WIDER BENEFITS OF LEARNING RESEARCH REPORT NO.10

A Model of the Inter-generational Transmission of Educational Success

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Centre for Research
on the Wider
Benefits of Learning

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The Centre for Research on the Wider Benefits of Learning (WBL) was established in 1999 by the then Department for Education and Employment, now the Department for Education and Skills (DfES). The Centre's task is to investigate the social benefits that learning brings to individual learners and to society as a whole. The views expressed in this work are those of the authors and do not necessarily reflect the views of the Department for Education and Skills. All errors and omissions are those of the authors.

Executive Summary

Purpose of the report

The intergenerational transmission of educational success is a key driver of the persistence of social class differences and a barrier to equality of opportunity. Although each child should be supported to achieve his or her objectives, differences in the capabilities of families to take advantage of educational opportunities exacerbate social class differences and limit actual equality of opportunity for many. Understanding the causes of this transmission is key to tackling both social class inequality and to expanding the skill base of the UK economy.

This report provides a review of the role of parental education in child development, particularly though not exclusively in terms of school attainments.

Parental education is a major influence both directly and via other channels such as income and parenting skills. However, there are many other important elements. These factors and the interactions between them are comprehensively reviewed in this report. Part of the effect of parents' education is in moderating the effects of other elements.

A theoretical framework

To structure our presentation of the theory and evidence we draw on the multilevel ecological model of developmental psychology. This provides a framework for presenting ideas not just from psychology but also from economics and other social sciences. It also enables a focus on the interaction between factors.

The framework has at its centre interactions between parents and children, in which dynamic processes support, sustain or hinder successful development. These processes are termed 'proximal' in the ecological model.

These processes are constrained and influenced by the characteristics of the family. Factors such as mental health, parents' beliefs and the availability of resources influence the more proximal interactions between parents and children.

These characteristics are themselves influenced by more distant social, economic and demographic features such as parental income, family structure and the education of parents. These factors are termed 'distal' in the ecological model.

Other contexts beside the family are also important. Contexts such as schools, pre-schools and neighbourhoods provide channels for effects of family background and so contribute to the intergenerational transmission of educational success.

Therefore, this framework sets up three essential categories for effects of families on children's development, namely proximal processes, characteristics of contexts and distal factors.

For each set of factors we present and evaluate the evidence suggesting:

i. an effect of parental education on the factor;

ii. an effect of the factor on children's development.

In this way we lay out the evidence to ascertain:

iii. which factors are most important;

iv. how such factors channel the effect of education, in part;

v. how the different factors interact.

The important influences on attainment

The most important socio-demographic, family-level, *distal* influences on children's attainments are parental education and income. Occupational status is also important, although the channels for the effect of occupation are less clear-cut. Family size is another important factor.

Other much-studied risk factors such as family structure and teen motherhood can have important indirect effects if occurring in combination with other factors but are not major influences in themselves on the overall distribution of attainment in the general population. Similarly, maternal employment is not a key factor provided quality pre-schools are is available.

Besides pre-schools, other important contexts for influences on attainment are provided by neighbourhoods and schools. These can mitigate or offset the impact of family-level factors in a substantial way.

The *characteristics* of families either have independent effects on attainment or are the mechanism for the effect of the socio-demographic factors. Parental beliefs, values, aspirations and attitudes (termed here 'cognitions') are very important, as is parental well-being.

In turn, *proximal* interactions between parents and children mediate the effects of the factors mentioned so far. Parenting skills in terms of warmth, discipline and educational behaviours are all major factors in the formation of school success. These factors are mechanisms for the effects of the family and can offset or exacerbate the influences of family characteristics and circumstances.

We find strong theoretical and empirical support for the view that education influences most of the factors that have been found to affect children's attainments. Thus, the role of education is extremely substantial. As well as having a direct influence on most of the key characteristics and parent-child interactions, parental education can also moderate the effects of risk factors and ease the effect of them on interactions between parents and children.

Although there is good evidence of the role of education in individual links in the complex picture of causality described, there are two particular evidence gaps in terms of: (i) simultaneous assessment of the role of education in the whole framework, and, (ii) the identification of causality in the relationships observed.

Conclusions

We conclude that the intergenerational transmission of educational success is a key element in equality of opportunity. There are substantial benefits of education that accrue to individuals and society in terms of what education enables parents to pass on to their children.

Understanding the way in which the features of the model interact can help in ensuring that policies run in sync with developmental processes and interactions between contexts rather than operating in opposition to these wider forces. The ecological model presented here is an example of the kind of holistic perspective that may help in these policy formulations.

Acknowledgements

We would like to thank all members of the WBL team and also Sue Stone (DfES) for helpful comments and suggestions. The report has also benefited from comments during presentations to the WBL Family Strand Advisory Panel (January 2004), at the Thomas Coram Research Unit (March 2004), a DfES Advisory Panel on research in early years and schools (March 2004), a WBL seminar at the Institute of Education (April 2004), and at the DfES (May 2004). We are also grateful to Pamela Davis-Kean and Katherine Magnusson for their advice. Simon Hayhoe provided helpful information and discussion in earlier versions of the work. We would also like to thank Ceri Hollywell for her administrative assistance in the preparation of this report.

Contents

Introduction

1.1. Overview

This report considers theory and evidence on the inter-generational effects of parents' education on children. We focus particularly on the role of parents' education but do so within a framework that recognises the importance of a multitude of other factors. We provide a coherent structure within which to assess (i) the role of each factor; (ii) the interactions between factors and (iii) the role of parents' education within the overall framework of influences on children's development.

This general framework is drawn from the work of developmental psychologists, most notably Bronfenbrenner (1979, 1986; Bronfenbrenner & Crouter, 1983). The great advantage of the framework is that it enables a focus on relationships between the many important factors rather than a simple list of important influences. This ecological perspective also provides a framework within which to nest economic perspectives together with those from other disciplines. One objective has been to present the valuable perspectives described in the developmental literature to those more versed in the sociological and economic literature and vice versa.

