy [-ve]	Kiernan 2009a
Child health including mental health (psycho social status/psychopathology)	SDQ	Poverty [-ve]	Bradshaw 2008
	SDQ	Family SE disadvantage [-ve]	Flouri 2010a
	SDQ	Family income [+ve]	Kiernan 2009a Hobcraft 2010
	SDQ	Social housing [-ve]	Bradshaw 2008 Cullis 2008
	SDQ	Cohabiting ([-ve] compared to other marital status)	Bradshaw 2008
	SDQ	Unemployed lone parent [-ve]	Bradshaw 2008
	SDQ	Step father [-ve]	Bradshaw 2008
	SDQ	Number of children [+ve]	Bradshaw 2008
	SDQ	Only household language English [+ve]	Kiernan 2009a
	SDQ	Indian/Pakistani/Bangladeshi [-ve]	Bradshaw 2008 Cullis 2008
	SDQ	Positive parenting [+ve]	Flouri 2010a
	SDQ	Maternal psychopathology [-ve]	Flouri 2010a
	SDQ	Maternal depression	Kiernan 2009a Hobcraft 2010
	SDQ	Mother's education level [+ve]	Bradshaw 2008 Kiernan 2009a
	SDQ	Mother's self rated health [+ve]	Kiernan 2009a Hobcraft 2010
	SDQ	Mother happy about pregnancy [+ve]	Kiernan 2009a
	SDQ SDQ	Older mother [+ve]	Cullis 2008 Kiernan 2009a
	SDQ	Mother lived away from home before 17 years old [-ve]	Kiernan 2009a
	SDQ	Child development [+ve]	Flouri 2010a
	SDQ	Child behaviour [+ve]	Flouri 2010a

3.3 Prevalence of risk factors in the UK population.

From this list of risk factors it is problematic to determine which are most important in identifying children and families at risk who might benefit from home based and early education and child care interventions. No set of factors stands out as being particularly significant and this problem is augmented by authors choosing to report on particular aspects (particularly cognitive risks) which may be skewing the data. In order to further consider which factors may be particularly important we have looked at the prevalence of these risk factors in the UK population (reported in Table 2), on the premise that those factors which are most prevalent in the population may be said to demonstrate an increased risk over factors which occur less frequently. We also report any associations between the factors reported in the national data. All population data were obtained from the ONS statistics website (http://www.statistics.gov.uk/default.asp)and and the Health Survey for England (http://www.ic.nhs.uk/statistics-and-data-collections/health-and-lifestyles-related-surveys/health-survey-for-england).

In terms of socioeconomic status, statistics suggest that at any one time between a quarter and a fifth of the UK population live below the poverty line (60% of contemporary median net disposable income). The proportion of children living in low-income households (using the low-income threshold of 60% of median income after deducting housing costs) fell from 34% of all children in 1996/97 to 28% in 2004/05 before rising to 30% by 2008/09. Directly linked to socioeconomic status around 1.9 million children live in workless households; this is 17% of all children, and children remain more likely than adults to live in low income households. 3.9 million children in the UK were living in low-income households in 2008/09 (after deducting housing costs). In particular, half of all people in lone parent families are of low income (although estimates vary between half and three quarters). This is more than twice the rate for couples with children. A child's risk of low income varies greatly depending on how much paid work the family does. However, unless all adults in the family are working (and at least one of them full time), the risks of being in low income are still substantial: 90% for unemployed families, 75% for other workless families and (notably) 35% for those where

the adults are part-working. Unsurprisingly, it is already clear from these statistics that risks related to income (and socio economic status) are more prevalent in workless households and single parent families. As half of all children of lone parents live in households which are workless these factors are significant.

Workless households are also the most likely to live in social housing which has again been shown to be a risk factor for poor outcomes relating to social and emotional wellbeing and cognitive development; around 27%, of families live in social housing. A further risk factor is families who have experienced housing difficulties but no measure of national prevalence could be obtained for this risk factor. The percentage of lone parent families in Great Britain is reported as 24% (in 2006), and since 1979 the proportion of people who are married has been slowly declining, from 50 per cent in mid-1979 to 40 per cent in mid-2009.

There are some measures of childcare on a national level with the proportion of three and four-year-olds enrolled in all schools reported as 64% in 2007/08, with 35% of three and four-year-olds placed with other non-school settings. However reports of informal childcare arrangements could not be found. No national measure of the parenting tools used by MCS could be identified.

In terms of child related factors, babies born to parents from from manual backgrounds are somewhat more likely to have a low birth weight than those from non-manual backgrounds (8% compared to 6½%). Also, babies born to lone parents are more likely to be of low birth weight than babies born to couples (10% compared to 7%). In 2009, 7.5% of births were under 2500g (7.2% 2008). Other reported risk factors in this category included the gender of the child (the sex ratio at birth was 1.05 male(s)/female(s) in 2006). Being first born was positively associated with social and emotional wellbeing and cognitive development, and being a multiple birth was negatively associated. In terms of family structure, 18% are one child families, 36% have two children, and 22% three children or more (in 2009). The rate of multiple births in the UK was 14.94 multiple births per 1000 single births (in 2009).

In the 2001 census, the UK population was reported as 92% White and 7.9% (4.6 million) from a non-White ethnic group. Indians were the largest of these groups, followed by Pakistanis, those of Mixed ethnic backgrounds, Black Caribbean, Black African and Bangladeshi. The remaining minority ethnic groups each accounted for less than 0.5 % of the UK population and together accounted for a further 1.4%. Around two-fifths of people from ethnic minorities live in low-income households, twice the rate for White people. Within this, there are big variations by ethnic group. More specifically, the proportion of people who live in low-income households is: 20% for White people, 30% for Indian and Black Caribbean, 50% for Black African, 60% for Pakistani, 70% for Bangladeshi. For all ages, people from ethnic minorities are, on average, much more likely to live in low-income households than White people. For example, almost half of all children from ethnic minorities live in low-income households compared to around a quarter of White British children.

