

March 2008

National evaluation report



The Impact of Sure Start Local Programmes on Three Year Olds and Their Families

SureStart

Report 027



Evidence
& research

Research Report
NESS/2008/FR/027

*The Impact of Sure Start Local Programmes on
Three Year Olds and Their Families*

The National Evaluation of Sure Start (NESS)
Institute for the Study of Children, Families and Social Issues,
Birkbeck, University of London

The views expressed in this report are the authors' and do not necessarily reflect those of the Department for Children, School and Families.

© Her Majesty's Printer and Controller of HMSO 2008
ISBN 978 1 84775 103 4

The National Evaluation of Sure Start Team is based at the Institute for the Study of Children, Families & Social Issues, Birkbeck, University of London, 7 Bedford Square, London, WC1B 3RA.

Core Team

Professor Edward Melhuish, Institute for the Study of Children, Families & Social Issues, Birkbeck (Executive Director);
Professor Jay Belsky, Institute for the Study of Children, Families & Social Issues, Birkbeck (Research Director);
Professor Alastair Leyland, MRC Social & Public Health Sciences Unit, Glasgow (Statistician);

Impact Module

Professor Edward Melhuish, Institute for the Study of Children, Families & Social Issues, Birkbeck (Director);
Professor Angela Anning, Institute for the Study of Children, Families & Social Issues, Birkbeck (Investigator);
Professor Sir David Hall, University of Sheffield (Investigator);

Implementation Module

Professor Jane Tunstill, Visiting Professor, Social Care Workforce Research Unit, Kings College, University of London (Director);
Mog Ball (Investigator);
Pamela Meadows, National Institute of Economic & Social Research (Investigator);

Cost Effectiveness Module

Pamela Meadows, National Institute of Economic & Social Research (Director);

Local Context Analysis Module

Professor Jacqueline Barnes, Institute for the Study of Children, Families & Social Issues, Birkbeck (Director);
Dr Martin Frost, Birkbeck (Investigator);

Support to Local Programmes on Local Evaluation Module

Professor Jacqueline Barnes, Institute for the Study of Children, Families & Social Issues, Birkbeck (Director);

Data Analysis Team

Dr Helena Romaniuk, Institute for the Study of Children, Families & Social Issues, Birkbeck;
Mark Hibbett, Institute for the Study of Children, Families & Social Issues, Birkbeck;
Dr Antero Malin, Institute for the Study of Children, Families & Social Issues, Birkbeck.

The views expressed in the report are the authors' and do not necessarily reflect those of the Department for Children Schools and Families (DCSF).

PEER REVIEW

Peer review is an important process contributing to the maintenance of high standards for research publications. This report has been subject to peer review, being evaluated for the adequacy and merit of its research by a scientific Advisory Group assembled by the Department for Children Schools and Families (DCSF) for the purpose of reviewing the National Evaluation of Sure Start. The Advisory Group contains internationally respected experts from the academic fields that form the basis of the National Evaluation of Sure Start, including psychology, psychiatry, education, economics, paediatrics and social science. Members of the Advisory Group can comment freely upon the merits of the report and such comments may well lead to modifications of the report prior to publication. This report has been subject to thorough inspection by the Advisory Group who suggested many changes that improved the report. It is important to note that this report would not be published without the approval of the Advisory Group, which has the objective of ensuring the scientific integrity of the research. In sum, the peer review process ensures that the research report has been thoroughly examined with regard to its scientific merit and found to be worthy of publication.

EXECUTIVE SUMMARY

A principal goal of Sure Start Local Programmes (SSLPs) has been to enhance the life chances of young children and their families by improving services in areas of high deprivation. SSLPs were set up between 1999 and 2003 and were experimental in the sense of trying out different ways of working with deprived communities where provision had been poor for years. They represent an intervention unlike almost any other undertaken to enhance the life prospects of young children in disadvantaged families and communities. A key difference is that programmes are *area-based*, with *all* children under four and their families living in a prescribed area serving as the “targets” of intervention. This has the advantage of services within a SSLP area being universally available, thereby limiting any stigma that may accrue from individuals being targeted.

In the early years of SSLPs, by virtue of their local autonomy and in contrast to more narrowly-defined early interventions, they did not have a prescribed “curriculum” or set of services, especially not ones delineated in a “manualised” form to promote fidelity of treatment to a prescribed model. Instead, each SSLP had extensive local autonomy concerning how to fulfil its mission with a common broad framework of services. Services were to be tailored according to local needs while covering a number of core services: outreach and home visiting; support to families and parents; support for good quality play, learning and childcare; primary and community healthcare and support for children and parents with special needs but without specification of how services were to be developed. This contrasts markedly with early interventions previously demonstrated to be effective (e.g. Abecedarian project, Ramey et al., 2000; Early Head Start, Love et al., 2002; Positive Parenting Program, Sanders 2003; Incredible Years, Webster-Stratton, 1993; Nurse Family Partnership, Olds et al., 1999). In contrast to these projects with detailed models of service provision, SSLPs were much more varied in their operation and service provision.

In November 2002 the Inter-departmental Childcare Review promoted the concept of children’s centres, following the early lessons from Sure Start, to provide integrated care and education, family support, health services and childminder support. Moves toward the children’s centre model were initiated in 2003 and confirmed in December 2004 in the ten year childcare strategy (HM Treasury, 2004) and by March 2006 the majority of SSLPs were generally functioning as Sure Start Children’s Centres. From April 2006, they have been funded via Local Authorities. This has modified the nature of services in that the guidelines for Sure Start Children’s Centres are more specific about the services to be offered, placing a clear focus on child outcomes and on adjusting provision in relation to the level of disadvantage in the area. Nonetheless the guidelines are not yet so specific that there is not a large degree of variation among Local Authorities and areas within Local Authorities in the way the new children’s centres are implemented. This poses challenges to evaluating their overall impact, as each SSLP is unique.

This second phase of the Impact Study of the National Evaluation of Sure Start (NESS) focuses on over 9000 3-year-olds and their families in 150 SSLP areas who were initially studied when the children were 9 months of age. These children/families were compared at three years of age with 1,879 children/families who participated in the first (i.e. 9 months) and second (i.e. 3 years) sweeps of the Millennium Cohort Study (MCS) and who resided in similar areas that did not have

SSLPs. In order to compare cases from areas as similar to the NESS Impact Study areas as possible the MCS sample was selected from the entire MCS cohort in England based on characteristics of the areas in which they lived.

After taking into consideration pre-existing family and area characteristics, comparisons of children and families living in SSLP areas with those living in similar areas not receiving SSLPs revealed *a variety of beneficial effects for children and families living in SSLP areas, when children were 3 years old*. There were positive effects associated with SSLPs with respect to 7 of the 14 outcomes assessed. SSLP children showed better social development, exhibiting more positive social behaviour and greater independence/self-regulation than their non-SSLP counterparts. Parenting showed benefits associated with living in SSLP areas, with families in SSLP areas showing less negative parenting while providing their children with a better home learning environment. The beneficial parenting effects appeared to be responsible for the higher level of positive social behaviour in children in SSLP areas. Also families in SSLP areas reported using more services designed to support child and family development than did families not in SSLP areas.

In addition, children growing up in SSLP areas were more likely to have received the recommended immunisations and were less likely to have had an accidental injury in the year preceding assessment. However caution is warranted in interpreting these two effects of SSLPs (i.e., more immunisations, fewer accidents) because the non-SSLP (MCS) sample was born, on average, two years before the SSLP (NESS) sample. Subsequent analyses revealed that the better performance of the SSLP group on these two outcomes might have been the result of time of measurement effects. For example, nationally child immunisations have been recovering from an earlier dip and SSLP areas may have benefited more than comparison areas from this effect.

The results of this second phase of impact evaluation differ markedly from those of the first phase (2005) carried out by the NESS Impact Study team. Whereas earlier findings indicated that the most disadvantaged 3-year-old children and their families (i.e., teen parents, lone parents, workless households) were doing less well in SSLP areas, while somewhat less disadvantaged children and families benefited (i.e., non-teen parents, dual parent families, working households), the current phase of the impact evaluation provides almost no evidence of adverse effects of SSLPs. The SSLP effects appeared generalisable across population sub-groups (e.g., workless households, teen mothers) for two reasons: (1) In general, there were almost no consistent differences in effects of SSLPs for particular subgroups and, (2) there was almost no consistent evidence that children and families in the most disadvantaged SSLP areas, which had more of the most disadvantaged families, functioned more poorly than children and families in somewhat less disadvantaged SSLP areas.

Various explanations can be offered for this difference in results between the earlier 2005 findings and the current results. Differences could have occurred because of methodological differences. The earlier findings were based on a comparison of children and families studied by the same research team (NESS) at roughly the same time in SSLP areas and in areas later to become SSLP areas. In contrast, the current findings derive from a comparison of children and families enrolled in two separate studies, the MCS and the NESS Impact Study, for which data collection was carried out two years apart by different research teams.

Nevertheless, although there is no way to determine whether methodological variations account for the differences in findings across the two phases of the NESS impact evaluation, it seems eminently possible that the contrasting results accurately reflect the contrasting experiences of SSLP children and families in the two phases. Whereas those 3-year-olds enrolled in the first phase were exposed to relatively immature programmes—and probably not for their entire lives—3 year old children and their families participating in the second phase were exposed to more mature and better developed programmes throughout the entire lives of the children. Also these latter children and families were exposed to programmes that had the opportunity to learn from the results of the earlier study, especially with respect to the need for greater effort to be made to reach the most vulnerable households. In sum, differences in the *amount of exposure* to these programmes and the *quality of SSLPs* may well account for both why the first phase of impact evaluation revealed some adverse effects associated with SSLPs for the most disadvantaged children and families and why the second phase of evaluation reveals beneficial effects for almost all children and families living in SSLP areas.

However some caution is warranted in interpreting the results of this second impact evaluation. First, as just noted, exactly why the two sets of results are different remains uncertain. It is thus impossible to completely discount the possibility that the virtual absence of adverse effects in the current report is due to methodological differences between the earlier and current phases of the impact study. Second, the two positive effects detected pertaining to child health may have been a function of the two year gap between the MCS and NESS studies rather than effects of living in SSLP areas per se, as SSLP effects on immunisations and accidents disappeared when time of measurement was taken into account. Third, all positive effects detected derive from parent reports and it would be preferable to have further evidence from alternative sources. Finally, positive effects of SSLPs were modest in size, so they should not be exaggerated.

In summary, taking into consideration the differences in research design of the current and earlier (2005) SSLP impact evaluation leads to the cautious conclusion that the increased benefits of SSLPs detected in the current study stem from (a) improvements in service effectiveness in SSLPs that have occurred in recent years, as well as (b) the longer exposure to SSLP services of the 3-year-olds and their families in the current phase of evaluation compared to the service exposure of those in the earlier phase of impact evaluation. It is plausible that the differences in findings across the first and second phases of the NESS Impact Study reflect actual changes in the impact of SSLPs resulting from the increasing quality of service provision, greater attention to the hard to reach, the move to children's centres, as well as the greater exposure to the programme of children and families in the latest phase of the impact evaluation. These positive results are modest but are evidence that the impact of Sure Start programmes is improving.

CONTENTS

- 1. Introduction 1**
- 1.1 Approach 3
- 2. Research Design 5**
- 2.1 Design..... 5
- 2.2 Identifying Potential Matched Areas 5
- 2.3 Propensity Scoring 6
- 2.4 Sample 8
- 2.5 Data Collection 14
- 2.5.1 Child/Family and Community Control Variables 14
- 2.5.2 Child/Family Dependent/Outcome Variables 15
- 3. Results 15**
- 3.1 First Stage: Overall (across-the-board) Effects of SSLPs 16
- 3.1.1 Summary of main effects 21
- 3.2 Second Stage: Did first stage analysis overestimate/underestimate SSLP effects? 21
- 3.3 Third Stage: Differential Effects of SSLPs on Specific Sub-populations. 22
- 3.4 Fourth Stage: Threats to confidence in detected SSLP effects 24
- 4. Summary 28**
- 5. Conclusion 29**
- References 31**
- Appendix A: Procedures for Propensity Matching 34
- Appendix B: Selection/Attrition and Missing Data Analyses 41
- Appendix C: Description of Outcome Variables 49
- Appendix D: Imputation procedure 54
- Appendix E: Producing Measures of area characteristics 57
- Appendix F: Effects of Strata and Covariates on Outcomes 58
- Appendix G: SSLP vs. MCS by demographic group interactions 62
- Appendix H: Results of Analyses including time of measurement 67
- Appendix I: SSLP vs. MCS by demographic group interactions, strata 2-5 68

TABLE OF TABLES AND FIGURES

Table 2.1:	Distribution of SSLP and MCS Areas Using Propensity Scores to Stratify Areas	7
Table 2.2:	Summary of Demographic Characteristics	10
Table 3.1:	Summary of Outcome Measures – 3 years: Imputed Data	18
Table 3.2:	Estimated Effects of Sure Start at 3 years	20
Table 3.3:	Summary of interaction effects between SSLP/MCS and select demographic variables	23
Table 3.4:	Summary of interaction effects between SSLP/MCS and select demographic variables, strata 2 to 5	28
Table A.1:	Mean and Standard Deviations of SSLP and MCS Areas of 85 Area Deprivation Variables	34
Table A.2:	Logistic Regression Results – Percent Correct Classification and MCS Areas	36
Figure A.1:	Covariation of IMD 2004 and % Asian Families in Local Area	36
Table A.3:	Propensity-score Descriptive Statistics for 150 SSLP and 138 MCS Areas	37
Figure A.2:	Distribution of Propensity Scores for SSLP (NESS) and MCS Areas	37
Table A.4:	Propensity-score Descriptive Statistics for 150 SSLP and 134 MCS Areas	37
Figure A.3:	Revised Distribution of Propensity Scores for SSLP (NESS) and MCS Areas	38
Table A.5:	Marginal Means of IMD IDAOP Score for Propensity-Score Strata for SSLP and MCS Areas	39
Table A.6:	Revised Means of IMD IDAOP Score for Propensity-Score Strata for SSLP and MCS Areas	39
Table A.7:	Final Propensity Score	39
Table A.8	Distributions of SSLP and MCS Areas for Five Propensity Strata, including Sample Sizes	40
Table A.9:	Distribution of SSLP and MCS Areas Using IMD Data to Stratify Areas	40
Table B.1.1:	Ness sample – Comparison of Children/Families Seen and Not Seen at 3 years	41
Table B.1.2:	MCS sample – Comparison of Children/Families Seen and Not Seen at 3 years	44
Table B.2.1	Comparison of Children/Families for missing values in outcome variables at 3 years, strata 2 - 4	47
Figure C.1:	Distribution of Parenting Risk Index (PRI)	52
Table C.1:	Frequencies of Parenting Risk Index (PRI)	52
Table C.2:	Statistics of Parenting Risk Index (PRI)	53
Table C.3:	Correlations between Parenting Risk Index (PRI) and child outcomes	53
Table D.1:	Summary of Demographic Characteristics: Data set for imputation	55
Table D.2:	Percentage of data imputed – 3 years	56
Table E.1:	Variables in area level composite factors	57
Table F.1:	Summary of Model Estimate Effects – 3 years: Complete data	58
Table F.2:	Summary of Model Estimate Effects – 3 years: Imputed data	60

TABLE OF TABLES AND CONTENTS CONTINUED

Table G.1:	SSLP/MCS by demographic interactions - significant results with p values: Complete data	62
Table G.2:	SSLP/MCS by demographic interactions - significant results with p values: Imputed data	65
Table H.1:	Estimated effects of SSLPs, controlling for time of measurement	67
Table I.1:	SSLP/MCS by demographic interactions: significant results, complete cases, strata 2 to 5	68
Table I.2:	SSLP/MCS by demographic interactions: significant results, imputed data, strata 2 to 5	71

1. INTRODUCTION

The principal goal of Sure Start Local Programmes (SSLPs) is to enhance the life chances of young children growing up in disadvantaged neighbourhoods. Children and families in these communities are at risk of developing in ways that are less than optimal. This has profound consequences for the children, families and communities, and for society at large. Thus, SSLPs not only aim to enhance health and well-being during the early years, but to increase the chances that children will enter school ready to learn, be academically successful in school, socially successful in their communities and occupationally successful when adult. Indeed, by improving—early in life—the developmental trajectories of children known to be at-risk of compromised development, SSLPs aim to break the intergenerational transmission of poverty, school failure and social exclusion.

It needs to be appreciated that the SSLP initiative represents an intervention unlike almost any other undertaken in the Western world devoted to enhancing the life prospects of young children growing up in disadvantaged families and communities. SSLPs were set up between 1999 and 2003 and were experimental in the sense of trying out different ways of working with deprived communities where provision had been poor for years. What makes the initiative so different is that it is *area-based*, with *all* young children and their families living in a prescribed area serving as the “targets” of intervention. In contrast to more targeted interventions carried out in the USA, SSLPs initially did not have a prescribed “curriculum” or set of services, especially not ones delineated in a “manualised” form to promote fidelity of treatment to a prescribed model. Instead, each local programme was charged with working with the community to improve existing services for families with children under four and creating new ones as needed where gaps existed. Services were to be tailored according to local needs while covering core services: outreach and home visiting; support to families and parents; support for good quality play, learning and childcare; primary and community healthcare and support for children and parents with special needs, but without specification of how services were to be changed. This contrasts markedly with early interventions previously demonstrated to be effective, be they childcare based, like the Abecedarian Project (Ramey et al., 2000); home based, like the Nurse Family Partnership, (Olds et al., 1999); or even a combination of centre and home based, like Early Head Start (Love et al., 2002).

SSLPs have been evolving and in particular have changed their model of service delivery by becoming Sure Start Children’s Centres. In November 2002 the Inter-departmental Childcare Review (DfES, 2002) promoted the concept of children’s centres following early lessons from Sure Start to provide integrated care and education, family support and health services and childminder support. Moves toward the children’s centre model were initiated in 2003 and confirmed in December 2004 in the ten year childcare strategy (HM Treasury, 2004) and by March 2006 the majority of SSLPs were generally functioning as children’s centres. From April 2006, they have been funded via Local Authorities, who have been charged with collaborating with service delivery partners in the NHS and Job Centre Plus within Children’s Trusts arrangements. This has modified the nature of services in that the guidelines for Sure Start Children’s Centres are more specific about the services to be offered, placing a clear focus on child outcomes and on adjusting provision in relation to the level of disadvantage in the area. Nonetheless the guidelines are not yet so specific that there is not a large degree of variation

among Local Authorities and areas within Local Authorities in the way the new Sure Start Children's Centres are implemented. Thus in contrast to other, more highly specified, early interventions, SSLPs are much more varied in terms of what they deliver and how they deliver it. This has posed challenges to evaluating their overall impact, as each SSLP is relatively unique.

Given the ambitious longer-term goals of SSLPs, it is clear that the ultimate effectiveness of SSLPs cannot be determined for quite some time and that children growing up in communities with SSLPs will need to be studied well beyond their early years before a final account of the success of SSLPs will prove possible. Nevertheless, by studying children and families in SSLPs during their early years, it may well prove possible to detect evidence of early effectiveness. The current phase of the Impact Study of the National Evaluation of Sure Start (NESS) has built upon the first phase of inquiry (Belsky, Barnes & Melhuish, 2007; NESS, 2005a) and was designed with this goal in mind. Specifically, over 9000 children growing up in 150 SSLP areas and first studied, along with their families, at 9-months of age have been studied again when 3-years-old, with plans for continued follow up at age five years.

In order to evaluate the effects of SSLPs on child and family functioning, the SSLP children/families are compared with select children/families participating in the Millennium Cohort Study (MCS) who have also been studied at 9 months and 3 years of age. Selection of children/families from the MCS was based on their residing in areas relatively similar to those of the NESS sample, but not benefiting from a SSLP. The necessity of relying on MCS children/families as a point of comparison for children/families residing in SSLP areas represented a compromise from the standpoint of research design, especially relative to the earlier phase of inquiry in which children/families residing in SSLP communities could be compared with children/families residing in more or less similar communities destined to become SSLP areas at a later date (see section 5). Indeed, the fact that the MCS data to be used in this impact evaluation were gathered by a different team of researchers some two years before that obtained on the NESS/SSLP sample and did not include as many children/families residing in the most disadvantaged communities meant that a number of steps needed to be taken to check the confidence that could be placed in the results of the present evaluation. Even when these potential "threats to confidence" were satisfactorily addressed, some unanswered questions still remain, leading ultimately to the drawing of "cautious conclusions" vis-à-vis effects of SSLPs.

Earlier findings from an initial impact study, involving comparisons of 9-month-olds and 3-year-olds and their families residing in 150 SSLP areas with counterparts living in 50 communities destined to become SSLP areas, revealed a limited number of indisputably small effects of SSLPs on child/family functioning (NESS, 2005a; see also Belsky & Melhuish, 2007; Belsky, Melhuish, Barnes, Leyland, Romaniuk, & the NESS Research Team, 2006). Differences between these two sets of families indicated, principally among the 3-year-olds and their families, that the less disadvantaged of the mostly disadvantaged families living in SSLP areas benefited somewhat from the programme, whereas the most disadvantaged children/families (i.e., teenage mothers, workless or lone parent households) seemed to experience some adverse effects of living in SSLP areas. More specifically, mothers of 9-month-olds experienced less household chaos and mothers of 3-year-olds proved more accepting of their children's behaviour (i.e. less slapping, scolding, physical

restraint). Moreover, mothers of 3-year-olds who became parents in their 20s or later engaged in less negative parenting when living in SSLP areas rather than the comparison communities; these mothers comprised 86% of the sample. Three-year-olds of these non-teen mothers exhibited fewer behaviour problems and greater social competence when living in SSLP communities than in comparison communities, and evidence indicated that these effects for children may well be mediated by SSLP effects on the parenting of non-teens (i.e. more acceptance, less negative parenting). Adverse effects of SSLPs emerged in the case of children of teen mothers (14% of sample) in that they scored lower on verbal ability and social competence and higher on behaviour problems than their counterparts in comparison areas. Children from workless households (39% of sample) and children from lone-parent families (36% of sample) also showed evidence of adverse effects of SSLPs, scoring significantly lower on verbal ability when growing up in SSLP areas than did their counterparts in comparison communities.

A core issue to be addressed in the current phase of the NESS Impact Study, which involves studying again at age three over 9000 of the 9-month-olds and their families living in SSLP areas who participated in the earlier phase of inquiry, is whether the apparent effects of SSLPs detected in that first study of 3-year-olds re-emerge, including the seemingly differential effects of SSLPs on select sub-populations. It should be realised that the 3-year-olds studied in this second phase of the NESS Impact Study will have had more exposure to SSLP services than those 3-year-olds included in the earlier phase of inquiry. Whereas the original sample of 3-year-olds would have been exposed to SSLP services for substantially less than three years, those studied in the second phase of impact evaluation would have been exposed for their entire lives (i.e., 3 years). Also SSLPs themselves will have further developed in their functioning. Thus, there are grounds for anticipating the possibility that SSLP effects in the current study may differ from the early findings detected in the first phase of the impact evaluation.