The paper fits within two wider concerns: (i) to understand the processes involved in the inter-generational transmission of opportunity generally and (ii) to evaluate the effects and importance of education. The focus in the paper is on the benefits for children of parents' education. The reverse interaction and other inter-familial relations are also important but are not assessed here. Furthermore, our main focus in this paper is on the prior learning of parents rather than adult or family learning, although there are important relations between the two and the model developed here will be very relevant for future work on family learning.

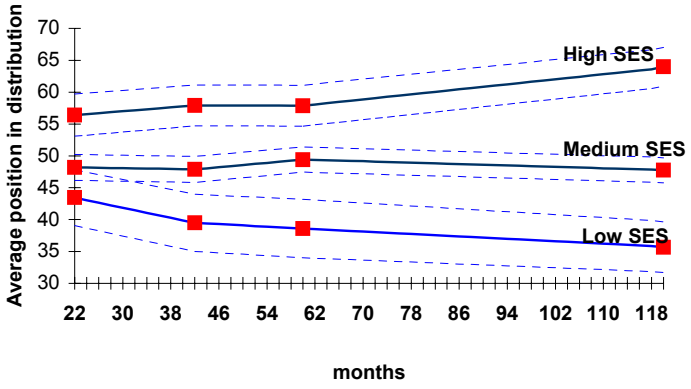
1.2. The attainment gap

The relation between family social class and children's academic development is well known and fairly universal, although with varying degrees of gradient across countries (Unicef, 2002). Evidence for the UK suggests that the social class gradient kicks in significantly before children enter school (Feinstein, 2003) suggesting that family contexts are particularly important in explaining educational disadvantage. Indeed, it has been estimated that upwards of 50% of the variance in such attributes as cognitive development as measured by IQ tests is predictable from levels of functioning in the first three years of life (Bloom, 1964). Although there is strong evidence from behavioural genetics to suggest that a proportion of this is due to genetic differences it is also clear that environments play a substantial and relevant role (Collins et al. 2000; Rutter, 1997).

This report examines the role of parental education and learning in this inter-generational transmission of attainment. The distinctions between education and learning are discussed below (1.5.10). Social class is about much more than just

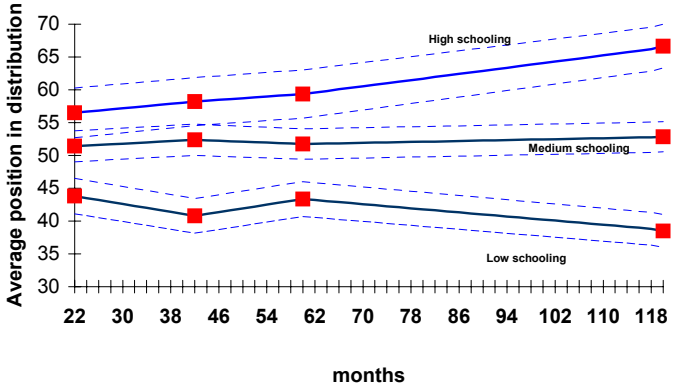
education but it is also the case that if one stratifies children by parental education rather than traditional occupational measures of social class the attainment gradient is every bit as steep. This is shown in Figures 1 and 2, reproduced from Feinstein (2003).

Figure 1: Average rank of test scores at 22, 42, 60 & 120 months, by SES of parents



Dotted lines represent intervals of two standard errors. The definition of categories with sample observations are as follows: High SES – Father in professional/managerial occupation and mother similar or registered housewife (307 obs.) Low SES – Father in semi-skilled or unskilled manual occupation and mother similar or housewife (171 obs.) Medium SES - Those omitted from the high and low SES categories (814 obs.) Thus, children whose mothers were housewives were categorised by the SES of fathers.

Figure 2: Average rank of test scores at 22, 42, 60 & 120 months, by schooling of parents



Dotted lines represent intervals of two standard errors. High schooling denotes families where both parents have A Level or higher (474 obs.) Low schooling denotes families where neither parent has qualifications (226 obs.) Medium schooling denotes those omitted from the high and low categories (592 obs.)

Source: Feinstein, L. (2003) *Economica,* 73-98.

This suggests that the same common features underlay the attainment gap however one stratifies parental background. Important gradients also exist in terms of other aspects of family background such as family structure, income, neighbourhood or age of mother (Haveman & Wolfe, 1995; Hobcraft, 1998, Hobcraft, 2003). Yet because

the education of parents is also known to impact on all these features of family life there is reason to suppose that education plays an important and particular role in the inter-generational transmission of academic attainment.

There is substantial evidence that children's education level and cognitive development are positively related to the education of their parents (Wolfe & Haveman, 2002). Whether the father or the mother left school before age fifteen has a negative effect on the probability that the young person will stay on at school beyond the minimum age required (Bynner & Joshi, 2002; Feinstein et al*.,* 1999; Gregg & Machin, 2000). Other evidence shows that mother's educational qualifications are positively related to children's maths and reading test scores (Gayle et al*.,* 2002; Hanson et al*.,* 1997; Hill et al*.,* 2001; Joshi & Verropoulou, 2000; Smith et al*.,* 1997).

The features of family background described so far are routinely considered in economic, sociological or demographic approaches to the attainment gap. Yet in branches of the psychological literature another set of factors has also been the focus of important study. There, a focus on features of parenting has emphasised the effects of parenting styles and the nature of interactions between parents and children as important determinants of children's attainment. That literature has also examined the attainment gap in psychological and behavioural development, another aspect of inequality with implications for the lifecourse and also an aspect of the wider benefit of parental learning.

So, the topic of inter-generational transmission is broad and diverse and has been approached in different disciplines, with different methodologies, addressing subtly different research questions. Even within disciplines, authors adopt different empirical strategies. Researchers have used a great many different models to explore the influence of family background on children's development. These different models control and test for different factors, in different combinations, in different datasets. Sometimes parental education is modelled as a key causal variable, sometimes as a mediating factor, sometimes as a control.

Much relevant literature has focused not on the inter-generational transmission of learning but on one or other important link in the chain of transmission. For example, Guo and Harris (2000) model the effect of income on attainment, entering parental education as a control (see 6.3). In many of their specifications, the effect of parental education often actually proves bigger than the effect of income but since parent education is not their focus the actual effect, its role and its size, is rather underplayed.