A number of maternal factors were reported as risk factors for experiencing problems with social and emotional wellbeing and cognitive development including maternal (and/or parental) education, mothers age, mother ever in employment, mother happy about the pregnancy, maternal depression, poor maternal psychopathology, alcohol consumption in pregnancy, smoking in pregnancy, and mother lived away from home before 17 years old. The national statistics report few of these risk factors for mothers in particular although many are available for the adult population. The factors reported specifically for mothers are age at first child and smoking rates in pregnancy. In 2009, there were decreases in fertility rates for women aged under 30 and increases for women aged 35 and over, compared with 2008; fertility rates for women aged 30–34 remained unchanged. Over the last decade the number of live births to mothers aged 40 and over has nearly doubled from 14,252 in 1999 to 26,976 in 2009. The standardised average (mean) age of women giving birth increased slightly to 29.4 in 2009, from 29.3 in 2008. The figure for 2009 is the highest on record, having increased by just over two years since 1971 when it was 26.6 years. Women giving birth outside marriage tend to do so earlier than those giving birth inside marriage: 26.8 and 31.0 years

respectively. In 2008 the teenage pregnancies rate was 7.8% of births to mothers aged under 16 years old, and 40.4% of births to mothers aged under 18 years old. The rate of smoking in pregnancy was reported to be 17% in 2005, however, smoking rates in general continue to fall and are currently thought to be below 20% of the population of Great Britain aged 16 and over, it is likely therefore that the current figure for smoking in pregnancy is below the 2005 rate.

In 2008 the percentage of adults with no qualifications was reported as 10.8%. There is no figure for mothers, but the proportion of the population aged 20 to retirement without any formal educational qualifications has fallen by nearly a third over the last decade, from 17% in 1999 to 11% in 2009. This is not however, because the proportion of young adults without a qualification has been falling (it has remained unchanged) but because older adults, where the proportion without a qualification is high, have been reaching pensionable age.

Mental illness in females was reported to be around 14% (in 2006). Adults in the poorest fifth are much more likely to be at risk of developing a mental illness than those on average incomes: 20% compared with 8% for men and 24% compared with 15% for women. People from manual backgrounds are at slightly higher risk of developing a mental illness than those from non-manual backgrounds.

Therefore it appears that the most prevalent risk factors in the UK population are low income (around 30% of children) linked directly to being a lone parent (24% of families) and living in social housing (27% of families) with ethnicity (minority ethnic 7.9%), child factors (such as low birth weight 7-10%) and maternal factors (such as smoking in pregnancy (17%) being less prevalent: however being of low income/socioeconomic status does further increase these additional risk factors. The prevalence of factors relating to parenting behaviours could not be found at the national level.

In addition, and further to reporting factors associated with social and emotional wellbeing and cognitive development, three papers also considered the factors in combination.

Flouri (2010a) in their full model (controlling for child age, sex, developmental milestones, temperament and ability) reported that their coefficient for family socio-economic deprivation is reduced (b=0.218, SE= 0.058) suggesting that family socio-economic deprivation predicts psychopathology in young children not only directly, but also by impacting on young children's development. The effect of proximal family adversity in contrast, remains substantial (b=0.387, SE = 0.055) by the addition of parenting, maternal psychopathology and all the child-level variables. In this final model, child level variance component was 16.439 (SE=0.0366) and the variance due to differences in lower layer super output areas (area level disadvantage) was 0.244 (SE = 0.146).

Flouri (2010b) described the interaction between proximal family risk and developmental milestones predicted conduct problems (b = -0.017, SE = 0.008), and the interaction between proximal family risk and non-verbal ability predicted both conduct problems (b = -0.002, SE = 0.001) and emotional symptoms (b = -0.002, SE = 0.001), but no interaction effects were significant. These findings suggest that delayed development buffered the effects of proximal risk on conduct problems, and non-verbal ability buffered the effect of proximal risk on both emotional symptoms and conduct problems.

Mensah (2010a) reported evidence for gender interaction for mother's educational qualifications (p=0.049), the quality of the area for bringing up children (p=0.039), and mothers age at first birth (p=0.011), each signifying that associations were more pronounced for boys than girls. The coefficient estimated for gender in their multivariate model was a difference of 3.2 points less for boys compared to girls. This may be interpreted as the gender gap among children of mothers who were highly educated, living in excellent areas and who began childbearing at the age of 30 or over, and was statistically significant (p=0.001). Gender interaction for mother's educational qualifications (p=0.001), the quality of the area for bringing up children

(p=0.005) and others age at first birth (p=0.001), again signifying more pronounced effects for boys than girls. Mothers level of qualification again predicts the strongest gradient of scores. Girls whose mothers held no qualifications were estimated as scoring 6.9 points less than girls whose mothers held an NVQ level 4 or 5 qualification, the corresponding effect for boys was 8.8. Girls living in a poor or very poor quality area were estimated as scoring 1.6 points less than girls in excellent area, the difference for boys was 3.6. Girls whose mothers had begun childbearing as a teenage were estimated as scoring 1.9 points less than girls whose mothers had delayed childbearing until her 30s or later, the effect for boys was 4.4 A combined test for interaction across these three measures provided evidence of gender interaction ($p<0.001$).

Table 2. Prevalence of reported risk factors in the UK population

Factor	Reported as	Population rates (All data from ONS/HSE).
Socio-economic status	family socio-economic disadvantage, parent's social class, family resources,	1/4 people in the UK (13m people) live below poverty line (60% of contemporary median net disposable income (2000/01) and 13½ million people in the UK were living in households below this low-income threshold. This is around a fifth (22%) of the population (2008/09) The proportion of children living in low-income households (using the low-income threshold of the 60% of median income after deducting housing costs) fell from 34% of all children in 1996/97 to 28% in 2004/05 before rising to 30% by 2008/09.
Income	Family income, number of earners in the household, workless household	Adult employment 74.7% (2008) 5.3 million people were in receipt of an out-of-work benefit in February 2009. Of these, 2.7 million (50%) were sick or disabled, 1.4 million (14%) were unemployed and 0.7 million (14%) were lone parents. Around 1.9 million children live in workless households. This is 17% of all children. With the rise in the most recent year (2009), both the number and the proportion are now close to their levels of a decade ago. In 2008/09, original income, before taxes and benefits, of the top fifth of households in the UK was approximately 15 times greater than that for the bottom fifth (£73,800 per household per year compared with £5,000). After redistribution through taxes and benefits, the ratio between the top and bottom fifths is reduced to four-to-one (average final income of £53,900 compared to £13,600). Until 2008, numbers had been falling steadily, from 5.4 million in February 1999 to 4.7 million in February 2008. Most of the fall was in unemployed claimants, the numbers of which fell by a third over the period, from 1.3 million to 800,000. By contrast, the number of sick or

		disabled claimants remained broadly unchanged.
Housing measures	social housing, owner occupiers, resident in deprived neighbourhoods, experienced housing difficulties	Social housing 27.2%, Children in poverty 22% (after housing costs 33%), 17.5 million dwellings in the UK were owner-occupied, rented in the social sector 4.5 million, privately rented homes rose 3.8 million (2009)
Early years/child care measures	any type of early years education, non formal child care (compared to formal care)	The proportion of three and four-year-olds enrolled in all schools was 64% in 2007/08, 35% of three and four-year-olds were placed with other non-school settings
Parental relationship and marital status measures	married parents, lone parent, unemployed lone parent, cohabiting, living with a step father, Parent's relationship at birth, disagreement over parenting the child	Lone parent families in Great Britain: 24% (2006). Since 1979 the proportion of people who are married has been slowly declining, from 50 per cent in mid-1979 to 40 per cent in mid-2009
Parenting measures	Summary measures (from BAS and FSP scales), having a positive home observation, parental warmth, child is read to/taught alphabet every day, visit library, irregular bedtimes, irregular meal times, parent child conflict	None available
Child factors.	Gender, birth weight, number of siblings, being first born, twin/triplet, age within the academic year, BAS scores earlier in life	UK birth rate 10.71 births/1000 population (2006.) Sex ratio at birth: 1.05 male(s)/female (2006) In 2009 7.5% of births were under 2500g. (7.2% 2008) One child families 18%. 36% have two children, 22% 3 children or more (2009) UK: 14.94 multiple births per 1000 single births (2009)