1.1 Approach

When, in 2000 following the Comprehensive Spending Review (HM Treasury, 2000), the government decided to double the number of SSLPs from 260 to more than 500, the decision was made to rely on the MCS to provide a comparison sample. For this reason, the NESS Impact Study has ensured that its procedures, methods and measurements mirrored, for the most part, those used in the MCS.

Several alternative strategies for using the MCS sample and data were initially considered, without committing to any one. One, for example, was to rely on all the children/families participating in the MCS and statistically control for any differences within and across samples on a host of child, family and community background factors. A second strategy called for using as a comparison only disadvantaged children/families living in areas of concentrated deprivation, thereby maximising family and community similarity to SSLP families and communities.

Since the start of the National Evaluation of Sure Start methodological advances have taken place in the study of environmental influences on child and family functioning. Many of these advances address concerns regarding statistical procedures and their means of controlling for potential pre-existing differences

between groups that vary on an independent variable of interest, especially concerns about omitted variables, that is, variables that might be important to control yet have gone unmeasured (McCartney, Bub & Burchinal, 2006). One of these advances is “propensity scoring”, which is adopted in this evaluation report. Propensity Score Analysis has been developed over the past several decades (e.g., Rubin, 1997), but has only recently come to prominence in the study of child development as a technique to address selection bias, the possibility that those who have a particular developmental experience, including exposure to early intervention programmes, may differ in unmeasured ways from those who did not (McCartney et al., 2006). The term propensity refers to “a conditional probability of an individual being in a treatment group, given a set of background variables for that individual” (McCartney et al., 2006, p. 114). In the NESS Impact study whether a child is in the treatment group is determined by whether or not the child lives in a SSLP area; the problem therefore reduces to identifying those areas that have a greater or lesser propensity of having populations that are similar to those of SSLP areas.

Propensity scoring estimates the likelihood of being a SSLP area by distinguishing between groups on area characteristics. The Local Context Analysis module of NESS developed a number of techniques that maximise the usefulness of data from diverse sources that can be used for this purpose (see Barnes, 2007; Frost & Harper, 2007). These have been used as far as possible to provide detailed data on areas with the constraint that equivalent data must be available for MCS areas. Using such data on area characteristics, 138 disadvantaged comparison areas were initially identified that did not have any geographic overlap with SSLP areas and that included children in the MCS. Of these, 72 MCS areas proved, from a propensity score analysis, to be suitable for comparisons between children living within and beyond SSLP areas. The 72 non-SSLP areas included 1,879 children participating in the MCS who were seen at both sweeps of the MCS and for whom there were adequate data for use in statistical analyses.

2. RESEARCH DESIGN

2.1 Design

SSLPs are area-based initiatives where all families with a child of the target age in the designated deprived area are potentially beneficiaries of the programme. As in the initial Impact Study (NESS, 2005a; Belsky et al., 2006; Belsky & Melhuish, 2007), an “intention to treat” design was adopted in the evaluation of the impact of SSLPs. Such an approach does not focus only on those children and families that have used identifiable SSLP services, but rather on all children and families living in SSLP areas. For the evaluation of SSLPs, this focus is appropriate because SSLPs had as their targets *all* children under four in their area and their families. Thus, 9-month-old children and their families in SSLP areas were randomly sampled in the first phase of the impact evaluation and followed up at 3 years of age in the second phase on which this report is focused, so that they can be compared with children and families similarly randomly sampled—by the MCS—but not residing in SSLP areas. It was decided that the MCS children to be used in such comparisons should live in areas that were as similar as possible to the SSLP areas. This decision was taken because the nature of an area was critical to it being allocated a SSLP. Hence this required matching areas where MCS children live with the SSLP areas in the NESS study. The strategy and method by which this was achieved are described in the following section.

2.2 Identifying Potential Matched Areas

The areas where SSLPs were placed were chosen because of their particular characteristics. Because it was considered essential to select MCS children residing in areas as similar as possible to those in which the NESS Impact Study sample resided, a fundamental challenge was to identify small geographical areas that included a reasonable number of children participating in the MCS that could serve as comparison areas. Geographical analysis was used for this purpose (see Barnes et al., 2007; Frost & Harper, 2007). The aim was to identify deprived areas containing MCS children/families that were as similar as possible to SSLP areas. Geographic Information Systems (GIS) were used to view and eliminate potential areas and to extract data on them. The main indicator initially used to identify and select areas at the first stage was the overall score of the Index of Multiple Deprivation (IMD) 2004 (ODPM, 2004). The specification of areas was complicated by the fact that the original design of the MCS was based on sampling within 1998 electoral wards, meaning that there was no direct comparability between the areas used in the MCS sampling and the areas for which IMD 2004 and Census information were available. Areas containing MCS children were identified using individual postcodes following strict guidelines specified by the ESRC longitudinal studies committee to prevent disclosure of personal information.

Initial tests were made using the IMD 2004 data to select wards that contained MCS children but did not overlap with any SSLP areas. These tests showed, however, that the wards selected in this way were clearly less deprived than the SSLP areas. Although some of them contained MCS children living in relatively deprived localities, the overall IMD scores for the wards reflected the fact that wards were large and contained both deprived and relatively non-deprived localities. It was

necessary, therefore, to delineate potential comparison areas using the smaller, more focused, Super Output Areas (SOAs) so that relatively deprived localities could be defined more clearly. GIS were used to select SOAs within the same deprivation score range as SSLP areas. By using an intersection method, any SOA that overlapped with an SSLP area was excluded. Any area selected had to contain more than 9 MCS children.

In order to enhance the comparability of SSLP and MCS areas we sought to create a measure of the levels of affluence of the areas surrounding the MCS and SSLP areas, to serve as an indication of the influence of adjacent areas and the degree to which any area was an isolated area of deprivation. A rule-of-thumb 750 metre buffer was created around each area to represent typical walking distance. Postcodes within each buffer and for the internal areas were extracted and linked to income data (mean household annual income). From this, the following measures were calculated: (1) the ratio of the internal and external buffer weighted means for comparison between the two; (2) percent of households in the buffer whose mean household income was greater than the national average, thereby providing an indication of how affluent the surrounding population was; and (3) a measure of household income variation in the buffer zones. With these and IMD data in hand, it proved possible to identify 138 potential comparison areas that included MCS children/families, but did not have a SSLP.

2.3 Propensity Scoring

As already noted, propensity scoring can be used to estimate the contextual similarity to residing in an SSLP area based, in this case, on area (rather than individual) characteristics (Hill et al., 2005). We can then create “treatment” and “control” groups matched on their propensity to be a SSLP area. First, the probability of an area having a SSLP, its propensity score, was estimated. This involved logistic regression, with the area’s status (SSLP vs. MCS) serving as the outcome to be predicted and several indices of area deprivation and numerous other socio-demographic area characteristics used as predictors of area status (see appendix A). This propensity score was used as a one-number summary of all the predictor variables for each area.

The idea underlying matching on the propensity score is to create a “quasi-randomised experiment”: if the two groups (SSLP and MCS) have identical propensity scores, then areas were equally likely to be in either group. Whilst a properly administered, truly randomised design has the advantage of ensuring equal distribution of measured and unmeasured covariates between groups, propensity scoring can only condition on the measured covariates. Strictly speaking, we are therefore only reducing bias due to non-random allocation with respect to the measured covariates and not any unmeasured covariates. However, as D’Agostino (1998) observed, “if one has the ability to measure *many* of the covariates that are believed to be related to the treatment assignment, then one can be *fairly confident* that *approximately* unbiased estimates for the treatment effect can be obtained” [our emphases]. Although we acknowledge that we do not have complete information on all relevant factors that eventually led to the designation of some areas as SSLPs, the list of covariates in appendix A (table A.1) is reasonably—even if not absolutely—comprehensive. It is certainly difficult to think of any other possibly relevant variables

for which data on both NESS and MCS areas might be available to incorporate in the propensity score analysis.

In order to implement propensity scoring analysis, it was essential to determine which of the 138 aforementioned MCS areas were sufficiently comparable to the SSLP areas to be useful in an analysis. Toward this end, the 138 identified MCS areas were compared with the 150 SSLP areas on 85 indices of deprivation and other area characteristics obtained from administrative sources (see appendix A for more complete reporting of Propensity Scoring data, analysis and decision making). This resulted in the number of MCS areas that were potentially useful for comparison being reduced to 126.

SSLP populations were, in general, more disadvantaged than the comparison population drawn from MCS sample. This necessitated dividing the NESS and MCS samples into five strata reflecting the degree of propensity to be chosen as an SSLP area. Areas in stratum 1 have the lowest propensity to be chosen as a SSLP area and those in stratum 5 have the highest propensity to be chosen as a SSLP area. As it turned out, only one MCS area had the highest propensity to be chosen as a SSLP area compared with 55 SSLP areas (i.e., stratum 5) and only two SSLP areas had the lowest propensity to be chosen as a SSLP area (i.e., stratum 1) (see Table 2.1); these skewed and differential distributions of MCS and SSLP areas across strata posed analytic challenges as discussed later in this section.

Table 2.1: Distribution of SSLP and MCS Areas Using Propensity Scores to Stratify Areas

Propensity score Stratum	Sure Start	MCS	
	N Areas	N Areas	N children
1	2	53	1041
2	15	40	970
3	33	22	818
4	45	10	565
5	55	1	21
Total	150	126	3415

The end result of the initial propensity scoring analysis is that we succeeded in identifying in the MCS a sample of 3415 children nested in 126 areas that could be used (stratified) as a comparison group. However, because there were so few MCS children in stratum 5, and so few NESS children in stratum 1 it was judged necessary to eliminate these strata when making NESS-MCS comparisons for purposes of detecting SSLP effects (i.e. comparisons were based on strata 2, 3 and 4). This meant that there were 72 MCS areas with 2353 children suitable for NESS-MCS comparisons (i.e., in strata 2-4). Of the MCS children in these 72 areas there were 1879 children and families who were seen at both 9 months and 3 years of age and therefore suitable for including in subsequent analyses.

In order to make the best use of the available data in evaluating effects of SSLPs, we first restricted the main NESS-MCS comparisons to only children/families included in Strata 2-4. After these comparisons, we then sought to determine whether the NESS children/families who were excluded from the NESS-MCS comparison functioned similarly to the other NESS/SSLP children/families. If they scored similarly on outcome measures (after adjustment for demographic variation), this would suggest, though not indisputably demonstrate, that any detected effects of

SSLPs (in the first stage of analysis) should generalise to all NESS/SSLP children/families. Should NESS children/families in stratum 5, the biggest group (37%) of SSLP areas, prove to function better than those in other strata within the NESS sample, this would suggest, but again not indisputably demonstrate, that any detected beneficial effects of SSLPs might under-estimate benefits of living in an SSLP area. In contrast, if NESS children/families in stratum 5 functioned more poorly than those in other strata within the NESS sample, this would suggest that any detected beneficial effects of SSLPs might reflect over-estimates of positive SSLP effects.

2.4 Sample

As already noted, the sample selected to be included in the second phase of the NESS Impact Study is a sub-sample of those originally studied in the 9-month data collection of the earlier Impact Study (NESS, 2005a; Belsky et al., 2006; Belsky & Melhuish, 2007). Potential study participants living in 150 SSLP areas were identified with the assistance of the Child Benefit Office of (initially) the Department of Works and Pension and (subsequently) HM Revenue and Customs. They were randomly selected from the Child Benefit Register and a total of 12,575 9-month olds and their families were enrolled in the study, representing a response rate of 84.4%. The aim was to have at least 8,000 children/families in the current, second-phase sample when the children were 3 years of age. Of those seen at 9 months of age, 11,118 children/families from the 150 SSLP areas were randomly selected to be approached by a NESS fieldworker in order to collect data when the child was 3 years old. Of these families 9,192 (82.7%) participated in the 3-year-old data collection. Of those not participating 388 refused (3.5%), 1,484 (13.3%) were not contactable, often because they had moved and were untraceable; and 54 (0.5%) were not seen for diverse other reasons. Thus data collection was completed for 9,192 children and families, who constitute the 3-year-old NESS sample for the second phase of the impact evaluation. The NESS children and families seen at 9 months but not seen at 3 years were compared with those seen on both occasions, separately for strata 1-5, on a range of demographic variables. Comparisons of those not seen at age three relative to those seen at both ages of measurements revealed that on several indicators families not re-studied were significantly less advantaged than those in strata 1-4, but significantly more advantaged than those in stratum 5 (i.e., for workless households, parent education and occupational status, poverty and ethnicity) (see appendix B1). Implications of these differences are considered in the results section 3.4.

MCS children/families were identified and recruited through a similar strategy by the MCS research team. As described earlier, 1879 MCS children could potentially serve in comparisons with the NESS sample in the current study as they had been seen at 9 months and 3 years of age and were categorised in stratum 2-4. These children came from areas that were matched—more or less—by means of propensity scoring to SSLP areas. In the MCS sample there also were children and families seen at 9 months but not at 3 years and they were compared on demographic characteristics to those seen on both occasions. The families not seen at 3 years were more likely to be from lone-parent and workless households and to be lower in occupational status, thereby appearing more deprived than the MCS subsample seen at both ages of measurement (see appendix B1 for full

comparisons). Possible implications are considered in the results section 3.4.

As described above regarding research design, the decision was taken to test for differences between the NESS and MCS samples only within strata 2-4; thus, the final samples used for these comparisons included 5883 children/families in 93 NESS/SSLP areas and 1879 children/families in 72 MCS/non-SSLP areas.

The demographic characteristics of the final NESS and MCS samples are shown using imputed data in Table 2.2. Demographic characteristics were recorded at 9 months and some were also recorded at 3 years. Both sets of measures are shown in Table 2.2. When strata 2-4 are considered, which are the strata used in NESS-MCS comparisons, there are some demographic differences between the NESS and MCS samples. Some indicate greater disadvantage amongst the NESS sample (i.e., NESS had more mothers reporting cognitive difficulties, more lone parents, and more workless households), whereas others related to ethnicity indicate potentially less disadvantage amongst the NESS sample (i.e., more white families and fewer homes where English was an additional language). For other variables the two samples appear similar (i.e., number of mothers having given birth to the target child while under 20 years of age; number of households with total incomes below the poverty line). The NESS sample of children tended to be slightly younger than the MCS sample when seen at 9 months and slightly older when seen at 3 years. The areas in which NESS families resided also scored lower on the 2004 overall Index of Multiple Deprivation (data not shown).

Table 2.2: Summary of Demographic Characteristics

Summary of Demographic Characteristics – 9 months: Imputed Data

Characteristic	Sure Start (N=9192)							MCS (N=1879)							Significance of NESS-MCS difference for strata 2-4 [#]
	Percentage in Each Stratum					In Strata 2-4 ^{&}		Percentage in Each Stratum					In Strata 2-4 ^{&}		
	Strata: how like a SSLP is the area					Number	%	Strata: how like a SSLP is the area					Number	%	
least 1	2	3	4	most 5	least 1			2	3	4	most 5				
(Total Number)	(116)	(957)	(2126)	(2800)	(3193)	(5883)	(64%)	—	(802)	(629)	(448)	—	(1879)	(100%)	
Child's Gender															0.87
Male	50.0	48.1	49.5	51.5	51.7	2955	50.2	—	49.0	49.9	50.9	—	948	50.4	
Female	50.0	51.9	50.5	48.5	48.3	2928	49.8	—	51.0	50.1	49.1	—	931	49.6	
Child's Ethnicity															<0.0001
White	95.7	86.4	85.9	82.4	62.9	4962	84.3	—	80.1	68.9	69.9	—	1326	70.5	
Mixed	2.5	4.2	4.1	4.3	6.3	246	4.2	—	5.0	5.2	5.1	—	97	5.2	
Indian	0.9	1.5	1.0	1.0	1.7	64	1.1	—	3.8	2.1	12.9	—	168	9.0	
Pakistani	0.0	0.9	2.7	4.9	12.4	203	3.5	—	4.2	10.7	2.7	—	96	5.1	
Bangladeshi	0.0	0.6	1.0	0.8	5.6	49	0.8	—	0.6	6.4	0.5	—	41	2.2	
Black Caribbean	0.0	2.0	1.3	1.1	1.7	78	1.3	—	1.2	2.5	2.2	—	42	2.2	
Black Other	0.0	2.6	1.9	3.5	5.1	164	2.8	—	2.3	2.3	3.1	—	52	2.8	
Other	0.9	1.8	2.1	2.0	4.3	117	2.0	—	2.8	1.9	3.6	—	57	3.0	
Language in Home															<0.0001
English Home Language	97.4	91.2	90.2	86.7	70.9	5218	88.7	—	86.9	77.9	75.9	—	1456	77.5	
Other Languages	2.6	8.8	9.8	13.3	29.1	665	11.3	—	13.1	22.1	24.1	—	423	22.5	
Maternal Age at Birth of Child															0.32
Not teenage	96.6	92.5	90.5	87.8	86.3	5269	89.6	—	92.6	88.7	90.6	—	1696	90.3	
Teenage (< 20 years)	3.4	7.5	9.5	12.2	13.7	614	10.4	—	7.4	11.3	9.4	—	183	9.7	

[&]Weighted by area weights; [#]Comparing Sure Start and MCS total numbers or means for strata 2-4

— Excluded from analysis due to insufficient MCS or SSLP communities; bold in final column indicates statistically significant

Table 2.2 (continued): Summary of Demographic Characteristics – 9 months: Imputed Data

Characteristic	Sure Start (N=9192)							MCS (N=1879)							Significance [#]
	Percentage in Each Stratum					In Strata 2-4 ^{&}		Percentage in Each Stratum					In Strata 2-4 ^{&}		
	Strata: how like a SSLP is the area					Number	%	Strata: how like a SSLP is the area					Number	%	
least 1	2	3	4	most 5	least 1			2	3	4	most 5				
(Total Number)	(116)	(957)	(2126)	(2800)	(3193)	(5883)	(64%)	—	(802)	(629)	(448)	—	(1879)	(100%)	
Maternal Cognitive Difficulties															0.002
No Difficulties Reported	94.0	91.1	90.1	91.3	87.0	5344	90.8	—	90.2	89.7	94.6	—	1744	92.8	
Has Some Difficulties	6.0	8.9	9.9	8.7	13.0	539	9.2	—	9.8	10.3	5.4	—	135	7.2	
Household Deprivation															0.09
Above poverty line ⁺	77.3	62.8	53.5	50.3	31.6	3147	53.5	—	64.1	53.1	48.0	—	958	51.0	
Below poverty line ⁺	22.7	37.2	46.5	49.7	68.4	2736	46.5	—	35.9	46.9	52.0	—	921	49.0	
Highest Occupation in Household															0.04
Management/Professional	41.1	28.8	23.4	19.8	12.1	1328	22.6	—	31.9	24.1	20.9	—	429	22.8	
Intermediate	12.2	8.0	8.9	9.2	6.2	524	8.9	—	8.3	9.5	7.5	—	153	8.1	
Small Employer	6.5	9.4	6.6	5.9	5.5	395	6.7	—	10.0	9.7	6.9	—	150	8.0	
Lower Supervisory/Technical	13.4	9.8	9.5	8.1	6.5	524	8.9	—	11.4	10.2	11.4	—	208	11.1	
Semi-Routine	10.9	11.0	11.7	13.1	13.9	720	12.2	—	10.0	12.8	13.8	—	248	13.2	
Routine	3.8	8.3	9.0	9.1	8.8	524	8.9	—	7.4	6.8	10.9	—	176	9.4	
Unemployed	12.1	24.7	30.9	34.8	47.0	1868	31.8	—	21.0	26.9	28.6	—	515	27.4	

[&]Weighted by area weights; [#]Comparing Sure Start and MCS total numbers or means for strata 2-4

— Excluded from analysis due to insufficient MCS or SSLP communities; ⁺Poverty line is £210 per week, taken from the financial year 2004-2005;

— bold in final column indicates statistically significant

Table 2.2 (continued): Summary of Demographic Characteristics – 9 months: Imputed Data

Characteristic	Sure Start (N=9192)							MCS (N=1879)							Significance [#]
	Percentage in Each Stratum					In Strata 2-4 ^{&}		Percentage in Each Stratum					In Strata 2-4 ^{&}		
	Strata: how like a SSLP is the area					Number	%	Strata: how like a SSLP is the area					Number	%	
least 1	2	3	4	most 5	least 1			2	3	4	most 5				
(Total Number)	(116)	(957)	(2126)	(2800)	(3193)	(5883)	(64%)	—	(802)	(629)	(448)	—	(1879)	(100%)	
Lone Parent															0.0009
Not Lone Parent	87.1	77.2	74.8	68.7	62.4	4251	72.3	—	82.7	81.1	75.6	—	1462	77.8	
Lone Parent	12.9	22.8	25.2	31.3	37.6	1632	27.7	—	17.3	18.9	24.4	—	417	22.2	
Work Status Household															0.002
Working Household	87.9	75.3	69.1	65.2	53.0	4015	68.2	—	79.0	73.1	71.4	—	1364	72.6	
Workless Household	12.1	24.7	30.9	34.8	47.0	1868	31.8	—	21.0	26.9	28.6	—	515	27.4	
Highest Education in Household															<0.0001
Degrees/Higher Education	52.6	30.3	27.5	26.1	17.7	1607	27.3	—	33.3	25.8	22.8	—	463	24.6	
A level	16.4	26.4	26.6	26.8	25.6	1570	26.7	—	34.4	35.4	33.2	—	639	34.0	
O level / GCSE	19.8	24.4	24.3	22.0	21.7	1365	23.2	—	19.5	22.6	26.6	—	464	24.7	
Other	3.4	7.6	6.6	6.4	7.5	392	6.7	—	3.5	3.7	4.7	—	81	4.3	
None	7.8	11.3	15.0	18.7	27.5	949	16.1	—	9.3	12.5	12.7	—	232	12.4	
	Summary for Each Stratum					For Strata 2-4 ^{&}	Summary for Each Stratum					For Strata 2-4 ^{&}			
	1	2	3	4	5		1	2	3	4	5				
Child's Age (Months)															<0.0001
Mean	9.2	9.1	9.1	9.1	9.1	9.1		—	9.7	9.7	9.6	—	9.7		
SD	0.5	0.4	0.5	0.5	0.5	0.5		—	0.6	0.6	0.6	—	0.8		

[&]Weighted by area weights; [#]Comparing Sure Start and MCS total numbers or means for strata 2-4; — Excluded from analysis due to insufficient MCS or SSLP communities bold in final column indicates statistically significant

Table 2.2 (continued): Summary of Demographic Characteristics – 3 years: Imputed Data

Characteristic	Sure Start (N=9192)							MCS (N=1879)							Significance [#]
	Percentage in Each Stratum					In Strata 2-4 ^{&}		Percentage in Each Stratum					In Strata 2-4 ^{&}		
	Strata: how like a SSLP is the area					Number	%	Strata: how like a SSLP is the area					Number	%	
least 1	2	3	4	most 5	least 1			2	3	4	most 5				
(Total Number)	(116)	(957)	(2126)	(2800)	(3193)	(5883)	(64%)	—	(802)	(629)	(448)	—	(1879)	(100%)	
Lone Parent															<0.0001
Not Lone Parent	86.9	78.2	75.2	72.0	65.6	4362	74.1	—	80.6	83.1	75.6	—	1471	78.3	
Lone Parent	13.1	21.8	24.8	28.0	34.4	1521	25.9	—	19.4	16.9	24.4	—	408	21.7	
Work Status Household															<0.0001
Working Household	85.6	77.1	72.2	69.5	58.6	4219	71.7	—	81.1	79.4	75.5	—	1450	77.2	
Workless Household	14.4	22.9	27.8	30.5	41.4	1664	28.3	—	18.9	20.6	24.5	—	429	22.8	
Highest Education in Household															0.003
Degrees/Higher Education	48.6	33.7	28.3	26.3	19.4	1659	28.2	—	33.6	26.4	23.7	—	477	25.4	
A level	25.9	29.1	29.5	30.7	27.9	1765	30.0	—	34.1	35.1	32.5	—	628	33.4	
O level / GCSE	19.5	23.7	24.0	21.9	22.7	1351	23.0	—	19.8	22.3	26.8	—	467	24.9	
Other	1.7	6.6	8.6	7.9	8.7	468	7.9	—	3.1	3.8	5.1	—	86	4.5	
None	4.3	6.9	9.6	13.2	21.3	640	10.9	—	9.4	12.4	11.8	—	221	11.8	
	Summary for Each Stratum					For Strata 2-4 ^{&}		Summary for Each Stratum					For Strata 2-4 ^{&}		
	1	2	3	4	5			1	2	3	4	5			
Child's Age (Months)															<0.0001
Mean	37.4	38.2	38.1	38.3	38.1	38.2		—	37.6	37.7	37.6	—	37.6		
SD	1.6	1.7	1.8	1.9	2.0	1.8		—	2.6	2.5	2.5	—	3.3		

[&]Weighted by area weights; [#]Comparing Sure Start and MCS total numbers or means for strata 2-4; — Excluded from analysis due to insufficient MCS or SSLP communities
bold in final column indicates statistically significant

2.5 Data collection

The families participating in the current phase of the NESS Impact Study, formally labelled as the “Study of Children, Families & Services in the Community”, provided extensive information on child and family functioning during the course of a single home visit conducted by a specially trained fieldworker, typically lasting around 90 minutes when children were 9 months of age and then again at 3 years of age. In the case of home visits to families with 9-month-olds, a survey research workforce under subcontract from the Office of National Statistics carried out data collection. Home visits to families with 3-year-olds were carried out by field staff specially hired and trained for this purpose by the Institute for the Study of Children, Families and Social Issues, Birkbeck, University of London (which houses NESS). It is acknowledged that this research team would have been aware that families interviewed were living in SSLP areas. MCS data were gathered by similar means by survey research businesses contracted by the Institute of Education.