Therefore, in order to understand, model and quantify the role of education in inter-generational transmission it is helpful to use a framework that can place these different strands of research in a common context and so enable some assessment of the relative importance of the different features.

In this introductory section we describe our hypotheses about how and why parental education impacts on children's attainments. To clarify these hypotheses and to structure the summary of the very diverse literature reviewed we draw on a

framework from developmental psychology. Subsequent sections of the report describe the available evidence within this framework. Key concepts are described in section 1.3 in this introductory section. These concepts are then applied to the question of the effect of parental education in 1.4 in which our hypotheses are summarised. Some of the limitations of the model are considered in 1.5. These wider issues are important. We discuss:

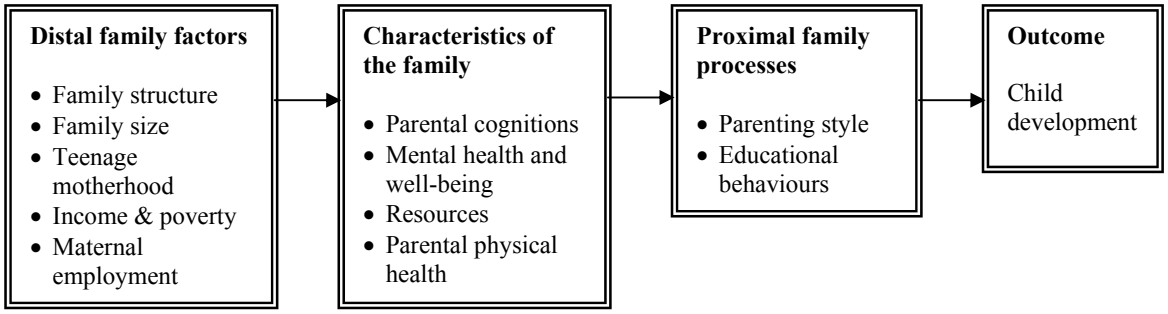
i. The importance of contexts other than the family;
ii. The multi-dimensionality of development;
iii. The importance of social and historical context;
iv. Compounding risk;
v. The problem of identifying policy implications;
vi. Dynamic modelling and the agency of children;
vii. The importance of social class;
viii. The definition and meaning of education;
ix. Representativeness and causality;
x. An alternative approach – the capitals framework;
xi. Problems in the integration of approaches from economics and psychology.

1.3. Distal and proximal factors

The framework we propose to use is based on a distinction between 'proximal' and 'distal' processes, a distinction that has its origins in developmental psychology, more specifically in ecological models of development (e.g. Bronfenbrenner, 1979, 1986; Bronfenbrenner & Crouter, 1983). This distinction is generic in that it can be applied to any topic but the precise meaning of the distinction depends on the context in which it is being applied. For example, in assessing the link between indices of parental social class and children's attainments in school, social class is a distal factor if one hypothesises that there are important mediating factors that explain the raw, distal correlation. These mediating factors can be thought of as pathways, interceding reasons why the distal factor exerts an influence on the outcome. Proximal factors are those mediating elements. These are factors closer to the lived experience of the child that impact directly on attainment, factors in the example such as the instruction provided by a teacher, parental emphasis of the importance of learning, being read to and so on. What is proximal and what is distal is entirely contextual.

For our purposes we have distinguished between three categories of environmental context measures: distal factors, characteristics within the family and proximal processes within the family (Gottfried & Gottfried, 1984; Gottfried et al*.,* 1994). These are shown in Box 1. Within each box the component factors that are discussed in this paper and suggested as key are itemised.

Box 1: Conceptual model for the related influences on child development



Distal factors refer to the more global or descriptive aspects that characterise the environment and provide an index of a family's demographic or socio-economic situation. Examples of distal variables include income or parents' occupation. Characteristics within the family are more closely related to the environmental factors that impact on children. Here important factors include the availability of cognitively enriching and stimulating materials and activities, parental attitudes, network supports and the physical infrastructure of the home. The notion of characteristics of contexts differs from the notion of distal factors in providing a more substantive measure of the child's immediate environment.

Context is the location and/or institutional grouping within which particular sets of processes occur. In childhood the key contexts are family, pre-school settings, schools, peer groups and neighbourhoods. These contexts are conceptualised as being developmentally appropriate (i.e. constructive) or inappropriate (destructive). Constructive environments are taken as being positively and destructive environments negatively, associated with child development. These environments are, in turn, related to patterns of achievement, behaviour, motivation and mental health of the whole person.

The final category of environmental measure is family process. By the term 'process' we refer to the actual interactions experienced by the child. Process is the most proximal element in the model as it refers to the day-to-day life of the child. Examples of family process variables include aspects of parent-child relationships such as warmth and affection, the use of discipline, control and punishment, as well as the educational content of language use in the home environment.

An important capability of this model is that it can be used to nest all the disparate literature within one framework. It also helps clarify how factors interrelate and so provides a structure for the analysis of the importance of education, as a specific distal factor.

The emphasis is not new. As far back as 1929, Van Alystne conducted pioneering research on the relationship of the home environment to the intelligence of three-year olds (VanAlystyne, 1929; see also Skodak, 1939). Since then distal and proximal

factors have been found to contribute uniquely and additively to the prediction of child development, for an early example of this see (Whiteman et al., 1967). Using a Deprivation Index of proximal home environment factors such as engaging in dinner conversation and exposure to cultural activities, the authors found that this index and one of socio-economic status each contributed independently to depressed IQ scores of inner-city elementary school children.

It is not implied that a specific factor (distal or proximal) causes a given child outcome through a unique one-way causal pathway that would operate for all parent child dyads with those specific aspects of an environment. Rather, there is a complex process of interaction between children and contexts.

The attention to proximal factors as the most central elements of the framework does not relegate distal factors or indicate a lower concern for their importance. Some aspects of the social class attainment gap may be explained by the proximal factors and characteristics of the family but that does not mean that the class effect is not real. Rather, this framework helps in understanding the elements of the class effect and the interactions between them.