		Babies from manual backgrounds are somewhat more likely to have a low birth weight than those from non-manual backgrounds: 8% compared to 6½%. Babies of lone parents are more likely to be of low birth weight than babies of couples: 10% compared to 7%.
Ethnicity measures	white mother, living in a family where only English was spoken in the household, Indian/Pakistani/Bangladeshi, Black African	White (92 per cent). 7.9%, 4.6 million from a non-White ethnic group (2001). Indians were the largest of these groups, followed by Pakistanis, those of Mixed ethnic backgrounds, Black Caribbeans, Black Africans and Bangladeshis. The remaining minority ethnic groups each accounted for less than 0.5 per cent of the UK population and together accounted for a further 1.4 per cent.
Maternal factors	maternal (and/or parental) education, older mother, mother ever in employment, mother happy about the pregnancy, maternal depression, poor maternal psychopathology, alcohol consumption in pregnancy, smoking in pregnancy, mother lived away from home before 17 years old	Smoking fell to its lowest recorded level in 2007 – 21 per cent of the population of Great Britain aged 16 and over. 2008 adults with no qualifications 10.8% (HSE) 2005 smoking in pregnancy 17% (HSE) In 2009, there were decreases in fertility rates for women aged under 30 and increases for women aged 35 and over, compared with 2008; fertility rates for women aged 30–34 remained unchanged. The largest percentage decrease (2.7 per cent) occurred among women aged under 20. For this age group the fertility rate fell from 26 live births per thousand women aged under 20 in 2008 to 25.3 in 2009. The highest percentage increase (2.4 per cent) occurred among women aged 40 and over. For this age group the fertility rate increased from 12.6 live births per thousand women aged 40 and over in 2008 to 12.9 in 2009. Over the last decade the number of live births to mothers aged 40 and over has nearly doubled from 14,252 in 1999 to 26,976 in 2009. The standardised average (mean) age of women giving birth increased slightly to 29.4 in 2009, from 29.3 in 2008. The figure for 2009 is the highest on record. The average age of mothers at childbirth has increased by just over two years since 1971

		when it was 26.6 years. In 2002 the average age for first births was 26.7 years, three years older than in 1971. Women giving birth outside marriage tend to do so earlier than those giving birth inside marriage: 26.8 and 31.0 years respectively. Although the average age of all mothers at childbirth is increasing, the average number of children women think they will have is still around two children per woman. Over time there has been a fall in the average intended family size for women aged 21 to 23 from 2.23 in 1979-81 to 2.14 at the turn of the 20th century. 2008 teenage pregnancies 7.8% u16, 40.4% u18 (HSE) Mental illness (female) 14% in 2006 (HSE) Adults in the poorest fifth are much more likely to be at risk of developing a mental illness as those on average incomes: 20% compared with 8% for men and 24% compared with 15% for women. People from manual backgrounds are at slightly higher risk of developing a mental illness than those from non-manual backgrounds The proportion of the population aged 20 to retirement without any formal educational qualifications has fallen by nearly a third over the last decade, from 17% in 1999 to 11% in 2009. This is not, however, because the proportion of young adults without a qualification has been falling (it has remained unchanged) but because older adults, where the proportion without a qualification is high, have been reaching pensionable age.

3.4 Absolute risk of children experiencing development difficulties

The scope of this analysis to develop an overall measure of absolute risk of experiencing difficulties in social and emotional development and cognitive development is limited as this would require substantial modelling work which is outside the scope of this review, and there were no reports of absolute risk in the studies we identified. However, in work for the PREView project, Mensah and Kiernan (2009) provide data on the chance (measured as the percentage of population) of experiencing any negative outcome, dividing the population by specific risk factors included in their model. This allows us to calculate the relative increase in risk for each factor (as the percentage difference in risk for the two most extreme measures of each factor); for example what is the increased risk of experiencing any outcome related to social and emotional wellbeing and cognitive development for a child whose mother is age 13-19, compared with a child whose mother is age 35+ (table 3).

Table 3. Risk factors contribution to overall risk of experiencing a negative outcome related to social and emotional development and cognitive development

Measure	Factor	Any difficulty outcome %	Difference (maximum) %
Child's gender	Female Male	14.7 21.0	6.3
Mother's age at 1st birth	13-19 20-24 25-29 30-34 35+	31.1 23.3 12.6 10.1 9.1	22
Mother's qualifications	NVQ level 4/5 NVQ level 3 NVQ level 2 NVQ level 1 No qualifications	9.2 13.8 19.0 29.2 36.7	27.5
Language usually spoken at home	English English and other Other language only	16.9 28.6 31.2	14.3
Child twin/triplet	Single birth Twin or triplet	17.6 26.3	8.7
Mother's general health	Excellent Good Fair Poor	12.6 17.3 29.4 39.1	26.5
Malaise score (psychological distress)	0 to 3 4 to 9 (high)	15.4 32.3	16.9
Self efficacy	No negative	12.9	18.5

	indication Any negative indication	31.4	
Housing tenure	Owner occupier Private rented Social housing Other	11.2 26.9 32.8 24.0	21.6 (social housing vs. owner occupier)
Housing difficulties	No Yes	17.4 34.6	17.2
Area index of multiple deprivation (highest quintile = least deprived)	Highest quintile 60- <80 40 - <60 20- <40 Lowest quintile	8.5 10.4 16.9 22.0 31.2	22.7
Birth weight	3.5kg or more 3 to 3.5kg 2.5 to 3kg Less than 2.5kg	14.9 17.3 22.5 28.0	13.1

Maternal factors

Poor general maternal health increases a child's risk by 26.5% (compared to a child who mothers are in good general health). There is a 22% increase in risk for children of young (13-19 year old) mothers compared to children of mothers over 35, and the increase in risk between children of the least qualified mothers (no qualifications) compared to the most qualified mothers (NVQ level 4/5) is 27.5%. A high score for mother's malaise increases risk by 16.9%, and any indication of poor self efficacy increases risk by 18.5%.