During home visits, several sets of data were gathered in order to be able to assess the effects of SSLPs on child development and family functioning. In addition to these outcome measures, demographic and background information were collected from each family, as well as area characteristics on each community, to serve principally as control variables in the analyses to be conducted.

The measures delineated below and used in analyses reflect those variables for where the procedures within the NESS and MCS studies were sufficiently similar to be comparable across the studies.

2.5.1 Child/Family and Community Control Variables

A variety of child/family and community variables functioned (principally) as control variables in the analyses to be described (see appendix B1 for fuller details of individual level control variables). These included the following:

- *Child Characteristics*: age (in months), gender, and ethnicity.
- *Demographic, Socio-economic and Parental Characteristics*: English as only household language (yes, no), maternal age at child’s birth (<20 vs. \geq 20), lone parent (yes/no), maternal self-reported cognitive difficulties (some vs. none), household income (below vs. above poverty line), highest individual occupational status in household, highest educational level of household (see Table 2.2), household work status (workless household vs. adult employed).
- *Area characteristics*: Area data, derived from the Index of Multiple Deprivation (IMD, ODPM, 2004) and the 2001 census (for detail see appendix E), were subject to a principal components analysis that yielded seven area-level factors. For purposes of the current evaluation of SSLP effects, the resulting area-level factor scores function as covariates. The seven area factors were identified by their predominant characteristics as: economic deprivation; large non-Asian ethnic minority present; many children; large Asian/Pakistani population; large transient population with children; large Asian/Bangladeshi population; and large Asian/Indian and student population (see appendix E for further details).

2.5.2 Child/Family Dependent/Outcome Variables

The outcome variables for children and families at the 3-year contact and used in analyses are summarised below, with further detail in appendix C:

Child Language Development: the picture naming vocabulary subscale of the British Abilities Scales (Elliot, Smith & McCulloch, 1996).

Child social and emotional development: positive social behaviour, negative social behaviour and independence/self-regulation. These were all obtained by parental report.

Child Physical Health: received all recommended immunisations or not; none/one or more accidents requiring treatment in the last 12 months. Scores for these outcomes were based on detailed reports by parents of the child's health history.

Parenting and Family Functioning: parenting risk index; home learning environment (HLE); father involvement (all parent report).

Maternal well-being: maternal smoking; life satisfaction; Body mass index (BMI).

Service Use: Total support score.

Local Area: rating by mother of how favourable the area was.

3. RESULTS

Four stages of analysis are presented. The first addresses the issue of whether there were across-the-board effects of SSLPs on child and family functioning when children were 3 years old. The second seeks to determine whether any effects detected by comparing NESS/SSLP and MCS/comparison samples in Strata 2-4 may have under, over or accurately estimated overall effects of SSLPs. The third stage focuses upon whether detected effects of SSLPs vary across demographically defined sub-populations (e.g., workless households, lone-parent families). Finally the fourth stage considers three sources of risk that might undermine confidence in any results emerging from the analyses.

All analyses outlined in this section were carried out twice, once using only those cases for which there were no missing data and then using multiple imputed data sets in which missing values on all independent and dependent variables were estimated based on standard multiple-imputation procedures (Rubin, 1997); these latter analyses included all 7762 cases in strata 2-4 that were available for NESS-MCS comparisons. The imputation approach represents an attempt to counteract the possibility that cases with missing data differ in some way from cases with complete data and therefore to avoid the possible biasing effects that their exclusion from the analysis could have on the results. At 9 months, some demographic information was missing for 8.2% of all study participants in strata 2-4 (4.4% of SSLP cases, 20.3% of MCS controls). At 3 years, the number of individuals who would be excluded from the complete cases analysis due to missing demographic

data increased slightly to 10.7% (7.2% of SSLP cases, 21.8% of MCS controls). The consequences of missing data for analyses are considered further in section 3.4. For any specific dependent variable, imputed data were generated for between 0% and 21.2% of study participants. The missing demographic and outcome data were imputed simultaneously for both waves of data (i.e., 9 month & 3 years) for each stratum and study group separately. For strata 2-4, there were 3.6% of data that were missing and were imputed. Ten imputed data sets were created, which ensured that all model estimates were over 90% efficient. For more detail of the imputation procedure see appendix D. *Only significant differences between SSLP and comparison areas that emerged in analyses of both complete-case and imputed data are reported, as this conservative procedure maximises confidence in the results and is in line with the practice followed in the first phase of impact evaluation.*

3.1 First stage: Overall (across-the-board) Effects of SSLPs

The first stage of data analysis was designed to assess the main (or across-the-board) effects of SSLPs on each of 14 dependent variables measured when children were 3 years old, after taking into account pre-existing differences between SSLP and comparison families and communities in their demographic characteristics (shown in Table 2.2). An overall main effect involves a significant difference between SSLP and comparison communities on an outcome having (a) allowed for the background differences in the populations and areas, but (b) without taking into consideration the possibility that sub-populations might be differentially affected by SSLPs. In other words, it addresses the question of whether, on average across all types of children and families, effects of SSLPs emerged. (Recall that these across-the-board comparisons do not involve the entire NESS sample, but only those areas in strata 2-4, the ones most similar across NESS/SSLP and MCS/comparison samples).

In order to determine whether main effects of SSLPs on child development and family functioning were detectable, the data were analysed using multilevel models, which take into account the hierarchical structure of the data, with children and families nested within communities, some of which are SSLP communities and some comparison communities. Linear models are used for the continuous measures and logistic models for binary outcomes. Summary statistics are presented for each of the outcomes in Table 3.1. The MCS sample was differentially weighted to take into account the fact that each stratum contained different numbers of MCS and SSLP areas. The analysis was restricted to strata 2 to 4, with areas in stratum 4 being more typical of SSLPs and areas in stratum 2 being less typical. This meant that the combined sample contained more MCS areas than SSLP areas in stratum 2 and vice versa in stratum 4. The weights applied to MCS areas effectively down-weighted MCS areas in stratum 2 and up-weighted MCS areas in stratum 4 so that comparisons were effectively made across a balanced sample. More details are provided in appendix A. The overall results of SSLP vs. MCS comparisons for the analyses of the 3-year data (i.e., estimated effects and probability values) can be seen in Table 3.2.

The estimated SSLP effects displayed in Table 3.2 show the degree of difference, including confidence intervals, between SSLP and MCS areas, after adjusting for child and family background factors and community characteristics (shown in Table 2.2). Positive values on the mean difference scores indicate that SSLP areas

scored higher than the comparison areas, as do odds ratios greater than 1.00; negative values of mean difference scores indicate the opposite, as do odds ratios less than 1.00. The effects of the strata, demographic and family characteristics and area level measures are shown in appendix G.

Table 3.2 presents the main effects of SSLPs, that is, whether the SSLP and comparison samples differed significantly across the entire sample, having adjusted for control variables. The data presented in Table 3.2 do not provide information as to whether the effects of SSLPs varied for specific subgroups related to gender, ethnicity, or income. Such interaction effects are reported in the third major stage of analysis.

Table 3.1: Summary of Outcome Measures – 3 years: Imputed Data

Outcome Measures	Sure Start						MCS						
	Summary for Each Stratum					For Strata 2-4 ^{&}	Summary for Each Stratum					For Strata 2-4 ^{&}	
	Stratum: how like a SSLP is the area						Stratum: how like a SSLP is the area						
least 1	2	3	4	most 5		least 1	2	3	4	most 5			
Physical Health													
Children with all immunisations	n	102	885	1967	2611	2925	5464	—	730	566	417	—	1729
	%	88.3	92.5	92.5	93.3	91.6	92.9	—	91.0	90.0	93.1	—	92.0
Children who had Accident(s)	n	36	296	670	740	868	1707	—	301	228	152	—	656
	%	31.0	30.9	31.5	26.4	27.2	29.0	—	37.5	36.2	33.9	—	34.9
Child Cognitive and Language Development													
BAS Naming Vocabulary	Mean	49.5	48.2	46.3	46.8	42.5	46.8	—	48.5	45.6	45.5	—	45.8
	SD	11.4	11.1	11.3	11.6	10.8	11.4	—	11.4	11.7	11.3	—	15.0
Child Social and Emotional Development													
Child Positive Social Behaviour	Mean	19.0	19.2	18.9	19.0	18.9	19.0	—	18.7	18.5	18.4	—	18.5
	SD	2.7	2.5	2.8	2.7	2.9	2.7	—	2.7	2.8	3.0	—	3.9
Child Negative Social Behaviour	Mean	6.5	6.6	6.7	6.8	7.1	6.7	—	6.6	6.8	6.9	—	6.6
	SD	1.5	1.7	1.7	1.7	1.9	1.7	—	1.5	1.7	1.7	—	2.3
Self-regulation (Independence)	Mean	12.3	12.6	12.6	12.6	12.6	12.6	—	12.2	12.1	12.1	—	12.1
	SD	1.7	1.7	1.7	1.7	1.7	1.7	—	1.7	1.8	1.9	—	2.4

[&]Weighted by area weights; — Excluded from analysis due to insufficient MCS or SSLP communities; SD=Standard Deviation

Table 3.1 (continued): Summary of Outcome Measures – 3 years: Imputed Data

Outcome Measures	Sure Start						MCS					
	Summary for Each Stratum					For Strata 2-4 ^{&}	Summary for Each Stratum					For Strata 2-4 ^{&}
	Stratum: how like a SSLP is the area						Stratum: how like a SSLP is the area					
least 1	2	3	4	most 5		least 1	2	3	4	most 5		
Parenting and Family Functioning												
Parenting Risk Index Mean	5.3	5.5	5.6	5.5	5.4	5.5	—	6.5	6.5	6.6	—	6.6
SD	1.8	1.9	2.0	2.1	2.0	2.0	—	1.6	1.7	1.7	—	2.3
Home Learning Environment Mean	25.4	26.9	26.5	26.6	25.2	26.6	—	25.4	24.7	25.3	—	25.2
SD	6.1	7.5	7.8	7.6	8.4	7.6	—	7.8	8.3	7.5	—	10.2
Father Involvement Mean	8.8	8.8	8.8	8.8	8.6	8.8	—	8.9	8.8	8.8	—	8.8
SD	1.8	1.8	1.8	1.8	1.9	1.8	—	1.6	1.6	1.8	—	2.3
Maternal Well-Being												
Currently smoking n	24	321	783	1032	1185	2135	—	280	195	141	—	595
%	20.3	33.5	36.8	36.8	37.1	36.3	—	34.9	31.0	31.5	—	31.6
Life Satisfaction Mean	7.7	7.5	7.4	7.6	7.3	7.5	—	7.7	7.7	7.4	—	7.5
SD	1.9	2.2	2.1	2.2	2.3	2.2	—	1.8	1.8	2.0	—	2.6
BMI Mean	25.6	25.2	25.4	25.6	25.5	25.5	—	25.1	25.1	25.2	—	25.1
SD	5.6	5.5	5.4	6.0	5.5	5.7	—	5.8	5.5	5.2	—	7.0
Service Use												
Total Support Score Mean	1.8	2.0	2.0	2.0	2.1	2.0	—	1.2	1.0	1.0	—	1.1
SD	1.7	1.8	1.9	1.9	2.0	1.9	—	1.4	1.3	1.3	—	1.7
Local Area Measures												
Mother's Area Rating Mean	4.2	4.0	3.9	3.9	3.8	3.9	—	4.0	3.9	3.8	—	3.9
SD	0.9	1.0	1.1	1.1	1.1	1.1	—	1.1	1.1	1.2	—	1.5

[&]Weighted by area weights; — Excluded from analysis due to insufficient MCS or SSLP communities; SD=Standard Deviation

Table 3.2 : Estimated Effects of Sure Start at 3 years

Outcome Measures	Sure Start Main Effects [#] Complete data			Sure Start Main Effects [#] Imputed data		
	Estimated Effect			Estimated Effect		
Physical Health	Odds ratio	95% CI	p	Odds ratio	95% CI	p
Children with all immunisations	1.46	1.06 to 2.01	0.02	1.48	1.10 to 2.00	0.01
Children who had Accident(s)	0.73	0.58 to 0.93	0.009	0.74	0.59 to 0.94	0.01
Child Cognitive and Language Development	Mean difference	95% CI	p	Mean difference	95% CI	p
BAS Naming Vocabulary	-0.49	-1.52 to 0.54	0.35	-0.43	-1.31 to 0.44	0.33
Child Social and Emotional Development						
Child Positive Social Behaviour	0.38	0.09 to 0.67	0.01	0.53	0.33 to 0.72	<0.0001
Child Negative Social Behaviour	-0.02	-0.20 to 0.16	0.86	-0.04	-0.16 to 0.08	0.49
Independence/Self Regulation	0.32	0.18 to 0.47	<0.0001	0.42	0.30 to 0.54	<0.0001
Parenting and Family Functioning						
Parenting Risk Index	-0.90	-1.11 to -0.69	<0.0001	-1.08	-1.27 to -0.90	<0.0001
Home Learning Environment	1.30	0.75 to 1.86	<0.0001	1.39	0.81 to 1.96	<0.0001
Father Involvement	-0.09	-0.24 to 0.05	0.21	-0.06	-0.21 to 0.08	0.40
Maternal Well-Being	Odds ratio	95% CI	p	Odds ratio	95% CI	p
Currently smoking	0.97	0.81 to 1.17	0.75	0.96	0.81 to 1.14	0.64
	Mean difference	95% CI	p	Mean difference	95% CI	p
Life Satisfaction	-0.02	-0.20 to 0.16	0.81	0.07	-0.10 to 0.23	0.44
BMI	0.05	-0.36 to 0.47	0.80	0.07	-0.27 to 0.42	0.68
Service Use						
Total Support Score	0.98	0.86 to 1.09	<0.0001	0.94	0.84 to 1.04	<0.0001
Local Area Measures						
Mother's Area Rating	0.05	-0.05 to 0.14	0.35	0.08	-0.01 to 0.17	0.09

[#] Effects are adjusted for child, family and area characteristics and strata
CI=Confidence interval;
bold in probability (p) column indicates statistically significant result

Inspection of Table 3.2 indicates the following overall significant differences between SSLP and comparison areas observed in both complete-case and imputed data. Of the 14 outcomes at 3 years of age, seven proved significantly different across NESS-MCS samples—and *all of these provided evidence of positive or beneficial effects of SSLPs*. Children growing up in SSLP areas relative to those living in non-SSLP areas were almost 50% more likely to have received all immunisations and were about 30% less likely to have had an accident in the year preceding data collection. SSLP children also were rated as showing greater positive social behaviour and independence/self-regulation. Problematic parenting, measured via the Parenting Risk Index, was lower in the SSLP families than in comparison ones, and SSLP homes also scored higher on the Home Learning Environment, indicating greater stimulation for learning. Finally, mothers living in SSLP areas reported receiving more services, as reflected in the Total Support Score. It should be acknowledged and appreciated that all of the outcomes on which SSLP effects were detected were based on parental reports (though only one outcome of the 14 was not parent report, i.e., BAS Naming Vocabulary).

In view of the detected effects of SSLPs on both parenting and child outcomes, we investigated whether effects on child functioning were mediated by—that is, a function of—SSLP effects on parent functioning, as we had found evidence for such parenting mediated effects in the first phase of impact evaluation (NESS 2005a; Belsky et al., 2006; Belsky & Melhuish, 2007). More specifically, we re-tested the multilevel models for each of the four child outcomes for which SSLP effects were detected (i.e., immunisations, accidents, positive social behaviour, independence/self-regulation) after adding to the original set of covariates the two parenting outcomes that also revealed SSLP effects (i.e., parenting risk index, home learning environment). If the previously detected SSLP effects on child functioning were attenuated or eliminated, there would be evidence consistent with the proposition that SSLP effects on children were mediated via effects on parenting. Analyses of both imputed and complete data sets revealed replicated evidence of mediation for only one of the four child outcomes, positive social behaviour. The previously reported significant effect of SSLPs on this outcome became insignificant—indicating full (rather than partial) mediation—when the parenting risk index and the home learning environment variables were statistically controlled (along with the original covariates)

3.1.1 Summary of main effects

In summary, then, out of 14 comparisons of NESS-MCS samples, 7 showed positive effects of SSLPs that were *replicated across complete and imputed data sets*, with no negative or adverse (main) effects of living in SSLP areas detected. The beneficial effects of SSLPs showed that families residing in SSLP areas used services more (i.e., Total Support Score), provided a more positive and developmentally supportive learning and emotional environment for children (i.e., Parenting Risk Index, Home Learning Environment), and that children growing up in such households functioned better socially (i.e., Child Positive Social Behaviour, Independence/Self-regulation) and experienced healthier environments (i.e., more immunisations, fewer accidents). Additionally there was evidence for child positive social behaviour that the favourable SSLP effect may well have been a function of the effect of SSLPs on parenting (i.e., SSLP→parenting→positive social behaviour).

3.2 Second Stage: Did first stage analysis overestimate/underestimate SSLP effects?

Recall that the across-the-board NESS-MCS comparisons just summarised excluded substantial numbers of NESS/SSLP children/families—those from Strata 1 and 5—because there were insufficient numbers of these children/families in the MCS sample (i.e., stratum 5) or in the NESS sample (i.e., stratum 1) to afford reliable comparisons between MCS and NESS samples. To determine whether the (main) effects of SSLPs detected and reported in the preceding section *might* have been different had it proven possible to include all NESS/SSLP children/families in the main comparisons presented in Table 3.2, a second stage of analysis was conducted. This involved comparing all NESS/SSLP children and families from stratum 2-5 with one another. Recall that stratum 1, the least typical of SSLP areas, included very few NESS children/families and so was excluded from this analysis. To the extent that *within-NESS comparisons* involving stratum 2-5 revealed differential functioning of the NESS children/families not included in the NESS-MCS comparison, this would suggest that the NESS-MCS

comparisons just reported might have either overestimated or underestimated SSLP effects. These analyses produced multilevel models for each of the 14 outcomes in terms of the control variables already used and strata. If no consistent differences across strata emerged then this would indicate that children and families are functioning similarly across strata.

The results of this second stage of analysis revealed that mis-estimation of effects probably did not occur. In only a single instance did it prove to be the case that a significant difference emerged across strata 2-5, and this only occurred for imputed data and not for complete cases (i.e., stratum 5 scored higher on Total Support, reflecting greater use of services, than stratum 3, but no different from strata 2 & 4). As the rate of detecting significant effects was no different from what would be expected by chance, this issue requires no further discussion. The bottom line is that this failure to detect consistent differences in functioning across strata in the NESS/SSLP sample (after allowing for a host of background and area factors) indicates that the effects of SSLPs detected and reported in the preceding section *appear* to be generalisable across all SSLP areas.

3.3 Third Stage: Differential Effects of SSLPs on Specific Sub-populations

Having detected multiple indications of positive effects of SSLPs on children and families when children were 3 years of age, as well as having found that these appear to apply to all SSLPs (i.e., even the most deprived areas excluded from the main analysis), the third stage of analysis was designed to determine whether effects of SSLPs were the same across various population sub-groups. This issue is particularly important given early findings from the first phase of impact evaluation showing that various demographically-defined sub-populations were differentially affected by SSLPs, at least in the case of 3-year olds and their families (NESS, 2005a; see also Belsky & Melhuish, 2007; Belsky et al., 2006).

In order to examine the prospect that SSLP effects varied across select sub-populations served by the programme, the same five demographic variables, along with ethnicity, were chosen because of their policy relevance to address the issue of sub-population-specific effects of SSLPs. More specifically, 2-way interactions involving SSLP status (NESS/SSLP or MCS/non-SSLP samples) and each of the following factors were tested for each outcome measure after controlling for the child, family and area characteristics (again using only strata 2-4 children/families):

- child gender
- child ethnicity
- teenage parenthood (i.e. mother <20 years of age at delivery)
- lone parenthood (i.e. no partner living in home)
- workless household (i.e. no adult employed in home), and
- household deprivation (i.e. <£210 p.w. or below poverty line vs. >£210 p.w.)