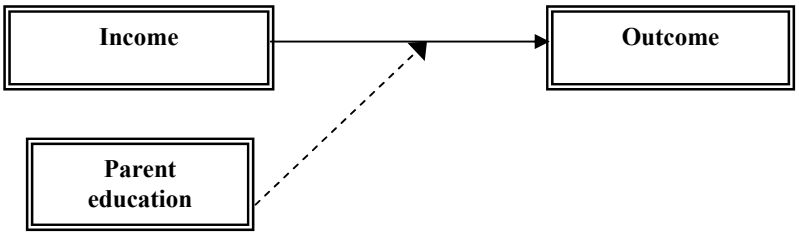
1.3.1 Mediation and moderation – some definitions

Aspects of this framework are modelled in statistical analysis in terms of mediation and moderation. For clarity it may be helpful to offer brief definitions.

Let us take the example of the effect of income which as we describe below acts as a distal factor, impacting on the outcome of child development. If the reason or channel for that effect is that income buys resources which are productive for child development, including good housing, nutrition, books and so on, then we can say that these resources mediate the effect of income. The mediator is the channel or mechanism for the effect. There may be other important mediators. In Box 1 characteristics of the family and proximal processes mediate the effects of the distal factors on child outcomes.

Now if we hypothesise that education changes the nature of the effect of income in that those with more education might spend more of their income on developmentally enhancing resources then we say that education moderates the effect of income (Box 2).

Box 2: Conceptual model for the moderating influences of parental education on income



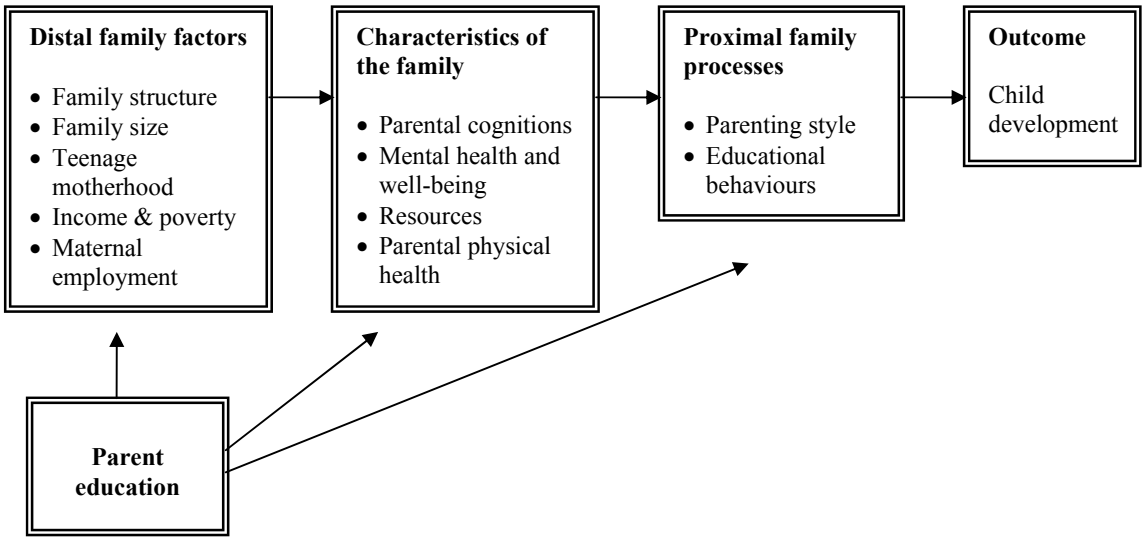
For those more familiar with the language of applied analysis a moderating effect is equivalent to an interaction effect.

1.4. A conceptual model of the inter-generational transmission of learning

We referred above to evidence suggesting a causal link between parents' education and the attainments of children. The studies referred to treat education as a distal factor like others. The objective of this paper, however, is to explore and model the more complex relationships underlying this distal connection.

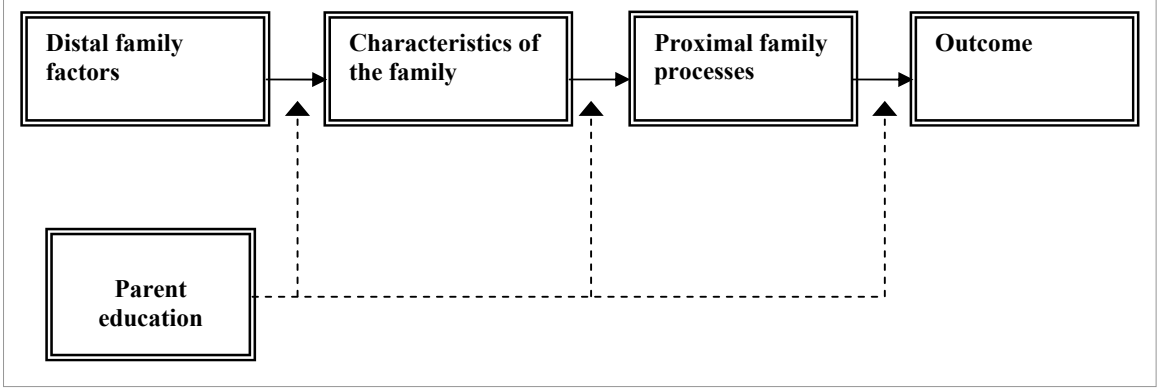
Box 3 lays out a model for the effect of parents' education on child development. It describe our hypotheses about how parental education impacts on family processes and hence development both directly and indirectly through other mediating distal factors and/or via important characteristics of contexts and proximal processes.

Box 3: Conceptual model for the mediating effects of parent education on child development



There are two types of channels for effects of parents' education. Parents' education matters because: (i) it impacts on other important factors (Box 3) and (ii) it moderates the effects of other important factors (Box 4).

Box 4: Conceptual model for the moderating influences of parental education



This double impact operates for each type of factor. To clarify the discussion of these relationships we start with income as an example of a distal factor. The discussion is at this point entirely conjectural. In subsequent sections of the paper we assess the nature of the links proposed both in terms of their theoretical foundations and empirically. Here, the focus is on clarifying hypotheses rather than evaluating them.