Child factors

Being of low birth weight increases risk by 13.1%, but the gender gap only increases boy's risk by 6.3%, and being a multiple birth increases risk by 8.7%.

Ethnicity

Only speaking languages other than English increases risk by 14.3% compared to exclusively English speaking households.

Housing

Living in social housing increases risk by 21.6%, compared to children whose parents are owner occupiers, and family experiencing housing difficulties also increases risk by 17.2%. Living in areas of high multiple deprivation increases risk by 22.7% (when comparing the highest to the lowest quintile of deprivation).

This analysis therefore suggests that maternal factors (mother's age, education and general health), and housing situation (social housing and high area deprivation) have the greatest effect on increasing the risk that a child will experience any negative outcome relating to social and emotional development and cognitive development.

4. DISCUSSION

This summary review focused on the factors relating to the risk of children experiencing difficulties with social and emotional development and cognitive development. We identified 20 papers from the Millennium Cohort Study which met the inclusion criteria. Unsurprisingly the factors associated with risk of children experiencing difficulties with social and emotional development and cognitive development are very complex and challenging to define. Here we have taken an evidence based approach in order the use the research literature to attempt to define these factors. Kiernan and Mensah (2009a) in their PREview work broadly defined three spheres of influence on emotional and social wellbeing: behavioural development, cognitive development, and health status. Here we have combined their analysis with additional work based on data from the MCS study and found that this data largely supports the PREview work (although some authors report on mental health specifically rather than general health). The factors which impact on each of these spheres are not independent, with many factors having an influence in all three spheres. We have loosely defined the influencing factors as measures of: socio-economic status, income, housing/neighbourhood, early years/child care, parental relationship and marital status, parenting behaviours, child factors, ethnicity and maternal factors. Taking into account the risk factors that are most prevalent in the population and those which appear to have the greatest impact on absolute risk it seems likely that those children at greatest risk of social and emotional problems and cognitive problems will be from lone parent, low income households, living in social housing in areas of high deprivation. Their mothers are likely to be relatively young, poorly educated and in poor health.

Unsurprisingly the factors associated with risk of children experiencing difficulties in social and emotional development and cognitive development are very complex and challenging to define. Here we have taken an evidence based approach in order to use the research literature to attempt to define these factors. Kiernan and Mensah (2009) in their PREview work broadly defined three spheres of influence on emotional and social wellbeing: behavioural development, cognitive development, and health status. Here we have combined their analysis with additional work based on data from the MCS study and found that this data largely supports the PREview work (although some authors report on mental health specifically rather than general health). The factors which impact on each of these spheres are not independent, with many factors having an influence in all three spheres. We have loosely defined the influencing factors as measures of: socio-economic status, income, housing/neighbourhood, early years/child care, parental relationship and marital status, parenting behaviours, child factors, ethnicity and maternal factors.

From this list of risk factors it is problematic to determine which are most important in identifying children and families at risk who might benefit from home based and early education and child care interventions. However, the most prevalent risk factors in the UK population are low income (around 30% of children) linked directly to being a lone parent (24% of families) and living in social housing (27% of families). Factors relating to ethnicity (minority ethnic 7.9%), child factors (such as low birth weight 7-10%) and maternal factors (such as maternal age and smoking in pregnancy (17%) are less prevalent: however being of low income/socioeconomic status does further increase these additional risk factors.

In addition, data from the PREview project (Kiernan 2009) can be further used to suggests that maternal factors (mother's health, age and education), and housing situation (social housing and high area deprivation) have the greatest effect on the absolute risk that a child will experience any negative outcome relating to social and emotional development and cognitive development. Income was not represented in this model.

Taking into account the risk factors that are most prevalent in the population and those which appear to have the greatest impact on absolute risk it seems likely that

those children at greatest risk of social and emotional problems and cognitive problems will be from lone parent, low income households, living in social housing in areas of high deprivation. Their mothers are likely to be relatively young, poorly educated and in poor health.

Combining this evidence with practitioner knowledge would further validate this as a model of the risk factors for children experiencing difficulties in social and emotional development and cognitive development.

EVIDENCE STATEMENTS

Millennium Cohort Study (MCS) Evidence Statement 1:
How can those vulnerable children and families who might benefit from early education and child care interventions be indentified?

It may be possible to identify children and families who might benefit most from early education and child care interventions by considering the factors which research suggests are likely to increase their risk as is discussed in the statements below.

The models for predicting future likely child health outcomes could be used at a population level to direct early intervention investment towards those children and families that are most likely to experience poorest outcomes. However the model is dependent on the robustness of the longitudinal data sets in identifying all the key risk factors, and the availability of local data to map these factors. Certain factors are not well represented including those relating to parenting and parental mental health problems. The nature of the relationship between cultural factors and child outcomes is not well understood.

Also such models cannot be used to predict outcomes at an individual level. The models may inform practitioners about risk factors, however practitioner knowledge will also be vital in validating the model for use in individual risk assessment purposes.

Millennium Cohort Study (MCS) Evidence Statement 2
What factors increase the risk of children experiencing difficulties in social and emotional development and cognitive development?

Children's social and emotional development and cognitive development are affected by a wide range of interacting risk factors. Here we have used studies which report on the Millennium Cohort Study to define these risk factors. There is strong evidence to suggest that the following factors were (statistically) significantly associated with child emotional and social development, and cognitive development:

Socio-economic status (positively associated with higher parent's social class, and greater family resources, negatively associated with family socio-economic disadvantage).

Income: (positively associated with family income and number of earners in the household, negatively associated with workless household).
Housing measures: (positively associated with being an owner occupier, negatively associated with social housing, resident in deprived area and experiencing housing difficulties

Early years/child care measures : (positively associated with attendance at any type of early years education, and with non- formal child care compared to formal care; specifically Grandparent care).

Parental relationship and marital status measures (positively associated with having married parents, and parent's relationship at birth positive, negatively associated with being a lone parent an unemployed lone parent, cohabiting, or living with a step father , and if parents had disagreements over parenting the child).

Parenting measures: positive parenting positively associated with child wellbeing. In addition one study also reported a summary measure of aspects of negative parenting (from BAS and FSP scales) specifically: positive home observation (FSP); parental warmth; child is read to/taught alphabet every day; visit library regularly; regular meal times and betimes. A high level of parent child conflict was negatively associated.

Child factors (positively associated with being female, higher birth weight, fewer of siblings, being first born, being older within the academic year, and high BAS scores earlier in life (Hansen 2010).