(Note: The £210 p.w. income figure was chosen as this was 60% of the median income for the country at the time of the 9-month data collection, and people with incomes below this figure are officially regarded as poor.) As always throughout this report, only those results that replicated across complete and imputed data will be regarded as sufficiently reliable to merit discussion.

Overall, the results of these interaction analyses clearly indicated that SSLP effects did not vary substantially across demographic subgroups (see appendix G). Indeed, as Table 3.3 shows, there was only one instance in which a significant interaction proved replicable across complete and imputed data (see cell in Table 3.3 with “C & I” notation), and this concerned positive social behaviour. Follow-up tests were undertaken to determine the source of this single replicated interaction. For both complete and imputed datasets, the results revealed that, whereas SSLP effects were positive for the White ethnic group (i.e., NESS/SSLP>MCS), they were negative for the Black-Caribbean ethnic group (i.e., MCS>NESS/SSLP), and for all other ethnic groups there was no SSLP effect. As the single significant interaction (replicated across complete and imputed data) of 84 tested was likely to be a product of chance, these results lead to the conclusion that, for almost all outcomes, SSLP effects did not vary by sub-population.

Table 3.3: Summary of interaction effects between SSLP/MCS and select demographic variables

Time Period	Outcome Measure	SSLP/MCS with sub-population Interactions					
		Child Gender	Child Ethnicity	Maternal Age at Birth of Child	Household Deprivation	Lone Parent	Work Status Household
At 3 years	Physical Health						
	Children with all immunisations						
	Children who had Accident(s)	C		C			
	Child Cognitive and Language Development						
	BAS Naming Vocabulary						C
	Child Social and Emotional Development						
	Child Positive Social Behaviour		C & I	C			
	Child Negative Social Behaviour						
	Independence/Self Regulation						
	Parenting and Family Functioning						
	Parenting Risk Index		I	C			
	Home Learning Environment						
	Father Involvement		C				C
	Maternal Well-Being						
	Currently smoking						
	Life Satisfaction					I	I
	BMI						
	Service Use						
	Total Support Score		I				
	Local Area Measures						
Mother’s Area Rating					C		

& Effects are adjusted for child, family and area characteristics and strata

C Indicates a significant (P<.05) interaction in complete cases data

I Indicates a significant (P<.05) interaction in imputed data

C & I Indicates a significant (P<.05) interaction in complete cases and imputed data

3.4 Fourth Stage: Threats to confidence in detected SSLP effects

Given the circumstances under which the NESS Impact Study was carried out, much of which was not under the control of the NESS team, three sources of concern threaten the confidence that can be placed in the SSLP effects reported so far (in addition to the fact that the evaluation could not be designed as a randomized control trial). First, because there was selective attrition, and also missing data within each of the samples studied, NESS and MCS, the possibility exists that the results detected are biased as a result of these sample/measurement limitations. Second, because the MCS sample was born, on average, two years before the NESS sample, the possibility arises that, through some unspecified means, the different times of measurement of the two samples might have influenced the results detected. Third, because the children and families residing in the most deprived areas (stratum 5) could not be included in the primary NESS-MCS comparison due to the general lack of stratum 5 areas within the MCS sample, it is possible that the failure to detect differential SSLP effects across demographically-defined sub-populations could be an artifact of not including stratum 5 children/families in the primary NESS-MCS comparisons. Each source of risk to study findings is considered in turn.

Selection/attrition issues

In both samples there were some children and families seen at 9 months who were not seen again at age 3. Hence it is reasonable to ask whether the SSLP effects detected would generalise to children/families not included in the sample studied again when children were 3 years old. To address this issue, the NESS children and families seen at 9 months but not at 3 years were compared on a range of demographic variables with those seen on both occasions, *separately by strata (i.e., attrition group vs. stratum 1; attrition group vs. stratum 2...)* (see appendix B1). If the NESS children/families not seen at age 3 proved more deprived than those seen at both ages of measurement—and, especially, more deprived than those in stratum 5—this would undermine confidence in the generality of the findings as well as the conclusion in the second stage of analyses that stratum 5 children/families were not different from those in strata 2-4. After all, it was this *absence of difference* that provided the basis for the earlier observation that the SSLP effects detected in the first stage of inquiry—which only involved strata 2-4—probably generalised to stratum 5 children/families, that is, those most likely to be in SSLP areas.

As it turned out, risks arising from selective attrition appear not to seriously threaten the confidence to be placed in the effects of SSLPs detected in the first stage of analysis and, which were found, in the second stage of analysis, to be probably generalisable to stratum 5 children. More specifically, although the NESS sub-sample not seen at age 3 proved to be significantly *less advantaged* than those in strata 1, 2, 3 and 4 seen at both ages, they turned out to be *more advantaged* than those from stratum 5 in a number of respects (i.e., workless households, parent education and occupational status, poverty, ethnicity). In other words the attrition sample appeared to be between strata 4 and 5 in character. This suggests that had the attrition group also been followed up at age 3 the absence of differences on test outcomes between stratum 5 and the other strata would have remained, again leading to the conclusion that the results from the first stage of analysis involving only strata 2-4 sub-samples appear generalisable to stratum 5 children/families, those most likely to be in SSLP areas.

With regard to the MCS sample similar analyses reveal rather similar effects with the attrition sample clearly being at the disadvantaged end of the spectrum. However the

MCS attrition group also appears to be at a level of deprivation equivalent to being somewhere between the levels of strata 4 and 5. Hence there are clearly more disadvantaged than the MCS sample used in analyses but the association between attrition and disadvantage appears to be similar for NESS and MCS samples. Since any biases introduced should affect NESS and MCS samples similarly they are unlikely to influence comparisons in this report.

Missing Data

In both samples there were missing data for some children and families seen when the children were 3 years old. The total amount of missing data was greater overall for the MCS/non-SSLP sample than for the NESS/SSLP sample as described at the beginning of section 3. Is the distribution of missing data between NESS/SSLP and MCS/non-SSLP samples different in terms of demographics? Using cases where there are complete demographic data, we consider the differential distribution of cases with and without any missing outcome data across demographic groups within both the NESS/SSLP and MCS/non-SSLP samples within strata 2-4, those strata used in the main analyses. For both samples there was a general pattern that missing data were more likely for more disadvantaged groups such as teen parents, poorer families, workless households, and parents with lower status occupations and education. Also there was more missing data for ethnic minorities and with parents where English was not the first language, which was to be expected in that researchers in both studies did not ask certain sensitive questions if another person, for example an interpreter, was present. The important question here is whether these demographic biases relating to missing data differed between the MCS and NESS samples. In order to answer this question all demographic variables used in the analyses were analysed in a logistic regression one at a time, controlling for strata, that tested for whether the biases related to missing data were different in the two samples (a NESS/MCS by missing/not missing interaction). For the ten demographic variables analysed only two revealed a difference in rate of missing data between the two samples. There was a greater difference in missing data for families where English was not the first language versus families with English as first language in the MCS/non-SSLP sample than in the NESS/SSLP sample. There was a greater difference in missing data between parents with a cognitive difficulty than parents without a cognitive difficulty in the NESS/SSLP sample than the MCS/non-SSLP sample. The results of these analyses related to missing data are presented in appendix B2. Thus for 8 of 10 demographic variables there is no difference in missing data bias between the two samples, whereas for two variables there is a difference in bias introduced by missing data between the two samples. However for one of these two variables the bias indicates the more disadvantaged group is more affected in the MCS/non-SSLP sample (English not first language), whereas in the second case the more disadvantaged group (parent with cognitive difficulty) is more affected in the NESS/SSLP sample. Overall it seems that, while missing data occurs more for disadvantaged groups, this tendency is not particularly different for the two samples and not to a degree likely to affect the tests for SSLP effects.

Time of measurement effects

The fact that the MCS sample was studied earlier in time than the NESS sample raises the prospect that the SSLP effects detected may have been as much a function of time itself as of SSLPs. To explore this possibility, advantage was taken of the fact that both data collections took some two years to complete, from the first to final home visit (i.e., MCS: 24 months; NESS: 26 months). In order to determine whether time of measurement may have affected the results of NESS-MCS comparisons, the final

prediction model from the first stage of analysis was re-run for each outcome, controlling for time of measurement, operationalised as time since 1 January 2000, related to each outcome.

These analyses revealed some limited grounds for caution in interpreting the original SSLP effects—in the case of two outcomes for which beneficial effects of SSLPs had originally been detected (see appendix H). More specifically, with timing of measurement (also) controlled, the previously detected beneficial effects of SSLPs on the outcomes related to immunisations and to accidents became insignificant in analyses of both the complete and imputed data. The other five significant effects detected in the original NESS-MCS comparison remained significant in both data sets. While some additional effects of SSLPs emerged with time of measurement controlled, this is not regarded as meaningful because in no case were these (two) newly detected effects replicated across both complete and imputed data sets.

Sub-population-specific SSLP effects

In the earlier phase of the impact evaluation there were differential effects of SSLPs across demographically defined sub-populations (Belsky et al., 2006; Belsky & Melhuish, 2007; NESS, 2005a). Given that similar sub-population differences for SSLP effects did not emerge at three years of age in this second phase of impact evaluation, it might be that this null result could be an artefact of the way in which the primary NESS-MCS comparison had to be conducted. In particular, it could not incorporate stratum 5 children/families as there were insufficient numbers in the MCS sample. Could this have resulted in the failure to detect interaction effects (e.g., SSLP X lone-parent; SSLP X workless household), especially ones that would qualify the across-the-board positive effects already detected?

In order to address this possibility, the primary NESS-MCS comparisons were re-run, ignoring strata distinctions, but including all stratum 5 children/families, and testing, one at a time, the same two-way interactions for differential sub-population effects tested in the primary NESS-MCS comparison (see section 3.3). The results of these analyses are presented in appendix I. As throughout the evaluation only results that are replicated across complete and imputed data are considered for discussion. Although some interactions (replicated across complete and imputed data) emerged in the re-analysis including stratum 5 families (see Table 3.4), only three pertained to the main effects of SSLPs already reported (i.e., Child Positive Social Behaviour, Parenting Risk Index, Total Support); and in none of these instances did the evidence reveal adverse effects of SSLPs. In the case of Child Positive Social Behaviour, NESS-MCS comparisons following up the interaction involving child ethnicity indicated that the benefit of SSLPs for this outcome was restricted to white UK children but there was no evidence of adverse effects for other ethnic groups. In the case of the Parenting Risk Index, NESS-MCS comparisons considering the interaction involving maternal age revealed that a statistically significant benefit of SSLPs for this outcome for both teen and non-teen mothers, but stronger for those who were teens. The same kind of finding emerged for the interaction involving ethnicity and the outcome Total Support: although the effect was somewhat more pronounced for some ethnic sub-groups than others, it was always a significant effect for all ethnic groups and always in the direction of the NESS/SSLP sample scoring higher than the MCS sample.

There were other interactions (replicated across complete and imputed data) that emerged for some outcomes that did not show any overall main effect of SSLPs, specifically: father involvement; (maternal) life satisfaction; and total support. For father

involvement there was a significant interaction involving ethnic group. Follow-up tests indicated that this was the result of a negative SSLP effect only for the small “Other” ethnic group, with all other ethnic groups showing no SSLP effect. For life satisfaction there were significant interactions involving household deprivation, lone/dual parent status, and working/workless household status. For the households above the poverty line, mothers expressed less life satisfaction in SSLP areas, while there was no significant difference for households below the poverty line. There was an analogous pattern with mothers in dual-parent households expressing less life satisfaction in SSLP areas, while lone parents showed no significant difference in SSLP areas. For working households there was less maternal life satisfaction in SSLP areas while for workless households there was greater maternal life satisfaction in SSLP areas. The pattern of results for life satisfaction indicates less life satisfaction in SSLP areas for the relatively *more* advantaged. With regard to total support there were differences in degree of SSLP effect but all ethnic groups scored higher on total support in SSLP areas.

In interpreting these additional analyses of interaction effects involving strata 2-5, it should be born in mind that the analyses differ from the sub-population interaction analyses reported earlier in section 3.3 through the inclusion of 56 stratum 5 areas, *55 of which are SSLP areas*. It was this imbalance in stratum 5 that led to the main analyses being restricted to strata 2-4. Hence differences from the earlier results (section 3.3) could reflect stratum 5 vs. strata 2-4 effects or SSLP vs. MCS effects. Therefore, these additional interaction analyses need to be interpreted with considerable caution. Perhaps most important, though, is that almost no evidence was detected that those households that might be considered more at risk, or more disadvantaged, were adversely affected by SSLPs. Recall that such evidence emerged in the earlier phase of inquiry with respect to teen mothers, lone parents and workless households (NESS, 2005a; Belsky et al., 2006; Belsky & Melhuish, 2007). The evidence is thus consistent with the main conclusion that, apparently, SSLPs did not adversely affect the most disadvantaged children/families when children were three years old.

Table 3.4: Summary of interaction effects between SSLP/MCS and select demographic variables, strata 2 to 5

Time Period	Outcome Measure	SSLP/MCS with sub-population Interactions					
		Child's Gender	Child's Ethnicity	Maternal Age at Birth of Child	Household Deprivation	Lone Parent	Work Status Household
At 3 years	Physical Health						
	Children with all immunisations						
	Children who had Accident(s)						
	Child Cognitive and Language Development						
	BAS Naming Vocabulary						
	Child Social and Emotional Development						
	Child Positive Social Behaviour		C & I				
	Child Negative Social Behaviour						
	Self-regulation (Independence)						
	Parenting and Family Functioning						
	Parenting Risk Index		I	C & I			
	Home Learning Environment						
	Father Involvement		C & I				C
	Maternal Well-Being						
	Currently smoking						
	Life Satisfaction				C & I	C & I	C & I
	BMI				C		
	Service Use						
	Total Support Score		C I				
	Local Area Measures						
Mother's Area Rating			C		C		

C Indicates a significant interaction in complete cases data

I Indicates a significant interaction in imputed data

C & I Indicates a significant interaction in complete cases and imputed data

4. SUMMARY

Analyses were undertaken comparing children and families living in SSLP areas with those living in similar areas not receiving SSLPs in order to evaluate effects of SSLPs on child and family functioning. It should not be forgotten that the MCS data were gathered by a different team to those gathering NESS/SSLP data and that the former data were collected, on average, some two years before the latter. After taking into consideration pre-existing family and area background characteristics, comparisons between children and families living in SSLP areas and those living in similar areas not receiving SSLPs revealed a variety of beneficial effects associated with living in SSLP areas and almost no evidence of adverse programme effects. At age 3 years, 7 of 14 outcomes assessed showed positive SSLP effects. Children growing up in SSLP areas were more likely to have received the recommended immunisations and were

less likely to have had an accidental injury in the year preceding assessment, results that may have been a function of time of measurement rather than of SSLPs per se. SSLP children also showed better social development, exhibiting more positive social behaviour and greater independence/self-regulation than their non-SSLP counterparts. Better parenting also was associated with living in SSLP areas, as parents in SSLP areas provided, on average, a more stimulating home learning environment and engaged in less negative parenting. Evidence also emerged consistent with the notion that, in the case of positive social behaviour, the effect of SSLPs on this outcome was a result of their effect on parenting. Finally, these beneficial effects of SSLPs on children and families may themselves have been a function of the greater use of support services reported by parents living in SSLP areas relative those not living in such areas.

Recall that in the earlier (2005) phase of the impact evaluation, undertaken on SSLPs at an earlier stage of development and on children/families exposed to SSLPs for a shorter period of time than those involved in the current phase of inquiry, some differences in SSLP effects across specific subgroups emerged (see Introduction). Perhaps most notable were the adverse effects for some of the most disadvantaged sub-populations (e.g., teen parents, workless households). In marked contrast, in the current analyses the detected benefits of living in SSLP areas appeared to apply to the entire population of SSLP areas. The basis of this inference is twofold. First, in the core analyses of subgroups (i.e., analyses of interactions) involving only strata 2-4 children/families, only a single adverse effect emerged (i.e., positive social behaviour: MCS>NESS/SSLP) and this could well have been a function of chance, given that only 1 of 84 tested interactions involving demographic sub-groups proved replicable across complete and imputed data sets. Second, in the secondary analysis addressing this same issue which included strata 5 children/families, no interactions revealed adverse effects on more disadvantaged subgroups; on occasion, though, more advantaged subgroups showed evidence of adverse effects, though there was little consistency in these.

Also important with respect to the conclusion of “virtually no adverse effects on the most disadvantaged subgroups” was the fact that even though the most and least economically disadvantaged SSLP areas could not be included in the core analyses, subsequent analyses including the most deprived areas provided no basis for concluding that the SSLP effects detected did not generalise to these excluded areas. The basis for this inference was the finding of virtually no differences *within the NESS/SSLP sample* of children/families residing in the most disadvantaged areas (i.e., stratum 5) and those living in somewhat less disadvantaged areas (i.e., strata 2-4). In addition, the fact that the children/families not seen at 3 years were significantly less advantaged than those in strata 1-4, but significantly more advantaged than those in stratum 5, implies that these findings are likely to generalise to them also.

5. CONCLUSION

Early findings related to effects of SSLPs revealed a limited number of significant programme effects, some of which were positive and others of which were negative in nature (NESS, 2005a; Belsky et al., 2006; Belsky & Melhuish, 2007). Most notably, the negative ones all pertained to the more disadvantaged families living in SSLP areas (i.e., teen mothers, workless households, lone parents). The present report, in contrast, reveals almost exclusively beneficial effects—and rather consistent ones at that. The

only adverse effect of SSLPs on a disadvantaged sub-group, consistent with results of the first phase of inquiry seems likely to have been a product of chance, given that it emerged after testing 84 possibilities. Moreover, the few other adverse effects (replicated across complete and imputed data) failed to form a meaningful pattern, only emerged in the secondary analyses exploring threats to confidence, and pertained to more, not less advantaged sub-groups (e.g., non-teen mothers). The fact that the across-the-board positive effects of SSLPs on immunisations and accidents disappeared once time of measurement was taken into account means that the original findings in the case of these two outcomes are open to alternative interpretation (i.e., effects of SSLPs vs. effects of time). For example, nationally child immunisations have been recovering from an earlier dip and SSLP areas may have benefited more than comparison areas from this effect.

The current results are distinctly different from those which emerged from the first phase of inquiry, particularly those highlighting (small) adverse effects of SSLPs on some of the most disadvantaged population sub-groups. Only a single finding (replicated across complete and imputed data) of this type emerged from the second phase of inquiry. What are the reasons for these differences in findings across early and current phases of impact evaluation?

On one hand, they could be a result of the methodological differences across studies, some of which have been highlighted. Although neither phase of inquiry benefited from a randomised control design, the earlier one did involve a single team gathering all data at more or less the same point in time. Moreover, the comparison group in the first phase of impact evaluation was drawn from communities selected to later become SSLPs (i.e., Sure-Start-to-be communities), which provided a preferable comparison group than that employed in the current phase of inquiry.

However there are other good substantive explanations why the results of the two phases of inquiry proved so different. First, SSLPs have evolved over time. The SSLPs have become children's centres, which have more clearly focussed services with better guidance available. In their guidance there has been acknowledgment that the hardest to reach families were perhaps not being well served. These changes were partly influenced by the early NESS findings and other research evidence (see Melhuish & Hall, 2007). It is to the credit of Sure Start that they have been responsive to research findings and modified services accordingly. Also at the outset, SSLP staff and administration had a lot to learn about how to deliver services in what had previously been a policy and service desert. As knowledge and experience have been acquired over the last seven years, SSLPs have matured in their functioning and staff skills shortages have been reduced. Even though such improvements have a long way to go, the result of these changes is that children and families in the current study may well have been exposed to *more effective services* than those encountered by children and families in the earlier phase of inquiry.

A second substantive explanation for changes in SSLP effects across the first two phases of the NESS Impact Study involves differences in exposure to SSLP services (dosage). In all likelihood, children/families in SSLP areas in the second phase of the impact inquiry had greater exposure to (more effective) SSLP services across a greater proportion of their lives than was true of the 3-year-olds studied in the first phase of inquiry. The children and families in the earlier phase of inquiry were seen at a time when SSLPs had only been set up for at most three years, meaning that they could not have been providing bedded-down services for the entire lives of the children studied.

Indeed, the NESS interim report on cost effectiveness in SSLPs (Meadows, 2006) showed that it was not until *after the third year of operation* that SSLPs became close to fully functioning.

In light of these considerations, it seems reasonable to embrace the conclusion that both first and second phases of the impact evaluation have produced valid findings that indicate the changing impact of SSLPs over time. With enhanced service provision and increased exposure to such improved programmes, across-the-board beneficial effects emerge, with only the most limited evidence of adverse effects, most of it pertaining to more, not less advantaged families (contrary to what was found in the earlier phase of inquiry). Of course, one cannot be certain, given design limitations of both phases of impact evaluation, whether this interpretation is accurate. One can also wonder whether the beneficial effects detected in the second phase of inquiry, based exclusively as they are on parent-report, reflect real developmental advantages to children and families exposed to SSLPs. It would be preferable if such results were corroborated from other data sources, which will be increasingly possible for comparisons at older ages. Nor should the modest effect sizes of the multiple beneficial effects detected be ignored—and they certainly should not be exaggerated.

Ultimately, it remains to be determined whether the beneficial effects of SSLPs detected in this study of 3-year-olds continue to be evident at age 5 years or even beyond, whether effects change in magnitude following longer exposure to SSLPs, and whether the beneficial effects extend to other developmental domains. If nothing else, the contrast between early and later findings highlights interpretive risks associated with potentially premature evaluation of an intervention, especially one as complex and multi-faceted as Sure Start Local Programmes. Indeed, one cannot help but be reminded of the history of early intervention evaluation given the changing conclusions that were drawn in the report of early SSLP findings and in this report. For instance, whereas some contended that Head Start in the USA had failed to benefit children (e.g., McKey, Condelli, Barrett, McConkey & Plantz 1985), longer term follow up studies revealed beneficial effects that were not detected initially (e.g., Lee, Brooks-Gunn & Schnur 1988; Currie and Thomas, 1993).

REFERENCES

Barnes, J., (2007) Targeting deprived areas: The nature of the Sure Start Local Programme neighbourhoods In J. Belsky, J. Barnes, & E. Melhuish, (Eds.). *The National Evaluation of Sure Start: Does Area-based Early Intervention Work?* (pp. 25 - 44). Bristol, UK: The Policy Press.

Belsky, J., Barnes, J., & Melhuish, E. (Eds.). (2007). *The National Evaluation of Sure Start: Does Area-based Early Intervention Work?* Bristol, UK: The Policy Press.

Belsky, J., & Melhuish, E. (2007). Impact of Sure Start local Programmes on children and families. In J. Belsky, J. Barnes, & E. Melhuish, (Eds.). (2007). *The National Evaluation of Sure Start: Does Area-based Early Intervention Work?* (pp. 133 - 154). Bristol, UK: The Policy Press.