First, the direct effect; parents' education has a direct effect on family income. Therefore, some of the effect of income is, in a sense, an effect of prior parental education. Secondly, the moderating effect: family income influences child

development through its impact on the more proximal characteristics experienced by the child such as good housing, toys, better schools and so on. These resources are bought with income and thus mediate the income effect. Yet the nature of this effect may depend on the parents' level of education. Parents with higher levels of education may spend income differently to those with lower education and so be better able to protect children against the effects of poverty or derive greater developmental advantages from high income. Similar relationships are proposed for education and each of the other distal factors.

Turning to family characteristics, the same double effect of parents' education may apply. Education may influence mental health and well-being, thus having indirect effects on children's developmental outcomes. Education may also help parents protect children against the impacts of ill-health or low levels of parental well-being, thus moderating the effects of those characteristics on children.

Finally, in relation to proximal processes, there are again sound foundations for the view that education will have the same double effect. First, education may improve the likelihood of parents reading to their children, for example. It may also be that education moderates the effects of proximal processes impacting, in the same example, on the way parents read to children or on their choice of book and thus moderating the nature of the developmental benefit for the child.

To conclude, we hypothesise that parental education is transmitted inter-generationally through six pathways:

i. by impacting on key distal factors such as income and poverty;
ii. by moderating the effect of each distal factor, i.e. acting protectively and providing resilience in the family;
iii. by impacting on the characteristics of contexts and hence on proximal processes;
iv. by supporting individuals and families in managing a set of characteristics and hence moderating the effect of characteristics;
v. by impacting on proximal processes such as learning behaviours in the home;
vi. by moderating the effects of proximal processes, changing the nature of their influence.

In the following sections we describe these processes in more detail and discuss the evidence on the inter-connecting links. However, the moderating role has not been much researched and so we do not pursue it further here save for some remarks in the concluding section. We focus instead on the indirect effects of education that operate via the other factors at the different levels.

Sections 2, 4 and 5 work outwards from the child's immediate environment and consider the family proximal processes, characteristics within the family and distal factors, respectively. Section 3 outlines the importance of other contexts and their

possible interactions with one another. For each, we lay out the key factors identified in the literature and focus particularly on the indirect effect hypotheses i., iii. and v., assessing the extent to which theory and evidence suggests that each factor is:

i. influenced by prior parental education;

ii. an important determinant of child development.

For each key factor we provide a summary that indicates the strength of the effect from theoretical perspective and from the evidence as well as an assessment of the extent to which the evidence has been able to identify the relevant causal link.

Finally, in section 6, we summarise the key evidence and evaluate the implications of parental education for the outcomes of children, an aspect of the inter-generational transmission of advantage and of the general formation of capability. We also describe some recent investigations into interactive effects across the model, using structural equation modelling, that have attempted to test the extent to which hypothesised proximal processes do mediate the effects of distal variables on outcomes. This strand of research attempts to test more complex aspects of the overall model of transmission.

1.5. Caveats, limitations and alternative perspectives

1.5.1 The importance of contexts other than the family

The focus on parents' education in this paper necessarily places an emphasis on the family context as a fundamental locus of interactions relevant to the developing child. However, we do not neglect schools, neighbourhoods and other important contexts. As we discuss below, the family is not independent of other contexts and there are vital interactions between contexts that are fundamental to the ecological model. Section 3 is an important part of this paper as it considers how other contexts act as channels for the effects of parents' education.

1.5.2 The multi-dimensionality of development

The paper aims to bring together theory and evidence on the effects of the diverse sets of factors in the ecological model. However, much of the evidence on distal factors has focused on school attainment and rather less on other domains of development. This is particularly so of the economic literature which has a strong interest in human capital. Therefore, whereas the parenting literature, for example, has an explicit concern for development defined more broadly than success in school exams or cognitive development, this is less so of the literature on the effects of family background. Yet wider skills are strongly linked to adult life opportunities (Feinstein & Bynner, 2003), which are recognised as sources of productivity benefit (DfES, 2003) and of social exclusion (UK Social Exclusion Unit, 1998). Therefore, we do not restrict our attention to cognitive development. There is a broad range of other outcomes that may be of interest for different theoretical and policy concerns, including: intelligence, educational achievement, social competence, behavioural

functioning, temperament, well-being, life skills, engagement and others (see Eccles & Gootman, 2002; Gottfried et al., 2003).

There are important differences in the way family factors influence the different domains of development and one cannot assume that if, for example, parental income impacts on school test scores it will also impact on behaviour or temperament. Unfortunately, there is a large evidence gap in regard to these relative differences in the nature of effects on different domains. The ecological model is sufficiently general that it can be applied to all aspects of development but we do not have detailed evidence on how the model works for all possible outcomes. In this paper, therefore, there is discussion at times of development generally and at times of outcomes defined more specifically. The important distinctions in the relevant processes are left to subsequent work.

1.5.3 The importance of social and historical context

As well as spending time in different institutional or environmental contexts, children live within specific historical or social contexts that will also moderate the nature of their experiences and the effects of them on development. Much of the analysis described in subsequent sections ignores this social and historical contingency. This is not so much a problem in relation to the conceptual framework as in regard to the evidence presented. Although the ecological framework could be applied to any type of social grouping in which children live, at any historical era, the precise estimates of effects or pathways are contingent on time, place and social context.

In places we have been regrettably dependent on US evidence which is particularly strong in methodological and measurement terms but context-dependent. In the sphere of parent-child relations the underlying issues may be more universal than for more localised issues such as education systems. There are, therefore, reasons to view this evidence as relevant to the UK context. However, because of recent and on-going investments in large sample UK data collection and analysis (such as the Millennium Cohort, the survey of the children of the 1970 Birth Cohort, the Effective Provision of Pre-School Project and the Avon Longitudinal Study of Parents and Children) future reviews will have more UK evidence to draw on.

1.5.4 Compounding risk

It is well established that children are vulnerable to adverse social and economic circumstances. But children react differently to the same biological or environmental risks. Early experiences, whether good or bad, do not determine an invariant life path. For example, in Werner and Smith's (1992) longitudinal study of high risk children, one third had made satisfactory life adjustments by adulthood, despite being born into highly disadvantaged circumstances. Why is it that some individuals succeed despite the odds, breaking cycles of poverty and deprivation (Clarke & Clarke, 2000; Elder et al., 1991) , while others from privileged backgrounds struggle to do so?