Ethnicity measures: (positively associated with having a white mother and living in a family where only English was spoken in the household, negatively associated with being of Indian/Pakistani/Bangladeshi or Black African origin.

Maternal factors: (positively associated with maternal (and/or parental) education having an older mother, mother's self rated health, mother ever been in employment, mother was happy about the pregnancy. Negatively associated with maternal depression, maternal psychopathology, alcohol consumption in pregnancy, smoking in pregnancy, if the mother had lived away from home before 17 years old).

Millennium Cohort Study (MCS) Evidence Statement 3:
What is prevalence of risk factors in the UK population?

It is problematic to determine which are most important risk factors in identifying children and families at risk who might benefit from home based and early education and child care interventions. No set of factors stands out as being particularly significant and this problem is augmented by authors choosing to report on particular aspects (particularly cognitive risks) which may be skewing the data.

We therefore looked at the prevalence of these risk factors in the UK population on the premise that those factors which are most prevalent in the population may be said to demonstrate an increased risk over factors which occur less frequently. The most prevalent risk factors in the UK population are low income (around 30% of children) linked directly to being a lone parent (24% of families) and living in social housing (27% of families) with ethnicity (minority ethnic 7.9%), child factors (such as low birth weight 7-10%) and maternal factors (such as smoking in pregnancy (17%) being less prevalent: however being of low income/socioeconomic status does further increase these additional risk factors. The prevalence of factors relating to parenting behaviours could not be found at the national level.

Millennium Cohort Study (MCS) Evidence Statement 4:
What is the absolute risk of children experiencing difficulties relating to these factors and their combination?

Further analysis of data generated by the PREview projects suggests that: Poor general maternal health increases a child's risk by 26.5% (compared to a child of good general health). There is a 22% increase in risk for children of young (13-19 year old) mothers compared to children of mothers over 35, and the increase in risk between children of the least qualified mothers (no qualifications) compared to the most qualified mothers (NVQ level 4/5) is 27.5%. A high score for mother's malaise increases risk by 16.9%, and any indication of poor self efficacy increases risk by 18.5%.

Being of low birth weight increases risk by 13.1%, but the gender gap only increases boy's risk by 6.3%, and being a multiple birth increases risk by only 8.7%. Only speaking languages other than English increases risk by 14.3% compared to exclusively English speaking households.

Living in social housing increases risk by 21.6%, compared to children whose parents are owner occupiers, and family experiencing housing difficulties also increases risk by 17.2%. Living in areas of high multiple deprivation increases risk by 22.7% (when comparing the highest to the lowest quintile of deprivation).

This analysis therefore suggests that maternal factors (mother's age, education and general health), and housing situation (social housing and high area deprivation) have the greatest effect on increasing the risk that a child will experience any negative outcome relating to social and emotional development and cognitive development.

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APPENDIX 1: EVIDENCE TABLES

First author, year Code	Main aim	Measures	Associations
Hobcraft 2010 (PREview)	Early life course characteristics from the millennium cohort study associated with later child development: Predictive factors at age 3 for outcomes aged 5.	FSP SDQ	In terms of behaviour at age five, the strongest association was with the Pianta conflict scale; those with the highest Pianta conflict scores at age 3 had a net odds ration of having extreme score at age 5 of over 8.1. Other significant behaviour factors: Negative parenting aspects were also significant (OR 1.4-1.7) for factors such as shouting at child daily if naughty, irregular meal times, frequent disagreements with partner over child. Children of depressed mothers had greatest incidence of poor behaviour (OR= 1.57) Income; top-bottom quintile OR=1.82 for poor behaviour outcomes Gender; behaviour problems greater in boys (OR=1.8) Ethnicity: behaviour problems greater in Pakistani/Bangladeshi origin OR=2.1 Children of mothers with no qualifications OR=2.0 Cognitive development (risk of low FSP scores associated with): Youngest children (born July/August) show higher risk of poor FSP scores (OR=5.0) Poor development scores associated with low scores on positive aspects of home observation (OR=2.4) also: low Pianta warmth scale (OR=1.86), reading to child less than daily (OR=1.24), irregular bedtimes (OR 1.74) and never used childcare or nursery (OR=1.41). Other factors: Mother's educational achievement (OR 1.38-1.9 depending on qualification level), Mothers age (teenage parent OR=1.54), Not first born (OR=1.3), Mother's general health poor (OR=1.52), Boys (OR 1.92), Workless household at age 3 (OR 1.31), Not living in owner occupied housing (OR 1.31), Low household income (OR 1.45) Pakistani/Bangladeshi origin (OR 1.64). Child health: Mother's health (OR 2.96 excellent : poor health), Maternal depression (OR 1.52), Low income household (OR 2.01)
Kiernan 2009a (PREview)	Early life course characteristics from the millennium cohort study	FSP SDQ	Cognitive development (FSP): mother's age at first birth, mother's qualification level, mother ever in employment, language spoken in the home, family child and whether child was twin/triplet, mother's self rated health, mother's depression, living in poverty, housing tenure, living in a deprived area. Behavioural development (SDQ): mother's qualification level, whether mother was happy

	associated with later child development		about pregnancy, smoking in pregnancy, parent's relationship at birth, language spoken in the home, whether child was first born or multiple birth, mother's general health, mother's malaise, mother's self efficacy, housing tenure, family experiencing housing difficulties, living in deprived area. Child health: mother's age, mother's qualifications, mother lived away from home before age 17, language spoken in the home, whether mother was happy about pregnancy, mother's self rated health, mother's post natal depression and self efficacy, family income.
Kiernan 2010 E19	Logistic regression was used to estimate the odds that children with different poverty, family resource, and parenting experiences in early childhood would have a good level of achievement in their first year at school.	Parenting index: promoting child reading and learning, relationship and interactions with child, aspects of child's family organisation, nutrition, positive and negative parenting practices. Additional behaviour observation (positive interactions including praising and answering child's questions, negative interactions including slapping, spanking, scolding, physically restraining). Child's poverty history: 60% below the UK median income, persistent or episodic. Family resources indicator: income poverty, mothers education, family employment, housing tenure, quality of local area, mothers age at	Two models: 1. Children's poverty history and parenting index 2. Family resources indicator and parenting index An OR of 2.39 represents an estimate of the relative increase in odds of good achievement associated with one SD increase in the parenting index. OR of 0.41 and 0.38 for children who experience episodic poverty reflect lower odds of good achievement compared to children who did not experience poverty, this is lower again: OR 0.20 when poverty was persistent. Comparing the least advantaged quintile to the highest = OR 0.11 for good achievement according to level of family resource. Model 1. The odds of a child having good achievement if they have experienced episodic poverty are lower than those with no record of experienced poverty, but the odds are similar for whether the poverty was in the past or was more current (OR 0.58 and 0.56 respectively). Those who experience persistent poverty have the lowest odds of good achievement (OR 0.40). Model 2. The introduction of the parenting index improves the odds that children will be doing better at school but the gradient across the quintiles, particularly the lower quintiles persists (OR 0.46 for 4th quintile, 0.24 for lowest). Differences in achievement between children in the upper two quintiles in no longer significant once parenting is taken into account (OR 0.85). Poverty and parenting, and family resources and parenting have independent effects on the odds of children achieving well at school, but family resources and parenting are also interrelated. When family poverty and resources were taken into account, the OR for the parenting index was attenuated, slightly more so by the family resources index than the poverty classification (OR 1.86 and 2.08 respectively). The potential benefits of positive parenting are evident regardless of socio economic