Belsky, J., Melhuish, E., Barnes, J., Leyland, A.H., Romaniuk, H., & the NESS Research Team. (2006). Effects of Sure Start Local Programmes on Children and Families: Early Findings From a Quasi-experimental, Cross-sectional Study. *BMJ*, 332,

1476-1578 (also published at [BMJonline](http://bmj.com/cgi/doi/10.1136/bmj.38853.451748.2F):
<http://bmj.com/cgi/doi/10.1136/bmj.38853.451748.2F>).

Currie, J., & Thomas, D. (1993). *Does Head Start Make a Difference?* Cambridge, MA: National Bureau of Economic Research, Inc.

D'Agostino, R. B. Jr. (1998). Propensity score methods for bias reduction in the comparison of a treatment to a non-randomized control group. *Statistics in Medicine*, *17*, 2265-2281.

DfES (2002), *Delivering for Children and Families: Inter-Departmental Childcare Review*. London: DfES/DWP/HM Treasury/Women and Equality Unit: HMSO.

Elliot, C, with Smith, P., and McCulloch, K. (1996). *British Ability Scales: 2nd edition*. Windsor: NFER-Nelson.

Frost, M., & Harper, G. (2007). The challenge of profiling communities. In J. Belsky, J. Barnes, & E. Melhuish, E. (Eds.). *The National Evaluation of Sure Start: Does Area-based Early Intervention Work?* (pp. 45 - 62). Bristol, UK: The Policy Press.

Hill, J.L., Waldfogel, J., Brooks-Gunn, J. & Han, W. (2005). Maternal employment and child development: A fresh look using new methods. *Developmental Psychology*, *41*, 833-850.

HM Treasury (2000). *New Public Spending Plans for 2001 - 2004: Prudent for a Purpose: Building Opportunity and Security for All*. London: HM Treasury. Available at http://www.hm-treasury.gov.uk/Spending_Review/Spending_Review_2000/Spending_Review_Report/spend_sr00_repindex.cfm

HM Treasury. (2004), *Choice for parents, the best start for children: a ten year strategy for childcare*. Norwich: HMSO. Available at http://www.hm-treasury.gov.uk/media/8F5/35/pbr04childcare_480.pdf

Lee, V. E., Brooks-Gunn, J., & Schnur, E. (1988). Does Head-Start work? *Developmental Psychology*, *24*, 210-222.

Love, J., Kisker, E. E., Ross, C. M. Schochet, P. Z., Brooks-Gunn, J., Paulsell, D., Boller, K., Constantine, J., Vogel, C., Fuligni, A. S., Brady-Smith, C. (2002). *Making a difference in the lives of infants and toddlers and their families: The impacts of Early Head Start. Volume 1: Final Technical Report*. Princeton, NJ: Mathematica Policy Research Inc. Available at: <http://www.mathematica-mpr.com/PDFs/ehsfinalvol1.pdf>

McCartney, K., Bub, K., & Burchinal, M. (2006). Selection, detection and reflection. In K. McCartney, Burchinal, M.R., & Bub, K. (Eds.), *Best practices in quantitative methods* (pp. 105-126). *Monographs of the Society for Research in Child Development*, *Serial 285*, Vol. 71.

McKey, R. H., Condelli, L., Barrett, B. J., McConkey, C., & Plantz, M. (1985). *The impact of Head Start on children, families and communities: Final report of the Head Start evaluation, synthesis and utilisation project*. The Head Start Bureau, Administration for Children, Youth and families, Office of Human Development Services, Washington, DC: CSR Incorporated.

Meadows, P. (2006). Cost Effectiveness of Implementing SSLPs: An Interim Report. London: DfES. Available at <http://www.ness.bbk.ac.uk/documents/activities/costeffect/1240.pdf>

Melhuish, E., & Hall, D. The Policy Background to Sure Start. In J. Belsky, J. Barnes, & E. Melhuish, E. (Eds.). *The National Evaluation of Sure Start: Does Area-based Early Intervention Work?* (pp. 3-22). Bristol, UK: The Policy Press.

National Evaluation of Sure Start Research Team (2005a). *Early impacts of Sure Start Local Programmes on Children and Families*. Report 13. London: Department for Education and Skills, www.surestart.gov.uk/doc/P0001867.pdf

Office of the Deputy Prime Minister. (2004), *The English Indices of Deprivation 2004 (revised)*. London: ODPM.

Olds, D. L., Henderson, C.R., Kitzman, H., Eckenrode, J. J., Cole, R. E., & Tatelbaum, R. C. (1999). Prenatal and Infancy Home visitation by Nurses: Recent findings. *Future of Children*, 9, 44-66.

Ramey, C. T., Campbell, F. A., Burchinal, M., Skinner, M. L., Gardner, D. M., & Ramey, S. L. (2000). Persistent Effects of Early Childhood Education on High-risk Children and their Mothers. *Applied Developmental Science*, 4(1), 2-14

Rubin, D.B. (1997). Estimating causal effects from large datasets using propensity scores. *Annals of Internal Medicine*, 127, 757-763.

Sanders, M. R. (2003). Triple P – Positive Parenting Program: A population approach to promoting competent parenting. *Australian e-Journal for the Advancement of Mental Health*, 2(3). www.auseinet.com/journal/vol2iss3/sanders.pdf. Also available at: http://www.pfsc.uq.edu.au/02_ppp/ppp.html

Webster-Stratton, C. (1993). Strategies for helping families with young oppositional defiant or conduct-disordered children: The importance of home and school collaboration. *School Psychology Review*, 22, 437-457. Also see <http://www.incredibleyears.com/>

Appendix A: Procedures for Propensity Matching

In order to be able to implement propensity scoring analysis, it was essential to determine how many of the 138 MCS areas were sufficiently comparable to the SSLP areas to mean that they might be useful in an analysis. Toward this end, the 138 identified MCS areas were compared with the 150 SSLP areas on 85 indices of deprivation and other socio-demographic variables obtained from administrative sources (see Table A.1). These variables were used in an attempt to distinguish between SSLP and MCS areas. The table below displays the mean and standard deviation for each of the 85 area deprivation variables in the 150 SSLP and 138 MCS areas. Also shown is the standardised percentage difference – the difference between the two means expressed as a percentage of the average standard deviation.

(The average standard deviation is $\sqrt{\frac{1}{2}(s_{SS}^2 + s_{MCS}^2)}$.)

Finally, Table A.1 shows a two sample t-statistic testing for the significance of a difference between SSLP and MCS areas and its p-value.

Table A.1: Mean and Standard Deviations of SSLP and MCS Areas on 85 Area Deprivation and Other Socio-demographic Variables

N	Deprivation Indicator	SSLP mean N=150	SSLP SD	MCS mean N=133	MCS SD	Stand % diff	t-statistic	p-value
1	% lone parent families	27.10	7.98	19.35	7.49	100.15	8.48	0.000
2	% inflow of all households with children	7.25	1.84	6.59	2.44	30.39	2.59	0.010
3	% outflow of all households with children	7.78	1.85	6.57	2.31	57.55	4.90	0.000
4	% Europe	91.08	11.18	92.03	11.74	-8.24	-0.70	0.485
5	% Asian Bangladeshi	1.73	6.14	0.49	1.85	27.38	2.28	0.023
6	% Asian Indian	1.79	3.33	3.97	9.77	-29.99	-2.59	0.010
7	% Asian Pakistani	4.66	12.13	1.91	5.46	29.18	2.44	0.015
8	% Black African	2.66	5.65	1.56	3.73	23.03	1.94	0.054
9	% Black Caribbean	2.18	3.83	1.74	3.59	11.81	1.00	0.318
10	% Chinese	0.48	0.64	0.33	0.39	27.14	2.28	0.023
11	% mixed	1.83	1.71	1.46	1.29	24.17	2.04	0.043
12	% other	1.12	1.68	1.29	2.60	-7.42	-0.63	0.526
13	% white British	81.27	22.90	85.00	21.35	-16.83	-1.43	0.155
14	% white other	2.29	3.25	2.21	2.47	2.80	0.24	0.814
15	% of all people LLTI*	21.41	3.89	17.98	3.95	87.44	7.42	0.000
16	% of people working or seeking with LLTI	8.74	1.11	7.63	1.30	91.85	7.81	0.000
17	% no working parents with children	29.38	10.01	15.92	8.35	146.10	12.34	0.000
18	% unemployed	6.08	1.87	3.82	1.75	124.70	10.56	0.000
19	% economically active ft student	2.48	1.36	2.32	0.97	13.37	1.13	0.261
20	% long term unemployed	3.76	1.32	2.20	1.19	124.12	10.50	0.000
21	% all managerial	16.26	6.43	23.09	8.01	-94.03	-8.01	0.000
22	% lower managerial	12.08	4.16	16.64	4.64	-103.57	-8.80	0.000
23	% intermediate	7.40	1.88	9.30	2.55	-85.00	-7.25	0.000
24	% small employers	4.97	1.82	6.90	3.07	-76.22	-6.53	0.000
25	% lower supervisory and technical	7.82	1.94	8.24	2.26	-20.06	-1.71	0.089
26	% all routine	27.86	6.09	24.95	6.92	44.54	3.79	0.000
27	% never worked and long term unemployed	8.49	5.02	4.18	2.85	105.79	8.87	0.000
28	% not classified	27.20	4.72	23.31	4.75	82.15	6.97	0.000
29	% vacant household spaces	4.71	3.38	2.63	2.11	73.99	6.22	0.000
30	Of all occupied hhold spaces: % unshared	99.63	0.53	99.75	0.57	-21.29	-1.81	0.072
31	% of all households owned	47.81	14.57	63.30	16.26	-100.33	-8.53	0.000
32	% all households social and council rented	39.38	15.48	25.39	16.11	88.51	7.51	0.000
33	% over 1.5 persons per room	1.24	1.68	0.82	1.28	28.65	2.42	0.016
34	% of all hholds with no dependent children	66.41	5.91	67.96	6.95	-24.14	-2.05	0.041
35	% Christian	65.54	15.82	68.58	13.66	-20.59	-1.74	0.083
36	% Buddhist	0.29	0.36	0.28	0.39	2.44	0.21	0.836
37	% Hindu	0.73	1.51	2.68	7.19	-37.36	-3.23	0.001

38	% Jewish	0.30	1.77	0.28	0.83	1.75	0.15	0.884
39	% Muslim	8.36	14.91	3.56	7.42	40.77	3.41	0.001
40	% Sikh	0.56	1.50	1.18	4.45	-18.65	-1.61	0.109
41	% any other religion	0.27	0.20	0.34	0.42	-20.29	-1.74	0.082
42	% no religion	14.97	5.97	15.09	6.18	-2.05	-0.17	0.862
43	% religion not stated	8.98	1.78	7.99	1.75	56.22	4.76	0.000
44	% no qualifications	41.16	8.43	33.04	8.71	94.85	8.05	0.000
45	% of under 24 with no qualifications	24.11	6.84	18.19	6.21	90.62	7.67	0.000
46	standardised LLTI males (per 100)	21.82	4.38	15.22	4.12	154.91	13.12	0.000
47	standardised LLTI females (per 100)	20.72	3.75	15.53	3.71	139.41	11.82	0.000
48	% of all people aged 0-4	7.43	1.49	6.53	1.55	59.08	5.01	0.000
49	% of all people aged 65+	13.38	3.21	14.79	4.91	-34.02	-2.91	0.004
50	% hholds all pensioners	20.33	4.40	22.05	7.34	-28.33	-2.43	0.016
51	% people in hholds with no car or van	36.45	11.58	21.76	10.52	132.80	11.24	0.000
52	% of aged 16+ ft students at term time	6.75	4.45	5.48	2.87	34.07	2.86	0.005
53	% age 15-24 in ft educ living away term	2.52	1.67	4.77	4.27	-69.50	-5.98	0.000
54	Weighted paycheck mean	23.26	4.43	28.58	5.22	-109.86	-9.35	0.000
55	% HH income < 60% national median	37.57	8.23	27.38	7.75	127.59	10.80	0.000
56	IMD score 2004	43.61	12.72	24.80	9.83	165.44	13.95	0.000
57	IMD crime score 2004	0.75	0.52	0.16	0.60	105.66	8.99	0.000
58	IMD education score 2004	45.13	17.03	27.30	14.12	114.04	9.63	0.000
59	IMD employment score 2004	0.20	0.07	0.11	0.06	143.52	12.12	0.000
60	IMD environment score 2004	33.02	16.42	23.25	12.22	67.47	5.69	0.000
61	IMD health score 2004	1.02	0.55	0.24	0.55	143.32	12.15	0.000
62	IMD housing score 2004	21.10	10.66	22.37	10.93	-11.70	-0.99	0.322
63	IMD IDAC# score 2004	0.42	0.13	0.24	0.12	143.22	12.12	0.000
64	IMD IDAOP^ score 2004	0.29	0.10	0.18	0.07	120.79	10.18	0.000
65	IMD income score 2004	0.30	0.10	0.16	0.08	152.63	12.88	0.000
76	GO EE	0.05	0.23	0.13	0.34	-26.84	-2.29	0.023
77	GO EM	0.08	0.27	0.09	0.29	-5.02	-0.43	0.670
78	GO LO	0.16	0.37	0.17	0.38	-3.72	-0.32	0.753
79	GO NE	0.13	0.33	0.04	0.19	33.41	2.80	0.005
80	GO NW	0.19	0.40	0.14	0.35	12.89	1.09	0.276
81	GO SE	0.07	0.26	0.19	0.39	-34.51	-2.95	0.003
82	GO SW	0.07	0.26	0.08	0.27	-2.39	-0.20	0.839
83	GO WM	0.11	0.32	0.08	0.27	11.36	0.96	0.338
84	GO YH	0.13	0.33	0.07	0.26	18.11	1.53	0.128
85	Rural	0.05	0.23	0.14	0.35	-28.90	-2.47	0.014

* LLTI- limiting long term illness

IDAC - Index of Deprivation affecting children

^ IDAOP - Index of Deprivation affecting older people

The fact that so many of the variables differed between SSLP and MCS areas—with significance denoted by bold type, was not important in itself; because as long as there was a reasonable overlap between the two samples, it should prove possible to adjust for the difference. For example, the total IMD score differs between samples with a mean (min-max) of 43.61 (14.74 – 76.13) in SSLP areas and 24.80 (13.79 – 71.81) in the MCS areas. There was considerable overlap, but it needed to be determined whether it was sufficient to adjust for differences in IMD total score between the two area types.

The data displayed in Table A.1 show, not surprisingly, that SSLP populations were, in general, more disadvantaged than the comparison population drawn from deprived areas using the MCS. The ethnic and religious mix of the areas differs, with SSLP areas having lower proportions of Asian Indians and Hindus than the MCS areas and higher proportions of Asian Bangladeshi, Asian Pakistani, Chinese, mixed and Muslim populations. The geographical spread shows that a higher proportion of the SSLP areas are in the North East and more of the comparison areas are in the East of England, the South East and in rural areas.

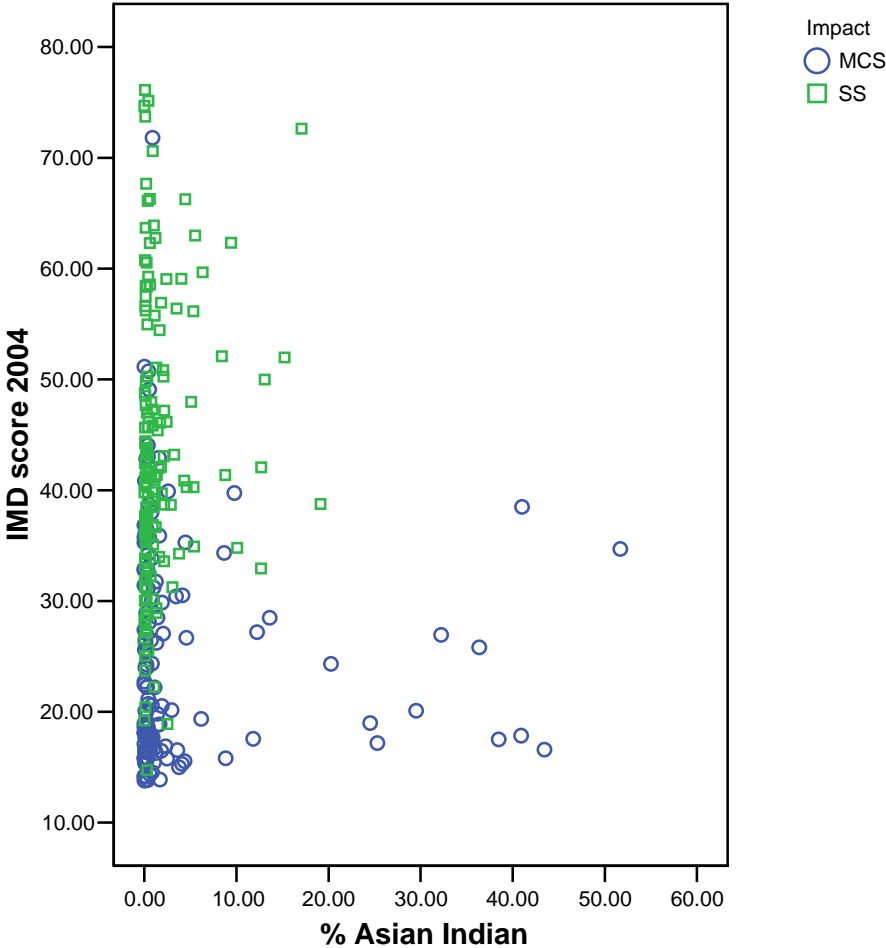
To determine the propensity of an area to be a SSLP Impact Study area, logistic

regression analysis was conducted with the outcome being SSLP or comparison area based on the variables listed in Table A.1 with the exception of the categories % white British, % all managerial, and % no religion. The analysis was conducted using standardised scores so that the relative importance of each variable could be evaluated. Increasing the number of variables in the model naturally tended to increase the ability of the model to discriminate correctly between SSLP and comparison areas. The most influential variables were total IMD score for 2004 (with SSLP areas tending to have higher IMD scores) and the proportion of Asian Indians (with SSLP areas tending to have lower proportions; see Table A.2). The crude values of these variables are plotted in Figure A.1.

Table A.2: Logistic Regression Results—Percent Correct Classification of SSLP and MCS Areas

Model	% correct SSLP	% correct MCS	% correct total	Stand coeff
IMD score 2004	82.0	77.5	79.9	2.100
+ % Asian Indian	82.0	79.7	80.9	-0.408
+ % of people working or seeking with LLTI	82.0	77.5	79.9	0.361

Figure A.1: Covariation of IMD 2004 and % Asian Families in Local Area



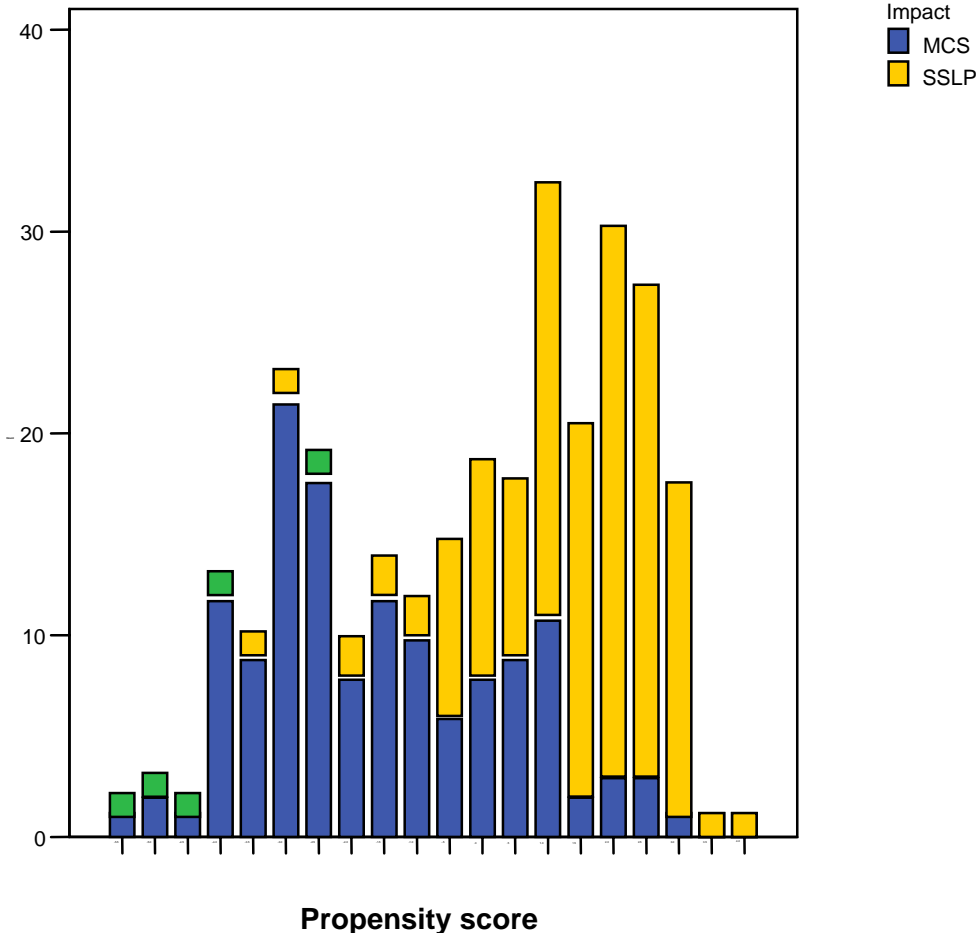
In addition to the above terms included in the logistic regression, including a quadratic term produced significant improvement in model fit. This model correctly classified (with a 50% cut-off) 80.2% of the areas as SSLP and MCS areas. The extent of the overlap on the propensity score is displayed in Figure 2, a stacked-bar chart, which shows that MCS areas have a heavy left-hand tail. This can in part explain the slightly higher standard deviation (SD) in the propensity score for the comparison areas (see Table

A.3). Notably, there were few comparison areas with high propensity scores.

Table A.3: Propensity-score Descriptive Statistics for 150 SSLP and 138 MCS Areas

	N	Mean	SD	Min	Max
SSLP	150	1.42	1.31	-3.43	3.81
MCS	138	-1.63	1.89	-5.70	3.17

Figure A.2: Distribution of Propensity Scores for SSLP (NESS) and MCS Areas



The exclusion of 4 MCS comparison areas with extreme (low) propensity scores yielded 284 areas that showed some overlap between the SSLP and MCS areas (with propensity scores ranging from -4.22 to 3.17). The difference between the means of these two groups remained still significant (see Table A.4).