Theories of risk and resiliency consider why children are likely to show diminished well-being in the face of certain negative biological and environmental conditions (Bynner, 2001; Garmezy, 1985, 1993; Werner, 1989). Fundamental to the notion of risk is the predictability of life chances from prior experience and circumstances. This is expressed through the concept of a 'risk trajectory', wherein one risk factor reinforces another, leading to increasingly restricted outcomes in later life (Rutter, 1990b). A recent study by Schoon et al. (2002), for example, investigated the extent of continuity of socio-economic disadvantage from birth to mid-adulthood and the maintenance of academic adjustment in the face of this risk. Similarly, Sameroff et al (see Gutman et al., 2002; Sameroff et al, 1998) have investigated the impact of cumulative risk factors on children's development and have shown that while there are significant effects of single risk factors, most children with only one risk factor would not end up with a major developmental problem. It is the compounding of risk that is most damaging, in the sense that the presence of more risk factors is related to a higher probability of negative outcomes. In a comprehensive review of the effects of biological, psychological and social influences on development, Wachs (2000) concluded that no single factor was sufficient to explain developmental outcomes and that only the study of multiple influences simultaneously would produce reasonable explanatory power.

Protective factors however, may impede or halt risk and risk trajectory processes, promoting resiliency and enabling the child's life to move in positive directions (Garmezy, 1985, 1993). Protective factors work on the more malleable components of development, such as the emotional, educational, social and economic influences. These operate alone as well as more commonly interacting with each other. They reflect the different kinds of resources that may help the child to resist adversity. Thus, for example, strong parental attitudes and aspirations as well as sustained encouragement and commitment to children by the schools they attend, may override some of the worst effects of poverty and disadvantage.

In the same way as risk factors reinforce other risk factors, protective factors can also have a cumulative effect. Individuals from more privileged homes for example, often have more educational opportunities, greater access to financial resources when they are needed (e.g. to pay for higher education), more positive role models, greater occupational knowledge and better established informal/kinship networks (Schulenberg et al., 1984).

We hypothesise that parental educational success acts as a protective factor for children's development, while lower levels of parents' prior educational attainment operates as a risk factor. Thus children of more educated parents will tend on average to benefit from warmer, more supportive parenting, live in safer neighbourhoods with better institutional resources and more positive role models, be placed in higher quality pre-schools and attend more successful schools. In addition to the effects of these specific individual factors, the interactions between them are vital. The role of parental education in the inter-generational transmission of life opportunities and

outcomes will differ depending on the combinations of circumstances and risk experienced by the child.

1.5.5 The problem of identifying policy implications - education is not the only thing that matters

Thus, education does not act on inter-generational transmission in isolation from other factors. This report lays out the mechanisms for the effects of a host of distal and proximal factors on child development and focuses on them in part as channels for effects of education. This is not to suggest that these other factors do not have importance independently of education. Education may impact on income and so some of the effect of income may be thought of as the channelling of the effect of education but that is not to subsume the whole income effect under the heading of education. A large component of family income is independent of parents' education and even to the extent that income mediates the effect of education this can still be conceptualised as an income effect. In policy terms it may be that an increment to income is a more effective policy tool than attempted increments to education even if income mediates education effects. We return to these important issues in the conclusions.

However, even conditioning on income, empirical investigations tend to find that the effect of parental education on children's attainments is at least as great as the effect of income. Our aim is not to denigrate the significance of income but to support a more balanced view that recognises that many factors are important in the development of ability. We also highlight the value of the ecological framework as a structure for assessing the interactions between the different factors and assessing the relative importance of each.

We have also hypothesised that education is a key moderator of the effect of each individual factor. However, we recognise that there are other important moderating factors. Education changes the way family resources impact on children but so do ethnicity and class. Resources may be allocated in different ways for boys and girls. These moderating effects may apply to all of the factors that impact on attainment so that the whole model of effects may be different for children of different ethnicities, class backgrounds or gender.

This model is put forward here as an aid to policy makers in better understanding the mechanisms for the inter-generational effects of education. However, the focus on education should not be taken for the claim that education is the only important factor or the only factor with such wide-ranging influences. That is certainly not the claim being made here.

1.5.6 Dynamic modelling and the agency of children

Children are themselves important determinants of their own academic and psychological development. The static model presented in this paper ignores these dynamic elements and so neglects somewhat the agency and resilience of children. It

is important to recognise that children themselves are a key part of the process of transmission. In economic terminology the educational attainment that may be considered to be an outcome at say, age 6, becomes an input when one is investigating the determinants of attainment at age 10.

This dynamic element to the process is extremely important as it reflects the ways in which children internalise contexts and processes and the ways in which inter-generational educational immobility asserts itself. This is also the process of maturation. Through childhood and as children become adults they start to choose contexts and influence interactions more and more strongly. Even in infancy, proximal processes are dynamic and trans-personal but this element of individual autonomy becomes stronger with maturation and this is reflected in more sophisticated versions of the model we adopt.

1.5.7 The importance of social class

The attainment gap discussed above is generally considered in terms of a social class difference in attainment. Yet here we focus on the role of education and other specific distal and proximal factors. We do and do not address class explicitly as a single distal (or proximal) factor.

Social class is a complex notion. It is not equal to education or to income or socio-economic status (SES). Elements of social class may include income, education, occupation and cultural capital, but even together these factors do not sum to social class. Social class is in some ways a relational and positional measure. It exists in the distribution of assets and advantages across society and not at the level of the individual. It varies in different societies in its rigidity and effect and in the extent to which it is mediated by income or the other factors mentioned.

Most empirical results suggest that the association between socio-economic status – a proxy measurement for social class – remains significant after controlling for education and income. Replication of results has been consistent in measuring the positive relationship between class and children's educational attainments. The mediating factors in the relationship between class and developmental outcomes over the life course are still subject to analysis. Feinstein and Symons (1999) found that parental interest in their children's education explains the variance on attainment otherwise explained by social class, parental education or family size. Sacker et al. (2002) stated that at age seven and age eleven parental social class is mediated by material deprivation, but by age sixteen the effect of class is mainly mediated by the school context. Sullivan (2001) found independent effects of social class on children's GCSE attainment even when cultural capital of parents and the child is included in the analysis. The role of class then may be mediated by characteristics of context such as values and aspirations (see section 4.2).