		birth of first child, family structure, number of children in household, child's birth order, child's ethnic origin, language spoken at home.	circumstances (p=0.72). Model suggests that half the effect of poverty on children can be explained by parenting, as can around 40% of the effect of family resources.
Hansen 2010 E12	Examines differences in early child development by examining the factors associated with the cognitive ability of children to age 5.	Cognitive ability (3 subscales of British ability Scale, relating to verbal, pictorial reasoning and spatial abilities).	Higher BAS test scores for: Child characteristics (older children, girls, children with higher birth weight, first born. Family characteristics (higher parental qualifications, higher family income, parent in professional or managerial occupation, not living in social housing, having a white mother, mother not diagnosed with depression). Value added model (controlling for development reached at age 3: Significant factors (p<0.01): age 0.075(0.003), parent has more than 5 GCSEs 0.156 (0.038) A levels 0.201 (0.043) or degree 0.267 (0.039), family income (£100 more per month associated with 0.51 SD higher BAS score) 0.044 (0.012), mother has GP diagnosed depression -0.059 (0.022), social housing -0.155 (0.034). Also better BAS score at age 3 associated with better age 5 score 0.120 (0.013). Factors related to being in the top 30% (highest risk) in the value added model: Pakistani or Bangladeshi ,or black mother, low parental education: parent has 5 GCSEs A-C -0.21 (0.008) p<0.001 low family income-0.019 (0.005) p<0.001 social housing 0.047 (0.012) p<0.001 Less likely to be in bottom 30% if: Older -0.005 (0.001) p<0.001 Girl -0.028 (0.007) p<0.001 higher birth weight -0.020 (0.006) are read to every day, -0.016 (0.007) p<0.05 are taught the alphabet every day -0.020 90.008) p<0.05
Bradshaw 2008 E2	How is poverty associated with elements of psycho-social status?	MCS measures.	If the family is poor at age three the child has a lower level of brain development (p<0.005). There are also negative coefficients for cohabiting (p<0.05) and step fathers (p<0.01) and social housing (p<0.005). The number of children (p<0.005) and the number of earners (p<0.05) seems to have positive associations in the child's behavioural development. There is no influence of

			ethnicity or the number of adults. Considering the future risk of mental health problems, having controlled for other factors, poverty is still an important factor ($p<0.005$), as is mothers education level ($p<0.005$), Indian and Bangladeshi ethnicity ($p<0.005$), cohabitating and lone parents with no employment ($p<0.05$) – all associated with higher mental health risks. A difference with mental health is that the more children and the older the mother lower the mental health risk.
Cullis 2008 E4	Determining why some children do better than others in the early years.	Cognitive outcomes age 5 (BAS) Behavioural outcomes age 5 (Strengths and Difficulties Questionnaire). Children in the bottom 20% of distribution scores. Foundation stage profile (FSP) scores provided by teachers on children' achievement at the end of the first year of school.	The most robust predictors of child cognitive achievement and behavioural development were the characteristics of the child; with girls, older children and heavier birth weight children performing better than other children and having fewer behavioural problems (with the exception of age). These children were also less likely to be in the bottom 20% when achievement and behaviour are ranked. Maternal education was positively related to cognitive development and negatively to problem behaviour and the probability of being among the 20% worst cognitive performers of the 20% of children with most problem behaviour. Other factors related to cognitive development and problem behaviour in general include: family income and reading to the child every day (both related positively to cognition and negatively to problem behaviour) and ethnicity (particularly Pakistani and Bangladeshi groups) and living in social housing (both related negatively to the cognitive outcomes and positively to the problem behaviour outcomes. Maternal depression was shown to be related to the probability of being amongst the poorest cognitive performers and the most problematic behaviours, but only to 2 of the 5 outcomes when considering development in general (FSP – negatively, and problem behaviour scores – positively). The group of poorest achievers was not consistent, with a lot of movement over time between categories. Poor achievement at age 5 is related to a range of other factors in addition to prior performance. In particular, age, gender and birth weight are important as is mother's education.
Ermisch 2010 E5	Origins of social mobility and inequality, the effect of parenting and early child development	Parental behaviour and outcomes up to age 3. Cognitive assessments; BAS and Bracken School Readiness Assessment (BSRA). Behaviour	At age 3, children from higher income groups have higher cognitive assessment scores and fewer behavioural difficulties. The difference exists throughout the income range, not only between the lowest group and the rest. The same pattern exists for cognitive and behavioural assessments aged 5. Parameter estimates: Reading more frequently to the child, or taking him to the library improves cognitive and behavioural development up to the child's 3rd birthday.

		assessments SDQ.	Other educational activities also have significant positive effects, particularly on school readiness and behaviour. Up to mother's late 30s, children with older mothers demonstrate higher cognitive ability and better behaviour at age 3. Depending upon whether the higher or lower parameter estimates are considered, what parents do is a major or minor contributor to socio-economic differences in outcomes aged 3. Even taken lower estimates, parenting makes an important contribution to differences in cognitive and behavioural development by income group.
Flouri 2010a. E6	To model the effects of area and family contextual risk on young children's psychopathology	Socioeconomic disadvantage at both area and family level and by distal and proximal adverse life events at family level. Strengths and Difficulties Questionnaire.	Full model (controlling for child age, sex, developmental milestones, temperament and ability) the coefficient for family SED is reduced (b=0.218, SE= 0.058) suggesting that family SED predicts psychopathology in young children not only directly, but also by impacting on young children's development. The effect of proximal family adversity in contrast, remains substantial (b=0.387, SE = 0.055) by the addition of parenting, maternal psychopathology and all the child-level variables. In this final model, child level variance component was 16.439 (SE=0.0366) and the variance due to differences in lower layer super output areas (area level disadvantage) was 0.244 (SE = 0.146).
Flouri 2010b. E8	Adverse life events, area socioeconomic disadvantage and psychopathology and resilience in young children; the importance of risk factors' accumulation and protective factors' specificity	Contextual risk was measured at both are (with the Index of Multiple Deprivation) and family (with proximal and distal adverse live events experienced) level. Moderator variables were parenting, verbal and non verbal ability, developmental milestones and temperament.	The interaction between proximal family risk and developmental milestones predicted conduct problems (b = -0.017, SE = 0.008), and the interaction between proximal family risk and non-verbal ability predicted both conduct problems (b = -0.002, SE = 0.001) and emotional symptoms (b = -0.002, SE = 0.001), but no interaction effects were significant. These findings suggest that delayed development buffered the effects of proximal risk on conduct problems, and non-verbal ability buffered the effect of proximal risk on both emotional symptoms and conduct problems.
Goodman 2010. E9	The importance of attitudes and behaviour for poorer children's educational attainment.	Summary, no data.	Analysis of the MCS showed big differences in cognitive development between children from rich and poorer backgrounds at the age of three, and the gap widened at age 5. Children from poorer backgrounds also face much less advantageous "early childhood caring environments". For example, compared with children from better off backgrounds, there were significant differences in poorer children's and their mother's: health and wellbeing, breastfeeding and maternal depression, family interactions, home environment (e.g. reading regularly), parenting styles and rules (e.g. regular bedtimes and mealtimes).