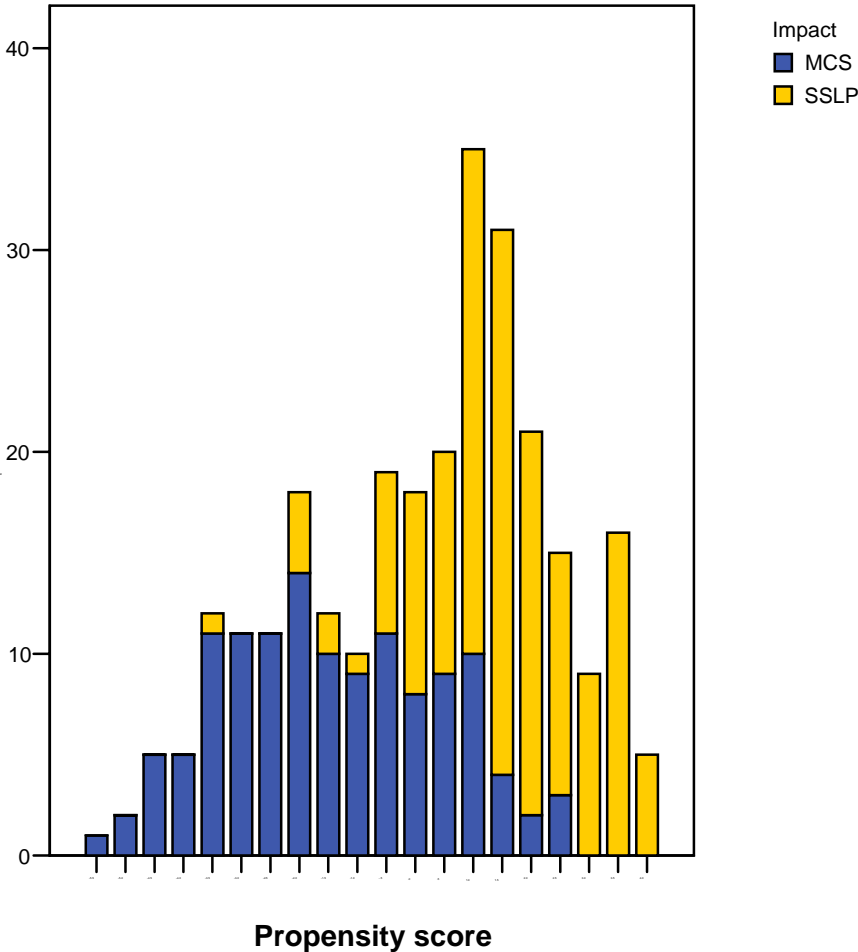
Table A.4: Propensity-score Descriptive Statistics for 150 SSLP and 134 MCS Areas

	N	Mean	SD	Min	Max
SSLP	150	1.42	1.31	-3.43	3.81
MCS	134	-1.52	1.82	-4.22	3.17

These four outlying MCS areas were therefore excluded, as these showed no similarities with the SSLP areas based on these three variables, and the propensity score was re-created. Repeating the process on the subset of areas resulted in a different propensity score—both in terms of the regression coefficients and the variables used to distinguish between the two sets of areas. Cycling through this

process resulted in the exclusion of another eight MCS areas, leaving a total of 276 areas (150 SSLP, 126 MCS). Despite clear differences in the distributions, there was the (necessary) overlap on the propensity score (see Figure A.3).

Figure A.3: Revised Distribution of Propensity Scores for SSLP (NESS) and MCS Areas



The distribution of propensity scores across the two studies, as displayed in Figure A.3, indicated that exact matching could not be achieved. Any form of one-to-one propensity score matching—such as nearest neighbour—would require the exclusion of some cases, given that there were more SSLP than MCS areas, and could therefore lead to the biases associated with incomplete matching. Some of the “nearest neighbours” would also still be fairly dissimilar. The alternative propensity-matching strategy in this situation was followed, namely, dividing the distribution along the propensity score into strata. Monte Carlo simulations suggest that a weighted analysis using five strata with adjustment for the propensity score within each stratum should result in little bias in estimating effects of SSLPs.

Thus, using five equal strata we proceeded to look for significant main effects of SSLPs or interactions with the strata for each of the covariates. A propensity score based on two variables together with one quadratic term correctly classified 79.1% of the areas as SSLP or MCS. It turned out, however, that when stratified on the basis of this propensity score the IMD IDAOP (Index of Deprivation applicable to Older People) score 2004 was unbalanced within the strata. A two-way analysis of variance showed that the marginal mean of this variable was higher within SSLP than MCS areas (see

Table A.5).

Table A.5: Marginal Means of IMD IDAOP Score for Propensity-Score Strata for SSLP and MCS Areas

	SSLP		MCS		p
	Mean	SE	Mean	SE	
Marginal mean	0.245	0.010	0.212	0.009	0.014
<i>Strata:</i>					
1	0.165	0.046	0.134	0.009	0.006
2	0.194	0.016	0.176	0.011	
3	0.228	0.011	0.246	0.014	
4	0.261	0.010	0.253	0.022	
5	0.378	0.009	0.250	0.033	

Following the inclusion of this variable (along with others) in the propensity score, the differences between SSLP and MCS areas were no longer significant, thus yielding balance within all strata for all variables. That is, two-way analyses of variance indicated that there were no significant main effects or interactions. The results for the IMD IDAOP score 2004 are displayed in Table A.6.

Table A.6: Revised Means of IMD IDAOP Score for Propensity-Score Strata for SSLP and MCS Areas

	Sure Start		MCS		p
	Mean	SE	Mean	SE	
Marginal mean	0.243	0.010	0.214	0.014	0.095
<i>Strata:</i>					
1	0.165	0.046	0.135	0.009	0.170
2	0.197	0.017	0.178	0.010	
3	0.218	0.011	0.240	0.014	
4	0.260	0.010	0.265	0.021	
5	0.376	0.009	0.250	0.065	

The final propensity score (based on standardised variables) is displayed in Table A.7 and the distributions of SSLP and MCS areas across the five propensity-score strata are shown in Table A.8.

Table A.7: Final Propensity Score

Variable	Standard coefficient
Constant	0.834
% Intermediate workers	0.055
Standardised LLTI (males)	0.793
IMD score 2004	1.313
IMD employment score 2004	0.502
IMD IDAOP score 2004	0.277
(Standardised LLTI (males)) ²	-0.066
(IMD employment score 2004) ²	-1.044
(IMD employment score 2004)*(IMD IDAOP score 2004)	0.932

Table A.8: Distributions of SSLP and MCS Areas for Five Propensity Strata, including Sample Sizes

Propensity Stratum	SSLP		MCS	
	N Areas	N Areas	N Areas	N children
1	2	53	1041	
2	15	40	970	
3	33	22	818	
4	45	10	565	
5	55	1	21	
Total	150	126	3415	

Importantly, the different distribution of MCS and SSLP areas in each stratum can be accounted for by weighting the analysis. Thus, each MCS area is weighted relative to the ratio of SSLP to MCS areas within that stratum, which is equivalent to weighting by the selection probability. Whereas SSLP areas in the sample have a weight of 1, the weight attached to each MCS area in the 2nd stratum would be 0.375 (i.e., 15/40; this would ensure that less weight would be given to the (many) MCS areas with the lowest propensity scores and that are least typical of SSLP areas. In the 4th stratum the weight attached to the MCS area would be 4.5 (i.e., 45/10), the increase in weight compensating for the fact that only ten MCS areas are in this stratum.

The strata are based on a scale (the propensity score) that rates areas on their tendency to be SSLP areas; using the variables listed above it is clear that there were areas at both extremes that are clearly distinguished. That is, only one MCS area had the characteristics “most like SSLP areas” and only two SSLP areas had those “least like SSLP areas.” It is important to note that even though the “most like SSLPs” areas tend to be more deprived, the propensity score is not a straightforward measure of deprivation. In fact, had we, for example, used the IMD score to stratify the data, we would have found increased numbers to make comparisons among, for example, the most deprived areas (see Table A.9).

Table A.9: Distribution of SSLP and MCS Areas Using IMD Data to Stratify Areas

IMD score Stratum	Sure Start		MCS	
	N Areas	N Areas	N Areas	N children
1	3	52	1010	
2	17	38	821	
3	33	22	1098	
4	45	10	430	
5	52	4	56	
Total	150	126	3415	

The end result is that we succeeded in identifying in the MCS a sample of 3415 children nested in 126 areas that can be used (stratified) as a comparison group (see Table A.8). Of these MCS children 2799 were seen at both 9 months and 3 years of age, and of these 2537 children had provided sufficient data to be used in analyses. When stratified there proved to be a good balance within each stratum for all the area variables. The analysis is weighted to take into account the unequal distribution of SSLP and MCS areas across the different strata. It must be noted that it would prove difficult in the final analyses to examine SSLP effects among the stratum characterised by the greatest propensity to be SSLP areas and which will include a lot of the most deprived areas because, in this stratum, the MCS only provides 21 children in one comparable area.

Appendix B: Selection/ Attrition and Missing Data Analyses.

Appendix B.1: Comparison of Children/Families Seen and Not Seen at 3 years.

Table B.1.1: NESS sample - Comparison of Children/Families Seen and Not Seen at 3 years

Characteristic	Percentage in Each Stratum					Attrition group	Comparison between Each Stratum and Attrition				
	Strata: how like a SSLP is the area						p-values				
	least 1	2	3	4	most 5		least 1	2	3	4	most 5
Child's Gender											
Male	50.0	48.6	49.7	51.5	52.0	50.3	0.94	0.34	0.64	0.36	0.19
Female	50.0	51.4	50.3	48.5	48.0	49.7					
Child's Ethnicity											
White	95.7	86.4	85.9	82.4	62.9	64.0	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Mixed	2.5	4.2	4.1	4.3	6.3	5.6					
Indian	0.9	1.5	1.0	1.0	1.7	2.1					
Pakistani	0.0	0.9	2.7	4.9	12.4	9.7					
Bangladeshi	0.0	0.6	1.0	0.8	5.6	5.3					
Black Caribbean	0.0	2.0	1.3	1.1	1.7	1.5					
Black Other	0.0	2.6	1.9	3.5	5.1	7.5					
Other	0.9	1.8	2.1	2.0	4.3	4.3					
Language in Home											
English Home Language	97.4	91.2	90.2	86.7	70.9	69.6	<0.0001	<0.0001	<0.0001	<0.0001	0.22
Other Languages	2.6	8.8	9.8	13.3	29.1	30.4					
Maternal Age at Birth of Child											
Not teenage	96.6	92.5	90.5	87.8	86.3	85.0	0.001	<0.0001	<0.0001	0.002	0.16
Teenage (< 20 years)	3.4	7.5	9.5	12.2	13.7	15.0					

Table B.1.1 (continued): NESS sample

Characteristic	Percentage in Each Stratum					Attrition group	Comparison between Each Stratum and Attrition				
	Strata: how like a SSLP is the area						p-values				
	least 1	2	3	4	most 5		least 1	2	3	4	most 5
Maternal Cognitive Difficulties											
No Difficulties Reported	94.0	91.1	90.1	91.3	87.0	85.9	0.01	<0.0001	<0.0001	<0.0001	0.18
Has Some Difficulties	6.0	8.9	9.9	8.7	13.0	14.1					
Household Deprivation											
Above poverty line ⁺	77.2	62.7	53.5	50.4	31.8	38.3	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Below poverty line ⁺	22.8	37.3	46.5	49.6	68.2	61.7					
Highest Occupation in Household											
Management/Professional	39.5	28.8	23.2	19.8	12.0	16.0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Intermediate	12.8	8.1	8.9	9.1	6.0	6.4					
Small Employer	6.4	9.3	6.5	5.8	5.3	7.7					
Lower Supervisory/Technical	13.8	9.8	9.5	7.9	6.2	6.2					
Semi-Routine	11.0	11.0	11.6	13.1	13.9	11.0					
Routine	3.7	8.3	9.1	9.1	8.8	8.8					
Unemployed	12.8	24.7	31.2	35.2	47.8	43.9					

⁺Poverty line is £210 per week, taken from the financial year 2004-2005

Table B.1.1 (continued): NESS sample

Characteristic	Percentage in Each Stratum					Attrition group	Comparison between Each Stratum and Attrition				
	Strata: how like a SSLP is the area						p-values				
	least 1	2	3	4	most 5		least 1	2	3	4	most 5
Lone Parent											
Not Lone Parent	87.1	77.2	74.8	68.7	62.4	64.5	<0.0001	<0.0001	<0.0001	0.0005	0.08
Lone Parent	12.9	22.8	25.2	31.3	37.6	35.5					
Work Status Household											
Working Household	87.9	75.3	69.2	65.2	53.0	57.4	<0.0001	<0.0001	<0.0001	<0.0001	0.0004
Workless Household	12.1	24.7	30.8	34.8	47.0	42.6					
Highest Education in Household											
Degrees/Higher Education	52.6	30.2	27.5	26.1	17.7	20.2	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
A level	16.4	26.5	26.6	26.8	25.6	20.6					
O level / GCSE	19.8	24.4	24.3	22.0	21.7	21.8					
Other	3.4	7.6	6.6	6.4	7.5	7.8					
None	7.8	11.3	15.0	18.7	27.5	29.6					

Table B.1.2: MCS sample - Comparison of Children/Families Seen and Not Seen at 3 years

Characteristic	Percentage in Each Stratum					Attrition group	Comparison between Each Stratum and Attrition				
	Strata: how like a SSLP is the area						p-values				
	least 1	2	3	4	most 5		least 1	2	3	4	most 5
Child's Gender											
Male	51.5	49.0	49.9	50.9	—	53.6	0.42	0.09	0.20	0.39	—
Female	48.5	51.0	50.1	49.1	—	46.4					
Child's Ethnicity											
White	91.1	80.3	69.2	69.9	—	66.3	<0.0001	<0.0001	0.003	<0.0001	—
Mixed	2.7	5.0	5.3	5.1	—	5.8					
Indian	0.7	3.8	2.1	12.9	—	3.4					
Pakistani	1.6	4.2	10.8	2.7	—	6.4					
Bangladeshi	0.7	0.5	6.1	0.5	—	5.3					
Black Caribbean	0.9	1.2	2.4	2.2	—	4.3					
Black Other	0.8	2.2	2.2	3.1	—	4.5					
Other	1.5	2.8	1.9	3.6	—	4.0					
Language in Home											
English Home Language	94.0	86.9	77.9	75.9	—	76.3	<0.0001	<0.0001	0.50	0.88	—
Other Languages	6.0	13.1	22.1	24.1	—	23.7					
Maternal Age at Birth of Child											
Not teenage	94.2	92.6	88.7	90.6	—	89.4	0.001	0.03	0.69	0.51	—
Teenage (< 20 years)	5.8	7.4	11.3	9.4	—	10.6					

Table B.1.2 (continued): MCS sample

Characteristic	Percentage in Each Stratum					Attrition group	Comparison between Each Stratum and Attrition				
	Strata: how like a SSLP is the area						p-values				
	least 1	2	3	4	most 5		least 1	2	3	4	most 5
Maternal Cognitive Difficulties											
No Difficulties Reported	91.0	90.3	89.8	94.6	—	88.7	0.15	0.35	0.54	0.001	—
Has Some Difficulties	9.0	9.7	10.2	5.4	—	11.3					
Household Deprivation											
Above poverty line ⁺	79.4	65.8	55.7	49.0	—	48.9	<0.0001	<0.0001	0.02	0.97	—
Below poverty line ⁺	20.6	34.2	44.3	51.0	—	51.1					
Highest Occupation in Household											
Management/Professional	47.3	33.0	25.0	21.1	—	19.3	<0.0001	<0.0001	0.001	0.03	—
Intermediate	11.3	8.1	9.5	7.3	—	7.0					
Small Employer	8.8	9.9	9.3	6.0	—	6.8					
Lower Supervisory/Technical	10.2	11.3	9.5	11.0	—	8.3					
Semi-Routine	6.1	9.9	13.1	13.6	—	10.9					
Routine	6.1	7.6	7.3	12.3	—	8.3					
Unemployed	10.2	20.2	26.3	28.7	—	39.4					

⁺Poverty line is £210 per week, taken from the financial year 2004-2005

Table B.1.2 (continued): MCS sample

Characteristic	Percentage in Each Stratum					Attrition group	Comparison between Each Stratum and Attrition				
	Strata: how like a SSLP is the area						p-values				
	least 1	2	3	4	most 5		least 1	2	3	4	most 5
Lone Parent											
Not Lone Parent	90.4	84.0	82.8	79.2	—	73.3	<0.0001	<0.0001	<0.0001	0.02	—
Lone Parent	9.6	16.0	17.2	20.8	—	26.7					
Work Status Household											
Working Household	90.3	80.8	75.4	73.4	—	63.5	<0.0001	<0.0001	<0.0001	0.001	—
Workless Household	9.7	19.2	24.6	26.6	—	36.5					
Highest Education in Household											
Degrees/Higher Education	44.7	34.5	26.3	23.1	—	23.8	<0.0001	<0.0001	0.004	0.01	—
A level	33.2	34.5	36.8	33.2	—	30.9					
O level / GCSE	16.9	19.2	21.5	27.3	—	20.4					
Other	0.4	3.2	3.5	4.7	—	5.5					
None	4.8	8.6	11.9	11.7	—	19.4					

Appendix B.2: Selection/Attrition and Missing Data Analyses.

Table B.2.1: Comparison of Children/Families for missing values in outcome variables at 3 years, strata 2 - 4

Demographic Characteristic	NESS		MCS		NESS/MCS interaction with demographic characteristic*
	No missing	Any missing	No missing	Any missing	p
(Total number)	(2531)	(2931)	(663)	(807)	
Child's Gender					
Male	49.3	50.7	46.8	50.9	0.29
Female	50.7	49.3	53.2	49.1	
Child's Ethnicity					
White	89.7	81.2	87.3	69.6	0.15
Mixed	3.3	5.1	3.8	6.3	
Indian	1.1	0.8	2.9	6.6	
Pakistani	1.4	4.3	1.5	6.5	
Bangladeshi	0.5	0.9	0.6	2.1	
Black Caribbean	0.7	2.0	0.9	2.6	
Black Other	1.7	3.7	0.9	2.5	
Other	1.6	2.0	2.1	3.8	
Language in Home					
English Home Language	92.3	87.5	92.9	77.8	0.0001
Other Languages	7.7	12.5	7.1	22.2	
Maternal Age at Birth of Child					
Not teenage	93.0	86.4	94.9	87.7	0.47
Teenage (< 20 years)	7.0	13.6	5.1	12.3	
Maternal Cognitive Difficulties					
No Difficulties Reported	94.4	88.4	91.4	91.3	0.001
Has Some Difficulties	5.6	11.6	8.6	8.7	
Household Deprivation					
Above poverty line ⁺	66.4	43.1	73.5	46.6	0.37
Below poverty line ⁺	33.6	56.9	26.5	53.4	
Highest Occupation in Household					
Management/Professional	31.0	15.8	37.3	20.7	0.18
Intermediate	11.9	6.5	9.3	7.8	
Small Employer	7.3	5.6	8.9	7.3	
Lower Supervisory/Technical	10.4	7.2	11.3	10.4	
Semi-Routine	12.7	11.8	13.1	9.9	
Routine	9.1	8.5	7.1	9.3	
Unemployed	17.6	44.6	13.0	34.6	

*Based on the logistic regression model regressing missing on ss+strata+characteristic+ss*strata+strata*characteristic+ss*characteristic

⁺Poverty line is £210 per week, taken from the financial year 2004-2005

Table B.2.1 (continued)

Demographic Characteristic	NESS		MCS		NESS/MCS interaction with demographic characteristic*
	No missing	Any missing	No missing	Any missing	p
Lone Parent					
Not Lone Parent	99.8	50.6	99.8	63.4	0.64
Lone Parent	0.2	49.4	0.2	36.6	
Work Status Household					
Working Household	88.3	57.1	92.6	68.3	0.47
Workless Household	11.7	42.9	7.4	31.7	
Highest Education in Household					
Degrees/Higher Education	37.1	21.3	36.0	23.4	0.18
A level	30.6	29.7	38.3	33.0	
O level / GCSE	20.5	25.1	19.3	24.3	
Other	6.5	8.6	2.0	4.4	
None	5.3	15.3	4.4	14.9	

*Based on the logistic regression model regressing missing on
 ss+strata+characteristic+ss*strata+strata*characteristic+ss*characteristic

Appendix C: Description of Outcome Variables

Physical Health	
Children who had all immunisations	Divides the children in 2 categories, those who had all recommended immunisations and those who did not
Children who had Accident(s)	Divides children in 2 categories, those who had one or more accidents since the child was 9 months old, and those who did not (only problems for which he/she has been taken to the doctor, health centre, or hospital were included)
Child Cognitive and Language Development	
BAS Naming Vocabulary	Picture naming vocabulary subscale of the British Abilities Scales (BAS).
Child Social and Emotional Development	
Child Positive Social Behaviour	A construct of: The child is generally obedient, can stop and think things before acting, sees games or jobs through to the end, good attention span, thinks about other people's feelings, shares readily with other children (treats, toys, pencils, etc.), is helpful if someone is hurt, upset or feeling ill, kind to younger children, often offers to help others
Child Negative Social Behaviour	A construct of: The child often complains of headaches, stomach-aches or sickness, is often unhappy or tearful, has many fears and is easily scared, often fights with other children or bullies them, often argues with adults
Independence/ self-regulation	A construct of: The child likes to work things out for self, does not need much help with doing things or playing games, chooses games on their own, keeps trying even when something is difficult, and can move to a new game after playing with another toy or game
Parenting and Family Functioning	
Parenting Risk Index	A construct of six parenting variables: Observer rating of mother responsiveness to child (observations of mother praising, responding, showing affection), observer rating of mother acceptance of child (not observing scolding/derogating, spanking, physically restraining), parent/child conflict (parent-child struggles, child easily angry with parent, conflict with discipline), parent child closeness (affectionate relationship, child seeks comfort, child shares feelings), harsh discipline (ignoring, smacking, shouting, punishing), home chaos (disorganized, noisy) Further details are given below for the derivation of this variable.
Home Learning Environment	A construct of 6 items measuring the frequency of learning opportunities provided to child in home; taken to library, helped to learn/play with alphabet, helped to learn/play with numbers, child read to, taught songs and rhymes, child paints and draws
Father Involvement	A construct of: How often does father play with the child and how often does he get the child ready for bed in the evening
Maternal Well-Being	
Currently smoking	Mothers who currently smoke tobacco products vs. those who do not
Life Satisfaction	How satisfied/dissatisfied respondent is about the way life has turned out.
BMI	Mother's Body Mass Index
Service Use	
Total Support Score	Number of different types of support respondent has used in past 12 months
Local Area Measures	
Mother's Area Rating	Respondent's rating of local area

Derivation of Parenting Risk Index (PRI)

The Parenting Risk Index (PRI) is derived from six parenting variables:

homeresb	Observer rating of mother responsivity to child
homeaccb	Observer rating of mother acceptance of child
pcconflb	Parent/child conflict score
pccloseb	Parent child closeness score
disciplb	Discipline Score
chaosb	Home chaos score

The distribution of each parenting variable was split in three categories, which were rescored 0, 1 and 2. Every effort was made to create divisions in terms of subgroups scoring in the lowest and highest scoring 33% on each variable, but this was often not possible due to the actual distribution of the PRI component scores. Category 0 indicates low amount and category 2 indicates high amount of the quality being measured in the original scale. The Parenting Risk Index (PRI) is the sum of these six scores and the total composite score ranges from 0 to 12. Low values of PRI indicate lower amount of parenting risk than high values. The data used in deriving the PRI were from 6675 cases (2537 cases in MCS2 and 4138 cases in NESS2). The PRI could be derived to 5890 cases. Due to missing values in one or more of six parenting variables, 785 cases (11.8 %) of PRI are missing.