Because of the complexity in the notion of class we choose not to reduce it to a single factor. The factors such as income, education and occupation that we do address might be seen in combination to create or underpin social class. In this sense, the

analysis provides a breakdown of the factors and processes and their inter-relationships that bring about the social class attainment gap. However, this does not reflect a view that social class is not important.

Neither does it reflect a view that social class can be reduced to education or to any of the other individual factors considered. Moreover, we recognise that a class-based perspective would offer a different analysis of the role of education.

1.5.8 A 'capitals' model

An alternative approach to the problem of why and how education impacts on children's attainment could be offered by a focus on 'capitals'. This approach would consider parental education as a proxy measure of parents' human capital, an asset which is productive in the production of children's attainment alongside other capitals which have all been mooted and/or tested as supportive of the development of attainment, such as social capital (Coleman, 1988), financial capital (Bynner & Paxton, 2001), cultural capital (Bourdieu, 1984) and identity capital (Côté & Levine, 2002).

There are many strengths of the capitals model and it has been usefully applied in many important papers as well as in previous work undertaken at the Centre for Research on the Wider Benefits of Learning (Schuller et al*.,* 2004).

However, the advantage of the developmental perspective adopted here is that it explicitly focuses on the relationships between elements and since an essential aspect of the role of education is the way it mediates and moderates other factors we see a great advantage to an approach that makes these processes explicit. Moreover, many aspects of a capitals approach can be modelled within this multilevel developmental approach, for example social capital and cultural capital.

Social capital

Section 3 of the report describes the effects of extra-familial contexts such as schools and neighbourhoods on child development. The strength of the interactions between these different contexts can be thought of as social capital.

Cultural capital

Another example is in relation to cultural capital, the impact on educational attainment of this has been investigated by Sullivan (2001). She uses primary data collected on 465 pupils in their final year of compulsory education in England. Parental cultural capital includes reading, newspapers taken, types of music and radio station listen to, participation in formal culture (visits to museums) and the subjects discussed by parents in the home. Sullivan finds that parental cultural capital mediates the effect of parental education and class on achievement. The overall effect of parents' class on pupils' GCSE attainment is reduced by 30% and the overall effect of parental education is reduced by 60% when measures of parental cultural capital are included in statistical analysis. We note that these aspects of cultural capital are

considered in this report under the heading ‘proximal process’, in particular as home learning.

Another element of cultural capital is ease and familiarity with the typically middle class environment of schools. This matching of child and family to school is considered in this report in section 4 on characteristics of context.

1.5.9 Integration of economic and psychological approaches

Another advantage of the approach adopted is that it enables us to integrate studies from a number of disciplines, in particular studies of distal factors from economics alongside studies of proximal processes from psychology. These studies tend to have quite different theoretical and methodological foundations but as we discuss in section 5 on distal factors the developmental model can nest both approaches.

The application of the economic model to children’s attainment derives from Becker (Becker, 1973) and a tradition which considers how children’s educational attainments can be modelled on the basis of an analogy between the family and the firm. In this model, the family can be figured as a production unit, producing the basic goods of family well-being such as health, consumption goods and the successful development of children on the basis of the allocation of the time of the productive members of the family in the relevant production processes.

Inputs are allocated in such a way as to produce that set of outputs that maximises the utility of the decision-making family members subject to the constraints of the family which are constraints of time, wealth and of their ability to produce the desired outputs.

In this sense parents can choose to influence children’s attainment by spending resources of time and money on those activities that produce attainment. The limit to this investment is the limit of time and money available and the ability of the attainment production process to produce attainment. The strength of the model is that it makes explicit the substitutions involved in parental decision-making. Money spent on school-books for children cannot simultaneously be spent on restaurants for the parents. Time spent in the labour market earning income to buy consumer goods cannot be spent on leisure and so on. The decisions about the relative allocation of time and resources depend on the valuation parents make about the different outputs obtainable to them. These are referred to as preferences and expressed mathematically in economic modelling as utility functions.

In the Becker model there are two main channels through which parental education may impact on children’s attainment:

i. it may improve the effectiveness of household production and so increase the academic attainment of children through the attainment production function;

ii. it may also change the utility function, increasing the weight given to the educational attainment of children and so increasing investments in children,

> hence increasing their attainments. Equivalently, if education increases patience, enhancing concerns for the long-run, it may also change the nature of household production decisions, giving more weight to increased attainments of children.

This theoretical formulation can be restated in terms of the developmental model. The improvement in productivity can be reformulated as an effect of education on the family and proximal processes within it, holding distal factors constant, particularly income. Indeed, the ecological model describes the processes by which parents enhance development or, in the Becker formulation, produce attainment. Education enhances productivity for a given level of resource and so moderates the effects of income.

The second Beckerian channel of an effect of education on the utility function can be re-articulated as an effect of education on parental cognitions, i.e. attitudes, values and beliefs. These also lead to a changed allocation of household resources as child development (or educational success) becomes prioritised. The implications for educational behaviours and investment in education are described here in section 2.3 and 4.2.

The indication of this discussion is that although the theory of the neo-classical economic approach is based on utility maximising, rational agents, it is not unrelated to developmentally grounded models of development. The assumption of rationality implies a level of determinism and self-knowledge in the Beckerian model that is absent in the developmental formulations. The mechanics of this determinism enables a mathematical clarity with respect to the predictions of the model bought at the cost of a strong and simple specification of the context of individuals' consciousness and temperaments. Foster (2002) usefully indicates the value of this approach in clarifying the substitution effects that occur within families. On the other hand, the developmental approaches offer insights into the processes of household production of children's attainment and development that are left as a black box in the economic approach.

In our formulation these two methodologies are not empirically separable but offer usefully different foci. The economic evidence demonstrates the importance of the distal factors but we attempt here to place that evidence in a slightly different theoretical and empirical context. In subsequent sections we have drawn on the developmental literature to unpack the elements of the household production process. This helps us to clarify the role of parental education as a particularly important distal factor, i.e. as one that moderates the whole process of household production.