Goodman 2009 E10	Inequalities in educational outcomes among children aged 3 to 16.	Age 3 and 5 MC: BAS vocabulary test scores.	All reported as gap in BAS scores between highest and lowest group. Age 3 to 5: Cognitive outcomes are already strongly graded by income by the age of 3 (0.706), and this gap widens between the ages of 3 and 5 (0.836). In particular children from the top quintile see the most rapid cognitive development between these ages. A similar pattern for mother and father's social class is apparent with a large and growing gap between ages 3 (-0.644 and -0.425) and 5 (-0.782 and -0.580). There is a large and growing gap in cognitive outcomes between age 3 and 5 according to mother's education. By the age of 3, young people with mothers who are educated to A level or above have higher than average cognitive development, while those with mothers whose highest qualification is GCSE or below have below average development. Compared to those mothers with degree level or higher education, all other educational groups see a decline in their relative cognitive outcomes between the ages of 3 and 5. High to low gap 0.852 age 3, 0.982 aged 5. By the age of 3, children with parents in owner occupied housing have considerably higher cognitive development than those whose parents do not own their own home. Children in socially rented housing have considerably below average outcomes The differences widen between age 3 and 5, with children in social rented housing falling further behind. By age three there are strong differences in education outcomes. Children whose mothers were aged 30 or over when they were born have significant better cognitive outcomes aged 3 and the disparities widen sharply to age 5 (Old to young gap, 0.404 age 3, 0.563 aged 5) Children of married parents have the strongest cognitive development age 3, children of lone parents have the poorest. These gaps seem to narrow by age 5. Regional differences in cognitive outcomes are more pronounced at age 3 than age 5, But the relationship between achievement and neighbourhood deprivation is strong and widening (Top to bottom gap, 0.633 aged 3, 0.681 aged 5). Girls show significantly better cognitive outcomes aged 3 (gender gap 0.241), but this disappears by age 5 (gender gap 0.082). Bangladeshi and Pakistani children in particular fall behind by age 3. By age 5 ethnic gaps in education outcomes narrow, although Black African children fall further behind over this time.

Hansen 2009. E11	Effect of different forms of childcare at an early age on cognitive skills and behavioural development age 3.	Childcare provision: 1. Formal group care incl. Nurseries and crèches. 2. Formal non-group care incl. Child minders, nannies and au pairs. 3. Partner care by child's father or mother's partner. 4. Grandparent care. 5. Other informal care including other relatives, friends and neighbours.	Children receiving grandparent care can achieve on average, higher vocabulary test scores (0.193 of a SD) than children using formal group care. The other factors most associated with vocabulary scores are: living in a household where English is the only language spoken (0.446), having a white mother (0.316), having a mother with fewer than 5 GCSE A-C (-0.029), being a female child (0.241) and being a first-born child (0.223). Children in formal non-group care achieve on average, 0.122 of a SD lower school readiness scores than children in formal group care. Children experiencing informal care achieve between 0.108 and 0.193 SD lower scores depending on the type of informal care. Other variables most associated with school readiness are having a father with fewer than 5 GCSEs A-C (-0.322), having a mother with fewer than 5 GCSEs A-C (-0.306), living in a household where only English is spoken (0.227), and being a female child (0.225). Children with young mothers who experience formal group care achieve 0.246 standard deviations higher school readiness scores than similar children who attend other childcare settings. Also children living in households claiming benefits achieve 0.224 higher scores than contemporaries with other care arrangements. SDQ problem behaviour scores show that grandparent care is positively associated with behavioural problems (by 0.121 of a SD).
Hopkin 2009. E14	Using foundation profile assessments to assess outcomes from early years education.	Foundation Stage Process Assessment.	The average FSPA score is statistically higher for children that attend early years education (88) than children who did not attend (85). Children who attended early years education part time at more than one provider had the highest scores (90), followed by children who attended some full time early years education (88). Attending full time had a positive significant effect on the total FSPA score, increasing it by 1.5 points compared to part time. The lowest scores were for children who started early years education after their third birthday (av. score 92, $p<0.05$), and the highest scores for children who started provision before their first birthday (av. score 83 $p<0.01$). The positive effects of starting before age 3 are confined to the learning areas: knowledge and understanding of the world, and physical development. The negative effects of starting after age 4 relate to mathematical development, communication, language and literacy and creative development. The type of provider effects are largely insignificant except in relation to personal, social and emotional development, and indicate a positive association from attending preschool