The distributions of the new scores and the cut points of original variables are:

New scoring	% of cases	Cut points of original variable		n of cases
		From	To	
0	75.3	4	5	4716
1	14.4	3	< 4	903
2	10.3	0	< 3	646
Total	100.0			6265
Missing				410

New scoring	% of cases	Cut points of original variable		n of cases
		From	To	
0	89.5	3	3	5706
1	7.3	2	2	468
2	3.2	0	1	202
Total	100.0			6376
Missing				299

New scoring	% of cases	Cut points of original variable		n of cases
		From	To	
0	29.5	6	10	1844
1	29.9	11	14	1874
2	40.6	15	30	2540
Total	100.0			6258
Missing				417

pccloseb Parent child closeness score

New scoring	% of cases	Cut points of original variable		n of cases
		From	To	
0	54.4	41	51	3401
1	13.3	40	40	830
2	32.4	11	39	2026
Total	100.0			6257
Missing				418

disciplb Discipline Score

New scoring	% of cases	Cut points of original variable		n of cases
		From	To	
0	33.9	6	< 15	2126
1	25.8	15	17	1617
2	40.4	18	24	2533
Total	100.0			6276
Missing				399

chaosb Home chaos score

New scoring	% of cases	Cut points of original variable		n of cases
		From	To	
0	13.9	2	3	926
1	51.3	4	5	3421
2	34.8	6	10	2317
Total	100.0			6664
Missing				11

Further information on the Parenting Risk Index (PRI) is given below, as this variable has not been described in previous studies. Figure C.1 shows the distribution of this variable graphically and Table C.1 shows the frequencies of scores. Table C.2 shows the descriptive statistics for the PRI and Table C.3 shows its association with several child development outcomes.

Figure C.1 : Distribution of Parenting Risk Index (PRI)

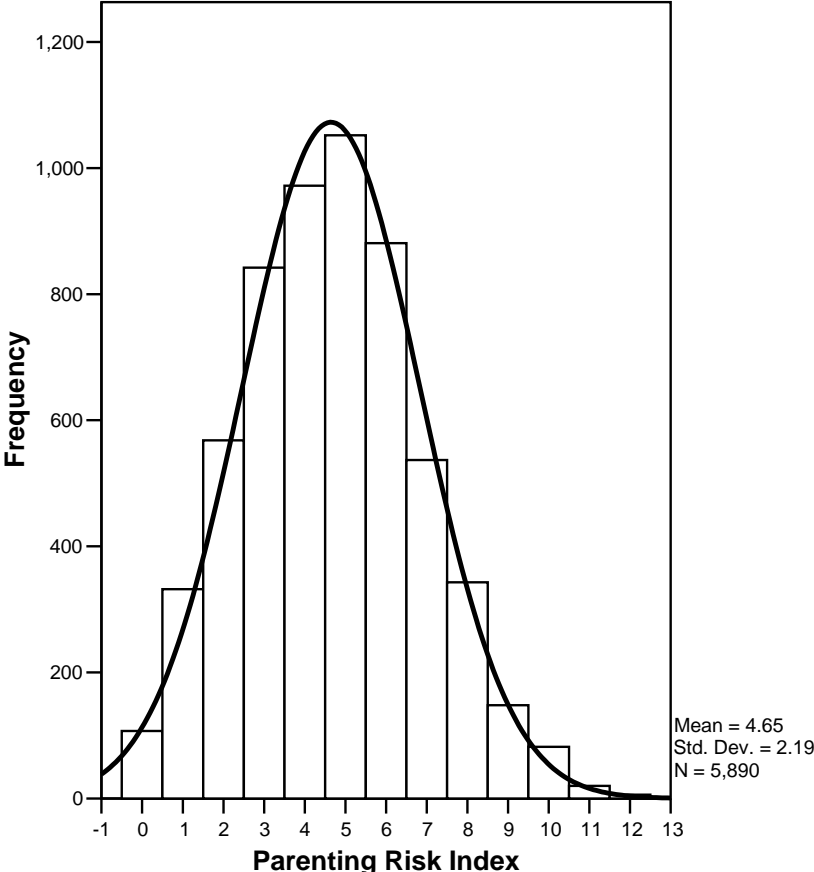


Table C.1: Frequencies of Parenting Risk Index (PRI):

Value	Frequency	%
0	107	1.8
1	332	5.6
2	568	9.6
3	842	14.3
4	972	16.5
5	1052	17.9
6	881	15.0
7	537	9.1
8	343	5.8
9	148	2.5
10	82	1.4
11	20	0.3
12	6	0.1
Total	5890	100.0
Missing	785	

Table C.2 : Statistics of Parenting Risk Index (PRI):

Mean		4.65
Std. Deviation		2.19
Median		5
Mode		5
Skewness		0.21
Kurtosis		-0.22
N	Valid	5890
	Missing	785

Table C.3 : Correlations between Parenting Risk Index (PRI) and child outcomes:

BAS naming ability score	-0.171
Child Externalising Score	0.489
Child Hyperactivity Score	0.358
Child Pro-Social Score	-0.336
Child Independence Score	-0.211
Child Internalising Score	0.201
Child Difficulties score	0.364

Appendix D: Imputation procedure

There is a strategy to overcome the problem that data may be missing in non-random ways and hence bias results. This involves the “imputation” of missing data. Imputation is based on the fundamental premise that tolerably accurate estimates of what a missing value would have been had the information been supplied can be determined using all the data that has been collected. Taking an over-simplified example, knowing a person’s age, education level, gender, work status and occupation enables a reasonably accurate prediction of salary, should salary data be missing, using data on all these variables obtained from respondents who also provided salary information. In the current evaluation, statistically sophisticated and widely used multiple-imputation techniques were employed to overcome the possibility of bias in results caused by non-random missing data. This takes into account that, in the above example, we can predict not just one value for the missing salary but a range of plausible values.

Two approaches have been taken for dealing with missing data: case deletion and imputation. Case deletion involves deleting for each outcome measure any individual who has missing data either for the outcome measure or for the demographic or family background characteristics, leaving only cases with complete data. Analysis of data with only complete cases has the drawback that, where we are considering a number of explanatory factors, we may discard quite a large part of the data. Not only is this inefficient, it may result in a subset of data that is small and, if data are missing in a non-random way (i.e. if certain subgroups are more likely to refuse to answer or skip over certain questions), may be unrepresentative of the population as a whole. Imputation of data for a respondent involves filling in the missing values with plausible values based on the known characteristics of that respondent together with the relationship between characteristics observed in the rest of the sample.

Multiple imputation (Rubin, 1987; Schafer, 1997) was used to estimate missing data values using the statistical package IVEware (<http://www.isr.umich.edu/src/smp/ive/>). Multiple imputation is the process of generating several data sets, analysing these and combining the results. This ensures that we have sufficient variability between imputed values to be able to draw correct inferences. The missing demographic and outcome data were imputed simultaneously for both waves of data. In each strata, the missing data were imputed separately for each study group. Fixed area effects were included to take account of the hierarchical structure of the data. For all the demographic and outcome variables included in the analysis of strata 2-4, 3.6% of the data were missing in the dataset. Table D.1 show the percent missing for each of the demographic and family background characteristic variables by strata and study, for those strata used in the analyses, and also for strata 2-4 by study. Compared to the SSLP data, the MCS study data had higher rates of missing for household deprivation, highest occupation in household, household work status and the highest education in the household. Table D.2 shows for each outcome measure the percent of cases with missing outcome measures and incomplete data (missing outcome and/or missing demographic or family background characteristics). For the complete-cases data analysis, the incomplete-data cases are excluded. For the 9-month data, between 8% and 14% of the cases are excluded from any one analysis. For the 3-year data, higher rates of missing data were observed, between 10% and 29% of the cases.

Rubin, D.B. (1987) *Multiple Imputation for Nonresponse in Survey*. London: B.J. Wiley & Sons.

Schafer, J.L. (1997) *Analysis of Incomplete Multivariate Data*. London: Chapman & Hall.

Table D.1: Summary of Demographic Characteristics: Data set for imputation

Characteristic	Sure Start: 9 months							MCS: 9 months						
	% missing by strata (N=9192)					Missing For Strata 2-4 (N=5883)		% missing by strata (N=1879)					Missing For Strata 2-4 (N=1879)	
	Strata: how like a SSLP is the area							Strata: how like a SSLP is the area						
9 months	least 1	2	3	4	most 5	n	%	least 1	2	3	4	most 5	n	%
Child's Gender	0.0	0.0	0.0	0.0	0.0	0	0.0	—	0.0	0.0	0.0	—	0	0.0
Child's Ethnicity	0.0	0.0	0.1	0.0	0.0	3	0.1	—	0.1	0.8	0.0	—	6	0.3
Language in Home	0.0	0.0	0.0	0.0	0.0	2	0.0	—	0.0	0.0	0.0	—	0	0.0
Maternal Age at Birth of Child	0.0	0.0	0.1	0.0	0.0	3	0.1	—	0.0	0.2	0.0	—	1	0.1
Maternal Cognitive Difficulties	0.0	0.0	0.1	0.0	0.0	3	0.1	—	0.2	0.3	0.2	—	5	0.3
Household Deprivation	1.7	2.2	3.1	4.1	4.4	200	3.4	—	8.6	11.4	8.5	—	179	9.5
Highest Occupation in Household	6.0	0.2	1.1	1.0	1.6	55	0.9	—	10.5	14.8	14.5	—	242	12.9
Lone Parent	0.0	0.0	0.0	0.0	0.0	2	0.0	—	0.0	0.0	0.0	—	0	0.0
Work Status Household	0.0	0.0	0.1	0.0	0.0	3	0.1	—	5.7	8.9	7.8	—	137	7.3
Highest Education in Household	0.0	0.1	0.4	0.1	0.2	12	0.2	—	9.7	14.1	14.1	—	230	12.2
Child's Age (Months)	0.0	0.0	0.0	0.0	0.0	2	0.0	—	0.0	0.0	0.0	—	0	0.0
3 years														
Lone Parent	0.0	0.4	0.2	0.1	0.8	12	0.2	—	0.6	0.6	0.4	—	11	0.6
Work Status Household	0.9	2.8	1.4	1.4	3.9	95	1.6	—	2.1	2.9	1.3	—	41	2.2
Highest Education in Household	1.7	3.9	1.8	1.5	4.7	117	2.0	—	1.6	2.7	1.6	—	37	2.0
Child's Age (Months)	0.9	2.5	0.9	1.8	3.2	93	1.6	—	1.4	1.3	0.9	—	23	1.2

Table D.2 : Percentage of data imputed – 3 years

Outcome Measures	Outcome only							Outcome and demographic characteristics						
	% missing by strata (N=11071)					For strata 2-4 (N=7762)		% missing by strata (N=11071)					For strata 2-4 (N=7762)	
	SS 1	SS and MCS			SS 5	Cases with outcome	% missing	SS 1	SS and MCS			SS 5	Cases with outcome	% missing
	2	3	4					2	3	4				
Children with all immunisations	0.9	3.1	2.0	1.4	1.6	7607	2.0	11.2	14.4	11.8	10.9	12.4	6829	12.0
Children who had Accident(s)	0.0	0.0	0.2	0.2	0.5	7751	0.1	10.3	12.2	10.7	9.9	11.7	6932	10.7
BAS Naming Vocabulary	9.5	15.3	18.4	20.4	22.4	6322	18.6	18.1	25.0	26.4	27.1	28.5	5716	26.4
Child Positive Social Behaviour	0.9	3.7	4.0	2.9	5.1	7494	3.5	11.2	14.2	12.8	11.7	14.7	6778	12.7
Child Negative Social Behaviour	0.9	3.6	3.8	3.1	5.3	7494	3.5	11.2	14.1	12.7	11.9	14.8	6776	12.7
Independence	2.6	3.7	3.6	2.7	4.9	7509	3.3	12.9	14.2	12.6	11.5	14.5	6791	12.5
Parenting Risk Index	3.4	19.8	21.2	21.9	24.1	6119	21.2	12.9	28.8	28.2	28.6	30.8	5550	28.5
Home Learning Environment	0.0	1.7	1.3	0.7	0.7	7673	1.1	10.3	13.0	11.3	10.1	11.8	6894	11.2
Currently smoking	0.9	1.5	2.2	2.3	6.8	7602	2.1	11.2	12.7	12.0	11.4	16.3	6837	11.9
Life Satisfaction	6.0	10.1	9.1	10.3	17.8	6999	9.8	14.7	19.6	16.8	17.7	24.2	6378	17.8
BMI	10.3	14.7	15.5	15.4	19.6	6579	15.3	20.7	24.4	23.4	23.3	27.2	5931	23.6
Total Support Score	4.3	5.2	6.1	5.3	11.0	7332	5.5	13.8	15.6	14.6	13.7	19.1	6641	14.4
Mother's Area Rating	0.0	0.9	0.6	0.4	0.9	7718	0.6	10.3	12.2	10.7	9.9	11.7	6932	10.7
	% missing by strata (N=8038)					For strata 2-4 (N=5842)		% missing by strata (N=8038)					For strata 2-4 (N=5842)	
Father Involvement*	0.0	7.0	7.0	3.4	1.8	5517	5.6	11.9	16.1	15.1	12.9	14.4	4995	14.5

*Not collected for lone parents

Appendix E: Producing measures of area characteristics.

Area characteristics: a variety of census variables for each community (e.g. ethnic make up, age distribution, employment status) and the 2004 IMD score were subjected to data-reduction-oriented factor analysis. Results were used to create composite factor scores reflecting dimensions of the community that could potentially influence the outcome measures. The labels of identified factors are listed in the left-hand column of Table E.1, with associated component variables defining each factor listed in the right-hand column.

Table E.1: Variables in area level composite factors

Composite	Variables in Composite
Economically deprived	High % lone parent families High % non working parents with children High % unemployed Low % all managerial Low % intermediate employment Low % small employers High % employment not classified Low % of all households owned High % all households social and council rented High % no qualifications High % people in households with no car or van High % household income < 60% national median High % of all people LLTI High IMD score 2004
Non Asian ethnic minority	High % Black African High % Black Caribbean High % Chinese High % mixed Low % white British High % white other Low % lower supervisory and technical Low % all routine employment Low % unshared of all occupied household spaces High % over 1.5 persons per room
Many children	Low % of all households with no dependent children High % of all people aged 0-4 Low % of all people aged 65+
Asian Pakistani	High % Asian Pakistani High % vacant household spaces
Transient population with children	High % inflow of all households with children High % outflow of all households with children
Asian Bangladeshi	High % Asian Bangladeshi
Asian Indian and students	High % Asian Indian High % economically active fulltime student

Appendix F: Effects of Strata and Covariates on Outcomes

Table F.1: Summary of Model Estimate Effects – 3 years: Complete data

Demographic Variables	Outcome Variables													
	Physical Health		Child Cognitive and Language Development	Child Social and Emotional Development			Parenting and Family Functioning			Maternal Well-Being			Service Use	Local Area Measures
	Children with all immunisations	Children who had Accident(s)		BAS Naming Vocabulary	Child Positive Social Behaviour	Child Negative Social Behaviour	Independence	Parenting Risk Index	Home Learning Environment	Father Involvement ^s	Currently Smoking	Life Satisfaction	BMI	Total Support Score
SSLP (Baseline MCS)	+ve	-ve		+ve		+ve	-ve	+ve					+ve	
Strata (Baseline Stratum 4)														
Stratum 2		+ve												
Stratum 3		+ve												
Child's Age			+ve	+ve					-ve					+ve
Childs Gender (Baseline Male)														
Female		-ve	+ve	+ve		+ve	-ve	+ve	-ve					
Child's Ethnicity (Baseline White)														
Mixed	#									#				
Indian	#	-ve	-ve					-ve		#		-ve	-ve	+ve
Pakistani	#						-ve		-ve	#				+ve
Bangladeshi	#		-ve						-ve	#				+ve
Black Caribbean	#		-ve					-ve		#		+ve		
Black Other	#		-ve				-ve	-ve		#		+ve		
Other	#									#				+ve
Language in Home (Baseline English)														
Other Languages		-ve	-ve		+ve					-ve				-ve
Maternal Age at Birth of Child (Baseline Not teenage)														
Teenage (< 20 years)					+ve						+ve	-ve		-ve
Maternal Cognitive Difficulties (Baseline No Difficulties)														
Has Some Difficulties					+ve		+ve	-ve					+ve	
Lone Parent (Baseline Not Lone)														
Lone Parent								#	+ve	-ve	-ve			
Household Deprivation (Baseline Above poverty line ⁺)														
Below poverty line			-ve	+ve										-ve

Note: +ve = positive effect and -ve = negative effect

Unable to estimate

⁺Poverty line is £210 per week, taken from the financial year 2004-2005

^s Not collected for lone parents

Table F.1 (continued): Summary of Model Estimate Effects – 3 years: Complete data

	Outcome Variables													
	Physical Health		Child Cognitive and Language Development	Child Social and Emotional Development			Parenting and Family Functioning			Maternal Well-Being			Service Use	Local Area Measures
	Children with all immunisations	Children who had Accident(s)	BAS Naming Vocabulary	Child Positive Social Behaviour	Child Negative Social Behaviour	Independence	Parenting Risk Index	Home Learning Environment	Father Involvement ^s	Currently Smoking	Life Satisfaction	BMI	Total Support Score	Mother's Area Rating
Highest Education in Household (Baseline O level / GCSE)														
Degrees /Higher Education			+ve		-ve			+ve	+ve	-ve			+ve	
A level								+ve						
Other														
None			-ve					-ve		+ve		+ve	-ve	
Highest Occupation in Household (Baseline Routine)														
Management /Professional			+ve						+ve	-ve	+ve	-ve	+ve	+ve
Intermediate			+ve		-ve		-ve			-ve				+ve
Small Employer												-ve		+ve
Lower Supervisory /Technical											+ve			+ve
Semi-Routine									+ve					
Unemployed										+ve				
Work Status Household (Baseline Working)														
Workless Household					+ve		+ve		+ve	+ve	-ve		+ve	
Area Variables														
Economically deprived					+ve				+ve					-ve
Non Asian ethnic minority								+ve		-ve		-ve	+ve	
Many children			-ve		+ve					+ve	-ve			-ve
Asian Pakistani							+ve							
Transient population with children														
Asian Bangladeshi	-ve					-ve				-ve	+ve			
Asian Indian and students	+ve	+ve		-ve	+ve		+ve		+ve		-ve		+ve	-ve

Note: +ve = positive effect and -ve = negative effect

Unable to estimate

[†]Poverty line is £210 per week, taken from the financial year 2004-2005

^s Not collected for lone parents

Table F.2: Summary of Model Estimate Effects – 3 years: Imputed data

Demographic Variables	Outcome Variables													
	Physical Health		Child Cognitive and Language Development	Child Social and Emotional Development			Parenting and Family Functioning			Maternal Well-Being			Service Use	Local Area Measures
	Children with all immunisations	Children who had Accident(s)	BAS Naming Vocabulary	Child Positive Social Behaviour	Child Negative Social Behaviour	Independence	Parenting Risk Index	Home Learning Environment	Father Involvement [§]	Currently Smoking	Life Satisfaction	BMI	Total Support Score	Mother's Area Rating
SSLP (Baseline MCS)	+ve	-ve		+ve		+ve	-ve	+ve					+ve	
Strata (Baseline Stratum 4)														
Stratum 2		+ve												
Stratum 3		+ve												
Child's Age			+ve	+ve										+ve
Childs Gender (Baseline Male)														
Female	+ve	-ve	+ve	+ve		+ve	-ve	+ve					-ve	
Child's Ethnicity (Baseline White)														
Mixed	#							-ve	#					
Indian	#	-ve	-ve					-ve	#		-ve	-ve	+ve	
Pakistani	#		-ve	+ve				-ve	-ve	#			+ve	
Bangladeshi	#		-ve					-ve	-ve	#			-ve	+ve
Black Caribbean	#	-ve	-ve					-ve		#	-ve	+ve		
Black Other	#		-ve				-ve	-ve		#		+ve		
Other	#		-ve				-ve			#				+ve
Language in Home (Baseline English)														
Other Languages			-ve	+ve	+ve					-ve				
Maternal Age at Birth of Child (Baseline Not teenage)														
Teenage (< 20 years)		+ve		+ve	+ve					+ve	-ve			-ve
Maternal Cognitive Difficulties (Baseline No Difficulties)														
Has Some Difficulties				-ve	+ve		+ve	-ve						
Lone Parent (Baseline Not Lone)														
Lone Parent								#		-ve	-ve	-ve		
Household Deprivation (Baseline Above poverty line [†])														
Below poverty line			-ve	+ve				-ve		+ve				-ve

Note: +ve = positive effect and -ve = negative effect

Unable to estimate

[†]Poverty line is £210 per week, taken from the financial year 2004-2005

[§] Not collected for lone parents

Table F.2 (continued): Summary of Model Estimate Effects – 3 years: Imputed data

	Outcome Variables													
	Physical Health		Child Cognitive and Language Development	Child Social and Emotional Development			Parenting and Family Functioning			Maternal Well-Being			Service Use	Local Area Measures
	Children with all immunisations	Children who had Accident(s)	BAS Naming Vocabulary	Child Positive Social Behaviour	Child Negative Social Behaviour	Independence	Parenting Risk Index	Home Learning Environment	Father Involvement ^s	Currently Smoking	Life Satisfaction	BMI	Total Support Score	Mother's Area Rating
Highest Education in Household (Baseline O level / GCSE)														
Degrees /Higher Education			+ve		-ve			+ve	+ve	-ve			+ve	
A level								+ve	+ve					
Other														
None			-ve			-ve		-ve		+ve			-ve	+ve
Highest Occupation in Household (Baseline Routine)														
Management /Professional			+ve		-ve				+ve	-ve	+ve	-ve		+ve
Intermediate			+ve		-ve					-ve				+ve
Small Employer												-ve		+ve
Lower Supervisory /Technical		+ve												+ve
Semi-Routine									+ve					
Unemployed														
Work Status Household (Baseline Working)														
Workless Household			-ve	+ve	-ve	+ve		+ve	+ve				+ve	
Area Variables														
Economically deprived				+ve										-ve
Non Asian ethnic minority				-ve			+ve		-ve		-ve	+ve		
Many children			-ve	+ve		+ve	-ve			-ve				-ve
Asian Pakistani														
Transient population with children														
Asian Bangladeshi							-ve	+ve		+ve				
Asian Indian and students	+ve	+ve			-ve	+ve	+ve				-ve	+ve		

Note: +ve = positive effect and -ve = negative effect

Unable to estimate

[†]Poverty line is £210 per week, taken from the financial year 2004-2005

^s Not collected for lone parents

Appendix G: SSLP vs. MCS by demographic group interactions

Note that estimated values are derived from models using interactions of interest (baseline characteristics assumed for all other variables).