			(p<0.1) and a negative association from attending a day nursery (p<0.1).
Kelly 2009. E15	Light drinking in pregnancy; associations with behavioural problems and cognitive deficits aged 3.	MCS measures Drinking patterns during pregnancy: Never Light; not more than 1-2 units per week or per occasion. Moderate; not more than 3-6 units per week or 3-5 units per occasion Heavy/binge: 7 or more units per week or 6 or more units per occasion.	There was a J-shaped relationship between mothers drinking during pregnancy and the likelihood of high scores (above the cut off) on the total difficulties scale of the SDQ and the conduct problems, hyperactivity and emotional symptom SDQ subscales. Children born to light drinkers were less likely to score above the cut off compared with children of abstinent mothers. Children born to heavy drinkers were more likely to score above the cut off than abstinent mothers. Boys born to mothers who had up to 1-2 drinks per week or per occasion were less likely to have conduct problems (OR 0.59, 95% CI 0.45-0.77) and hyperactivity (OR 0.71, 95% CI 0.54-0.94). These effects remained in fully adjusted models. Girls were less likely to have emotional symptoms (OR 0.72, 95% CI 0.51-1.01) and peer problems (OR 0.68, 95% CI 0.52-0.92) compared to those born to abstainers. These effects were attenuated in fully adjusted models. Boys born to light drinkers had higher cognitive ability test scores [SD, 95% CI] BRSA 0.24 (0.16- 0.32), BAS 0.15 (0.08-0.23) compared with boys born to abstainers. The difference for BAS was attenuated on adjustment for socio-economic factors, whilst the difference for BRSA remained statistically significant.
Kelly 2006.	Ethical differences in achievement of developmental milestones by 9 months of age.	MCS measures	OR (95% CI). Black Caribbean 0.23 (0.11-0.48), Black African 0.31(0.18-0.55) and Indian 0.55 (0.33-0.93) infants were less likely to show delay in the attainment of gross motor milestones compared with White infants after adjustment for a range of explanatory variables. Pakistani and Bangladeshi infants were more likely to have delays in fine motor development 1.69 (1.21-2.35) and 2.17 (1.17-4.02) respectively, and communication gestures 4.19 (1.47-11.94) and 7.64 (3.96-14.76), but these were explained by cultural tradition and socio-economic factors.
Kiernan 2009. E17	Poverty, maternal depression, family status and cognitive and behavioural development. Persistent vs. episodic poverty.	MCS measures	Strong associations between poverty and children's intellectual and behavioural development, persistent poverty being particularly important in relation to cognitive development. Maternal depression (net of other factors) was more weekly related to cognitive development but strongly related to whether children were exhibiting behavioural problems, and persistent poverty amplifies the situation. Family status, net of other factors (most noticeably poverty) was only weakly associated with children's development.
Kiernan 2008.	Economic depression, maternal depression, parenting and children's	MCS measures	Children living in economically deprived families are less likely to inhibit advanced cognitive skills at age 3 (-0.26 SD) and have higher risks of experiencing externalising (0.37 SD) and internalising behavioural problems (0.18) Children with depressed mothers tend to experience more behavioural difficulties than their peers whose mother is not depressed (0.22 SD for externalising problems and 0.13SD for internalising problems). Mothers emotional wellbeing is not associated with children's

	cognitive and emotional development age 3.		cognitive performance (-0.01 SD). The association between mother's depression and economic deprivation is positive and statistically significant (0.5 SD).
Mensah 2010a. E21	Gender differences in education attainment; influences of family environment.	Communication, language, literary and mathematical development. Foundation stage profile.	Communication, language and literacy: There was evidence for gender interaction for mother's educational qualifications (p=0.049), the quality of the area for bringing up children (p=0.039), and mothers age at first birth (p=0.011), each signifying that associations were more pronounced for boys than girls. Mothers level of qualification predicted the strongest gradient in scores. Girls whose mothers had no qualifications were estimated a score 8.3 points less than girls whose mothers held an NVQ level 4 or 5 qualification, the effect for boys was 9.7. Girls living in a poor or very poor quality area were estimated as scoring 1.6 points less than girls in excellent area, the difference for boys was 2.7. Girls whose mothers had begun childbearing as a teenage were estimated as scoring 2.6 points less than girls whose mothers had delayed childbearing until her 30s or later, the effect for boys was 5.1. Common effects for boys and girls: Lower attainment was found among children with low family income, children from households who had experienced periods where no parent was in paid employment, and children who lived in rented accommodation (especially local authority or housing association). Children who lived with step parents or families who had experienced periods of separation attained lower scores than children who lived with married parents, however attainment in children from cohabiting or lane mother families were not significantly different to married families. Children who were first born attained higher scores than subsequent children. Children of Pakistani or Bangladeshi origin attained lower score compared to White children, others ethnicities were not significant. The coefficient estimated for gender in the multivariate model was a difference of 3.2 points less for boys compared to girls. This may be interpreted as the gender gap among children of mothers who were highly educated, living in excellent areas and who began childbearing at the age of 30 or over, and was statistically significant (p=0.001). The additional gender difference for mothers with no qualifications was 1.4 points (a difference of 9.7 points for boys, minus a difference of 8.3 for girls), for children living in poor or very poor areas for bringing up children an additional 1.1 points, and for children whose mother was aged under 20 at the birth of her first child an additional 2.5 points. In total a gender gap of 8.2 can be estimated for children who are most disadvantaged in

			these aspects. MATH: Gender interaction for mother's educational qualifications (p=0.001), the quality of the area for bringing up children (p=0.005) and others age at first birth (p=0.001), again signifying more pronounced effects for boys than girls. Mothers level of qualification again predicts the strongest gradient of scores. Girls whose mothers held no qualifications were estimated as scoring 6.9 points less than girls whose mothers held an NVQ level 4 or 5 qualification, the corresponding effect for boys was 8.8. Girls living in a poor or very poor quality area were estimated as scoring 1.6 points less than girls in excellent area, the difference for boys was 3.6. Girls whose mothers had begun childbearing as a teenage were estimated as scoring 1.9 points less than girls whose mothers had delayed childbearing until her 30s or later, the effect for boys was 4.4 A combined test for interaction across these three measures provided evidence of gender interaction (p<0.001).
Mensah 2010b. E22	Parents' mental health and children's cognitive and social development	Mental health: Kessler 6 scale. Foundation stage profile CLL, MATH, PSE	On a scale of 0 to 100 children whose mothers were experiencing high levels of psychological distress were estimated as scoring 8.1 points less than children whose mothers were experiencing the lowest levels (p,0.001). The model R2 statistic estimated that mother's mental health explained 1`.9% of the variability in children's CLL scores. Fathers mental health explained only 0.6% of the variability in CLL scores. Controlling for parent's characteristics, family socioeconomic resources and stability attenuated the effect. A significant but much reduced effect of mother's mental health was retained. Will the difference in score estimated at 3.5 between those whose mothers were most and least psychologically distressed (p<0.001). The effect of Father's mental health became non-significant. Similar patterns were also seen for MATH and PSE. A gender interaction test did not provide statistically significant evidence for a difference in impact of mother's mental health for boys or girls (p=0.165).
Plewis 2008. E24	Changing economic circumstances in childhood and their effects on subsequent educational and other outcomes.	MCS and National Pupil Database	MCS suggests small increases in cognitive scores and slightly improved behaviour for a substantial increase in income between 9 months and 3 years – perhaps 1/16th of a standard deviation unit higher on cognitive tests. This effect represents a difference of around one month in terms of educational progress. A similar effect size is found for behaviour. Changes in parental employment status between 9 months and three years are unrelated to cognitive and behavioural scores, and to earnings age 34.