Table G.1: SSLP/MCS by demographic interactions - significant results with p values: Complete data

Outcome Measure	Categories	Sure Start		MCS		P-value	
		Estimated values (95% CI)		Estimated values (95% CI)			
Physical Health Children who had Accidents(s)	Child's Gender	Male	0.29	0.22 to 0.37	0.40	0.30 to 0.51	0.0006
		Female	0.25	0.19 to 0.32	0.27	0.20 to 0.36	0.40
	Maternal Age at Birth of Child	Not teenage	0.30	0.23 to 0.37	0.38	0.29 to 0.49	0.001
		Teenage (< 20 years)	0.39	0.30 to 0.48	0.32	0.21 to 0.47	0.35
Child Cognitive and Language Development BAS Naming Vocabulary	Work Status Household	Estimated means	95% CI	Estimated means	95% CI		
		Working Household	48.13	46.60 to 49.67	48.06	46.25 to 49.88	0.91
		Workless Household	46.36	44.76 to 47.96	48.51	46.45 to 50.58	0.004

Table G.1 (continued): SSLP/MCS by demographic interactions - significant results with p values: Complete data

Outcome Measure	Categories	Sure Start		MCS		P-value
		Estimated values (95% CI)		Estimated values (95% CI)		
		Estimated means	95% CI	Estimated means	95% CI	
Child Social and Emotional Development Child Positive Social Behaviour	Child's Ethnicity					
	White	18.62	18.19 to 19.04	18.09	17.52 to 18.66	0.002
	Mixed	18.60	17.97 to 19.23	18.31	16.91 to 19.71	0.71
	Indian	18.68	17.83 to 19.53	18.93	17.92 to 19.94	0.65
	Pakistani	18.89	18.04 to 19.75	19.99	17.49 to 22.49	0.38
	Bangladeshi	17.90	16.63 to 19.18	18.21	17.21 to 19.22	0.64
	Black Caribbean	18.59	17.68 to 19.50	20.60	18.82 to 22.39	0.03
	Black Other	19.06	18.21 to 19.92	19.52	17.89 to 21.16	0.54
	Other	19.28	18.39 to 20.16	19.50	18.05 to 20.94	0.78
	Maternal Age at Birth of Child					
Not teenage	18.57	18.10 to 19.04	18.25	17.70 to 18.80	0.03	
Teenage (< 20 years)	18.97	18.45 to 19.49	18.04	17.34 to 18.74	0.001	
Parenting and Family Functioning						
Parenting Risk Index	Maternal Age at Birth of Child					
	Not teenage	4.88	4.50 to 5.26	5.74	5.34 to 6.14	<0.0001
	Teenage (< 20 years)	4.83	4.43 to 5.23	6.18	5.67 to 6.68	<0.0001

Table G.1 (continued): SSLP/MCS by demographic interactions - significant results with p values: Complete data

Outcome Measure	Categories	Sure Start		MCS		P-value
		Estimated values (95% CI)		Estimated values (95% CI)		
		Estimated means	95% CI	Estimated means	95% CI	
Father Involvement	Child's Ethnicity					
	White	8.50	8.14 to 8.87	8.54	8.21 to 8.87	0.64
	Mixed	8.02	7.38 to 8.65	8.46	7.56 to 9.36	0.31
	Indian	8.59	7.78 to 9.40	8.83	7.93 to 9.72	0.57
	Pakistani	7.62	6.94 to 8.31	8.46	7.40 to 9.52	0.11
	Bangladeshi	6.80	5.46 to 8.14	8.55	7.80 to 9.29	0.01
	Black Caribbean	7.78	6.92 to 8.63	9.36	8.85 to 9.87	0.0003
	Black Other	8.50	7.87 to 9.13	7.09	5.74 to 8.44	0.04
	Other	8.67	7.97 to 9.37	9.31	8.52 to 10.10	0.21
	Work Status Household					
Working Household	8.89	8.71 to 9.06	8.94	8.77 to 9.11	0.46	
Workless Household	8.96	8.66 to 9.27	9.64	9.25 to 10.03	0.002	
Local Area Measures						
Mother's Area Rating	Lone Parent					
	Not Lone Parent	3.80	3.64 to 3.96	3.82	3.64 to 3.99	0.74
	Lone Parent	3.81	3.63 to 3.99	3.56	3.29 to 3.84	0.03

Table G.2 : SSLP/MCS by demographic interactions - significant results with p values: Imputed data

Outcome Measure	Categories	Sure Start		MCS		P-value
		Estimated values (95% CI)		Estimated values (95% CI)		
		Estimated means	95% CI	Estimated means	95% CI	
Child Social and Emotional Development Child Positive Social Behaviour	Child's Ethnicity					
	White	18.66	18.27 to 19.06	17.92	17.42 to 18.42	<0.0001
	Mixed	18.61	18.11 to 19.11	18.62	17.66 to 19.58	0.99
	Indian	18.56	17.68 to 19.43	18.55	17.94 to 19.17	1.00
	Pakistani	18.26	17.65 to 18.87	18.81	18.05 to 19.56	0.17
	Bangladeshi	17.92	16.86 to 18.97	17.63	15.76 to 19.50	0.79
	Black Caribbean	18.61	17.93 to 19.29	20.57	18.57 to 22.57	0.04
	Black Other	19.22	18.49 to 19.94	19.00	17.99 to 20.00	0.60
Other	18.52	17.79 to 19.26	18.85	17.70 to 20.00	0.64	
Parenting and Family Functioning Parenting Risk Index	Child's Ethnicity					
	White	5.68	5.35 to 6.01	6.69	6.33 to 7.05	<0.0001
	Mixed	5.73	5.29 to 6.16	6.85	6.32 to 7.37	<0.0001
	Indian	4.82	4.22 to 5.42	6.71	6.04 to 7.37	<0.0001
	Pakistani	4.90	4.32 to 5.49	6.71	5.75 to 7.66	<0.0001
	Bangladeshi	5.01	4.28 to 5.74	6.85	5.89 to 7.82	0.0006
	Black Caribbean	5.46	4.91 to 6.01	6.07	5.08 to 7.07	0.21
	Black Other	5.09	4.53 to 5.65	6.01	5.42 to 6.60	0.004
Other	4.87	4.33 to 5.41	6.41	5.50 to 7.31	0.001	
Maternal Well-Being Life Satisfaction	Lone Parent					
	Not Lone Parent	7.56	7.34 to 7.78	7.59	7.31 to 7.86	0.77
	Lone Parent	6.99	6.73 to 7.25	6.62	6.31 to 6.92	0.004
	Work Status Household					
	Working Household	7.54	7.32 to 7.76	7.61	7.33 to 7.89	0.43
Workless Household	7.57	7.28 to 7.85	7.08	6.74 to 7.42	0.002	

Table G.2 (continued): SSLP/MCS by demographic interactions - significant results with p values: Imputed data

Outcome Measure	Categories	Sure Start		MCS		P-value
		Estimated values (95% CI)		Estimated values (95% CI)		
Service Use	Child's Ethnicity	Estimated means	95% CI	Estimated means	95% CI	
Total Support Score						
	White	1.91	1.72 to 2.10	1.03	0.82 to 1.24	<0.0001
	Mixed	2.08	1.75 to 2.41	0.88	0.60 to 1.16	<0.0001
	Indian	1.46	0.91 to 2.02	0.57	0.09 to 1.05	0.004
	Pakistani	1.77	1.38 to 2.17	0.60	-0.03 to 1.23	<0.0001
	Bangladeshi	1.67	0.99 to 2.35	0.31	-0.20 to 0.82	0.0008
	Black Caribbean	2.26	1.75 to 2.77	0.86	0.06 to 1.66	0.002
	Black Other	2.16	1.80 to 2.51	0.85	0.20 to 1.50	0.0007
	Other	1.76	1.24 to 2.27	0.82	0.18 to 1.47	0.009

Appendix H: Results of Analyses including time of measurement

Table H.1: Estimated Effects of SSLPs, controlling for time of measurement – 3 years

Outcome Measures	Sure Start Main Effects [#] Complete data			Time of Measurement Effects Complete data			Sure Start Main Effects [#] Imputed data			Time of Measurement Effects Imputed data		
	Estimated Effect			Estimated Effect			Estimated Effect			Estimated Effect		
Physical Health	Odds ratio	95% CI	p	Coefficient	95% CI	p	Odds ratio	95% CI	p	Coefficient	95% CI	p
Children who had all immunisations	0.61	0.27 to 1.35	0.22	0.03	0.01 to 0.06	0.008	0.63	0.30 to 1.33	0.22	0.03	0.01 to 0.06	0.008
Children who had Accident(s)	1.55	1.07 to 2.24	0.02	-0.03	-0.04 to -0.02	<0.0001	1.29	0.89 to 1.86	0.18	-0.02	-0.03 to -0.01	0.0001
Child Cognitive and Language Development	Mean difference	95% CI	p				Mean difference	95% CI	p			
BAS Naming Vocabulary	-1.76	-3.57 to 0.06	0.06	0.06	0.00 to 0.12	0.05	-1.81	-3.50 to -0.13	0.03	0.05	0.00 to 0.11	0.05
Child Social and Emotional Development												
Child Positive Social Behaviour	0.45	0.09 to 0.80	0.01	0.00	-0.01 to 0.02	0.66	0.52	0.18 to 0.86	0.003	0.00	-0.01 to 0.01	0.91
Child Negative Social Behaviour	-0.01	-0.28 to 0.26	0.93	0.00	-0.01 to 0.01	0.58	0.02	-0.19 to 0.24	0.83	0.00	-0.01 to 0.00	0.48
Independence	0.32	0.05 to 0.59	0.02	0.00	-0.01 to 0.01	0.60	0.30	0.06 to 0.53	0.01	0.00	0.00 to 0.01	0.29
Parenting and Family Functioning												
Parenting Risk Index	-0.49	-0.82 to -0.16	0.004	-0.02	-0.03 to -0.01	0.0003	-0.81	-1.16 to -0.46	<0.0001	-0.01	-0.02 to 0.00	0.06
Home Learning Environment	2.52	1.32 to 3.72	<0.0001	-0.04	-0.09 to 0.00	0.05	1.96	0.81 to 3.11	0.0008	-0.02	-0.06 to 0.02	0.26
Father Involvement	-0.24	-0.66 to 0.18	0.26	0.01	-0.01 to 0.02	0.48	0.02	-0.31 to 0.35	0.91	0.00	-0.01 to 0.01	0.64
Maternal Well-Being	Odds ratio	95% CI	p				Odds ratio	95% CI	p			
Currently smoking	0.86	0.60 to 1.23	0.40	0.00	-0.01 to 0.02	0.41	0.82	0.60 to 1.12	0.22	0.01	-0.01 to 0.02	0.29
	Mean difference	95% CI	p				Mean difference	95% CI	p			
Life Satisfaction	0.31	-0.01 to 0.64	0.06	-0.01	-0.02 to 0.00	0.03	0.29	0.02 to 0.57	0.03	-0.01	-0.02 to 0.00	0.06
BMI	-0.24	-1.18 to 0.70	0.62	0.01	-0.02 to 0.04	0.53	-0.21	-1.01 to 0.59	0.60	0.01	-0.02 to 0.04	0.49
Service Use												
Total Support Score	0.77	0.50 to 1.03	<0.0001	0.01	0.00 to 0.02	0.10	0.90	0.67 to 1.12	<0.0001	0.00	-0.01 to 0.01	0.67
Local Area Measures												
Mother's Area Rating	0.15	-0.06 to 0.35	0.15	0.00	-0.01 to 0.00	0.24	0.11	-0.04 to 0.26	0.15	0.00	-0.01 to 0.00	0.61

[#] Effects are adjusted for child, family and area characteristics, strata and time of measurement
CI=Confidence interval

Appendix I: SSLP vs. MCS by demographic group interactions, strata 2-5

Table I.1: SSLP/MCS by demographic interactions - significant results with p values: Complete data, strata 2 to 5

Outcome Measure	Categories	Sure Start		MCS		P-value	
		Estimated values (95% CI)		Estimated values (95% CI)			
		Estimated means	95% CI	Estimated means	95% CI		
Child Social and Emotional Development Child Positive Social Behaviour	Child's Ethnicity						
	White	18.45	18.20 to 18.69	17.97	17.67 to 18.27	<0.0001	
	Mixed	18.39	18.03 to 18.76	18.59	17.73 to 19.46	0.65	
	Indian	18.30	17.61 to 18.98	18.67	17.91 to 19.42	0.42	
	Pakistani	18.07	17.67 to 18.47	18.14	17.51 to 18.76	0.84	
	Bangladeshi	17.97	17.38 to 18.56	17.45	16.18 to 18.72	0.43	
	Black Caribbean	18.38	17.86 to 18.90	19.46	18.20 to 20.72	0.10	
	Black Other	18.94	18.45 to 19.44	18.37	17.43 to 19.30	0.22	
	Other	18.06	17.59 to 18.52	18.02	17.06 to 19.98	0.94	
Parenting and Family Functioning Parenting Risk Index	Maternal Age at Birth of Child						
	Not teenage	5.06	4.85 to 5.27	5.98	5.76 to 6.21	<0.0001	
	Teenage (< 20 years)	5.03	4.78 to 5.27	6.49	6.18 to 6.80	<0.0001	
Father Involvement	Child's Ethnicity						
	White	8.66	8.49 to 8.84	8.73	8.53 to 8.94	0.30	
	Mixed	8.20	7.87 to 8.52	8.60	8.14 to 9.06	0.13	
	Indian	8.55	8.03 to 9.06	8.68	8.03 to 9.34	0.68	
	Pakistani	7.86	7.48 to 8.24	8.26	7.57 to 8.95	0.20	
	Bangladeshi	7.61	7.12 to 8.11	7.79	7.15 to 8.43	0.62	
	Black Caribbean	8.29	7.73 to 8.84	8.87	8.50 to 9.24	0.06	
	Black Other	8.51	8.05 to 8.96	8.35	7.43 to 9.27	0.75	
		Other	8.04	7.53 to 8.55	9.62	8.95 to 10.29	<0.0001
	Work Status Household						
Working Household	8.90	8.79 to 9.01	9.00	8.85 to 9.14	0.12		
Workless Household	9.11	8.94 to 9.28	9.62	9.26 to 9.98	0.007		

**Table I.1 (continued):
SSLP/MCS by demographic interactions - significant results with p values: Complete data, strata 2 to 5**

Outcome Measure	Categories	Sure Start		MCS		P-value
		Estimated values (95% CI)		Estimated values (95% CI)		
		Estimated means	95% CI	Estimated means	95% CI	
Maternal Well-Being Life Satisfaction	Household Deprivation					
	Above poverty line ⁺	7.57	7.38 to 7.76	7.76	7.55 to 7.97	0.01
	Below poverty line ⁺	7.54	7.33 to 7.74	7.51	7.28 to 7.75	0.80
	Lone Parent					
	Not Lone Parent	7.58	7.39 to 7.77	7.77	7.57 to 7.98	0.004
	Lone Parent	7.03	6.82 to 7.24	6.79	6.53 to 7.04	0.02
	Work Status Household					
	Working Household	7.57	7.38 to 7.76	7.81	7.60 to 8.01	0.0005
Workless Household	7.44	7.20 to 7.69	7.03	6.72 to 7.34	0.0006	
BMI	Household Deprivation					
	Above poverty line ⁺	26.06	25.48 to 26.63	25.62	24.96 to 26.28	0.04
	Below poverty line ⁺	25.89	25.32 to 26.46	26.17	25.43 to 26.90	0.36
Service Use Total Support Score	Child's Ethnicity					
	White	1.83	1.67 to 1.99	1.03	0.86 to 1.21	<0.0001
	Mixed	1.93	1.68 to 2.19	0.69	0.43 to 0.95	<0.0001
	Indian	1.79	1.20 to 2.38	0.46	-0.03 to 0.94	0.0002
	Pakistani	1.69	1.34 to 2.05	0.70	0.19 to 1.20	<0.0001
	Bangladeshi	1.55	1.09 to 2.01	0.67	0.24 to 1.09	0.0001
	Black Caribbean	2.00	1.63 to 2.38	0.66	0.14 to 1.17	<0.0001
	Black Other	2.32	1.96 to 2.68	0.33	-0.09 to 0.75	<0.0001
	Other	1.87	1.43 to 2.32	0.68	0.18 to 1.19	<0.0001

⁺Poverty line is £210 per week, taken from the financial year 2004-2005

**Table I.1 (continued):
 SSLP/MCS by demographic interactions - significant results with p values: Complete data, strata 2 to 5**

Outcome Measure	Categories	Sure Start		MCS		P-value
		Estimated values (95% CI)		Estimated values (95% CI)		
Local Area Measures		Estimated means	95% CI	Estimated means	95% CI	
Mother's Area Rating	Maternal Age at Birth of Child					
	Not teenage	3.91	3.81 to 4.01	3.94	3.83 to 4.06	0.48
	Teenage (< 20 years)	3.83	3.71 to 3.94	3.60	3.36 to 3.83	0.05
	Lone Parent					
	Not Lone Parent	3.91	3.81 to 4.02	3.96	3.84 to 4.07	0.33
	Lone Parent	3.90	3.78 to 4.02	3.77	3.59 to 3.95	0.12

Table I.2: SSLP/MCS by demographic interactions - significant results with p values: Imputed data, strata 2 to 5

Outcome Measure	Categories	Sure Start		MCS		P-value
		Estimated values (95% CI)		Estimated values (95% CI)		
		Estimated means	95% CI	Estimated means	95% CI	
Child Social and Emotional Development Child Positive Social Behaviour	Child's Ethnicity					
	White	18.47	18.22 to 18.71	17.90	17.62 to 18.19	<0.0001
	Mixed	18.45	18.08 to 18.82	18.45	17.74 to 19.17	0.98
	Indian	18.17	17.49 to 18.86	18.25	17.64 to 18.85	0.85
	Pakistani	18.11	17.66 to 18.55	18.06	17.44 to 18.68	0.88
	Bangladeshi	17.78	17.15 to 18.40	16.52	15.06 to 17.98	0.11
	Black Caribbean	18.44	17.91 to 18.97	19.25	17.82 to 20.67	0.27
	Black Other	18.93	18.40 to 19.45	18.71	17.85 to 19.57	0.63
	Other	18.06	17.58 to 18.53	18.26	17.20 to 19.31	0.72
Parenting and Family Functioning Parenting Risk Index	Child's Ethnicity					
	White	5.88	5.68 to 6.08	6.83	6.62 to 7.04	<0.0001
	Mixed	5.86	5.56 to 6.16	6.87	6.53 to 7.21	<0.0001
	Indian	5.52	4.93 to 6.11	6.86	6.32 to 7.41	0.0003
	Pakistani	5.36	5.02 to 5.71	7.16	6.62 to 7.69	<0.0001
	Bangladeshi	5.63	5.20 to 6.07	7.28	6.42 to 8.14	0.0004
	Black Caribbean	5.76	5.34 to 6.17	6.60	5.96 to 7.24	0.02
	Black Other	5.60	5.23 to 5.97	6.27	5.71 to 6.83	0.03
	Other	5.50	5.14 to 5.87	7.18	6.43 to 7.93	<0.0001
	Maternal Age at Birth of Child					
	Not teenage	5.88	5.68 to 6.08	6.86	6.65 to 7.07	<0.0001
Teenage (< 20 years)	5.91	5.67 to 6.16	7.30	7.00 to 7.60	<0.0001	

Table I.2 (continued): SSLP/MCS by demographic interactions - significant results with p values: Imputed data, strata 2 to 5

Outcome Measure	Categories	Sure Start		MCS		P-value
		Estimated values (95% CI)		Estimated values (95% CI)		
Father Involvement	Child's Ethnicity					
	White	8.68	8.51 to 8.86	8.69	8.49 to 8.88	0.96
	Mixed	8.21	7.90 to 8.53	8.60	8.07 to 9.13	0.18
	Indian	8.57	8.11 to 9.03	8.42	7.83 to 9.02	0.62
	Pakistani	7.82	7.46 to 8.18	8.16	7.58 to 8.75	0.20
	Bangladeshi	7.60	7.16 to 8.05	8.16	7.12 to 9.21	0.31
	Black Caribbean	8.21	7.68 to 8.74	8.91	8.08 to 9.74	0.14
	Black Other	8.49	8.05 to 8.93	8.26	7.49 to 9.02	0.55
	Other	7.98	7.51 to 8.45	9.06	8.34 to 9.77	0.007
Maternal Well-Being Life Satisfaction	Household Deprivation					
	Above poverty line ⁺	7.56	7.38 to 7.74	7.72	7.52 to 7.91	0.03
	Below poverty line ⁺	7.52	7.33 to 7.71	7.46	7.23 to 7.70	0.55
	Lone Parent					
	Not Lone Parent	7.57	7.39 to 7.74	7.70	7.51 to 7.90	0.04
	Lone Parent	7.03	6.83 to 7.23	6.82	6.56 to 7.08	0.06
	Work Status Household					
Working Household	7.56	7.38 to 7.73	7.74	7.54 to 7.93	0.008	
	Workless Household	7.43	7.20 to 7.67	7.09	6.82 to 7.37	0.002
Total Support Score	Child's Ethnicity					
	White	1.82	1.67 to 1.97	1.00	0.84 to 1.15	<0.0001
	Mixed	1.95	1.69 to 2.20	0.83	0.59 to 1.07	<0.0001
	Indian	1.67	1.17 to 2.17	0.44	0.00 to 0.88	0.0001
	Pakistani	1.72	1.38 to 2.07	0.44	-0.16 to 1.04	<0.0001
	Bangladeshi	1.52	1.07 to 1.96	0.34	-0.14 to 0.81	<0.0001
	Black Caribbean	2.02	1.67 to 2.36	0.82	0.34 to 1.29	<0.0001
	Black Other	2.27	1.94 to 2.61	0.48	0.07 to 0.89	<0.0001
	Other	1.82	1.42 to 2.21	0.74	0.09 to 1.39	0.005

⁺Poverty line is £210 per week, taken from the financial year 2004-2005

Copies of this publication can be obtained from:

DfES Publications, PO Box 5050, Sherwood Park, Annesley,
Nottingham, NG15 0DJ; Tel 0845 6022260; Fax 0845 6033360;

Textphone 0845 6055560; E-mail <mailto:dfes@prolog.uk.com>

Please quote reference: NESS/2008/FR/027

© Her Majesty's Printer and Controller of HMSO 2008

ISBN: 978 1 84775 103 4