It should be noted, too, that there are also papers in the sociological or social policy literature that assess the significance of distal factors without framing their theoretical foundations within the Beckerian approach. Duncan et al. (1997) or Duncan (1994), for example, provide developmental of sociological explanations for the effects of distal variables.

The essential advantage of the Becker approach is its clarity and support in the formulation of hypotheses. It does not provide alternative hypotheses about the processes by which resources impact on attainment but assumes that attainment follows in a fairly straightforward way from the investments of parental resources. The developmental model provides more insight into these processes and wider constraints on them. However, while it recognises the importance of financial and other constraints at the distal level it has been less explicit in formulating their implications. The two approaches can thus be beneficially brought together within the developmental framework adopted here.

1.5.10 The definition and meaning of education

In this study we focus on the effects of prior parental education assessed in terms of qualifications and years of schooling. This reflects the approach adopted in the vast majority of the studies reviewed. Therefore, we abstract from consideration of the effects of vocational training and current learning by parents, either separately or jointly with children in family learning programmes.

Moreover, there is an important distinction between participation in a learning opportunity on the one hand and actual learning on the other. For some aspects of the relation between parental education and children's attainment the distinction may not matter. For example, if parents with higher levels of education earn more purely because of credential signalling advantages in the labour market then their children may have access to better learning opportunities even if no parental learning has actually taken place (Altonji & Pierret, 2001; Spence, 1973; Weiss, 1995). This is a case where there is an inter-generational effect of education not channelled by learning. However, most examples of theorised links from parental education to children's attainments will assume that education does include some genuine element of learning and cognitive development. Quite what is learnt is an important research question. Few studies, however, are in a position to assess empirically the implications for our research questions.

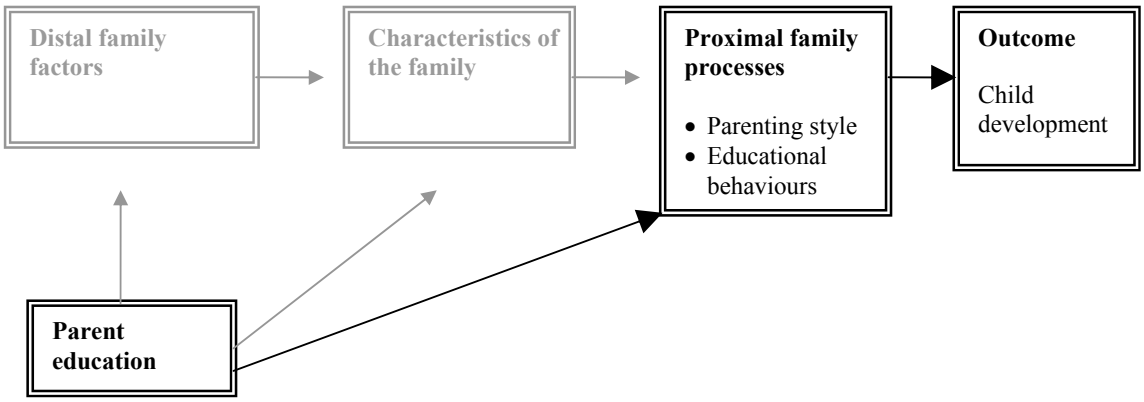
1.5.11 Representativeness and causality

There are also problems in assessing the extent to which one can generalise from the inter-generational returns to education for those who actually did participate in education to benefits for others were they to do so. These issues have not been resolved in the literature reviewed in this paper because, on the whole, the focus of authors has been elsewhere. Indeed few papers focus on the full assessment of the pathways for the inter-generational transmission of learning. Most of the papers reviewed here are concerned with what we take to be steps in that process or links in that chain of processes. Many authors have written on the effects of income on attainments (see section 5.5) without considering the effect of education on income or of education elsewhere in the process of transmission of income effects. Thus, even where authors have been concerned to identify precise causal effects in an econometric sense, their results do not allow for generalisation because they have only been considering one link in the chain, as we see it.

Other researchers have not been concerned with the issue of causality but with identifying the key proximal processes or contexts that impact on children's development. These differences in approach and objective must be borne in mind. This is another issue that returns throughout.

2. Proximal family processes

Box 5: Conceptual model for the effects of proximal family processes on child development



2.1. Introduction

In this section we examine key proximal family processes that influence our final outcomes. Proximal family processes in this instance are defined as elements of the interactive parent-child relationship. For each aspect of family process we assess from theory and evidence the strength of the link:

i. from the family process to child development;

ii. from prior parental education to the family process.

There is a large body of literature on family process factors in terms of parent-child interaction with many different elements of this relationship put forward as influences on child development. We adopt a simple, twofold classification of types of parent-child interactions as follows:

i. parenting style;

ii. educational behaviours.

Parenting style encompasses elements that are sometimes treated separately such as warmth, discipline and intrusiveness. In some contexts this separation is useful as it may be, for example, that parental education impacts on discipline but not on parental warmth. However, since development benefits from the integration of these elements it seems useful to treat them jointly here. Warmth with discipline provides a developmentally enhancing structure, one without the other less so.

Educational behaviours are clearly influenced by parenting style but we distinguish them as separate because they are specific behaviours rather than part of parent-child interaction more generally. Educational behaviours include reading to children and the provision of and engagement in a cognitively stimulating environment. These have been consistently associated with children's development.

Language pervades the transmission of human and cultural capital from birth and many studies report an association between aspects of verbal communication in the home and subsequent school achievement. Since humans are predisposed to communicate, inputs to language acquisition and resulting individual differences in development are key in illuminating potential mechanisms for the transmission of learning. Thus language can also be considered as an element of interactions in both categories.

This twofold classification can be related to that of others. In a five-fold classification of core processes that link family functioning and school achievement for children, Hess & Holloway (1984) identified five core processes:

i. verbal interaction between mothers and children;

ii. affective relationships between parents and children;

iii. discipline and control strategies;

iv. expectations of parents for achievement;

v. parents' beliefs and attributions.

Of these five, the last two are considered in our model as characteristics of the family context and not immediate elements of parent-child interactions. Therefore, they are considered in section 4.2 on parental cognitions. The second and third can be considered as elements (warmth and discipline) of our first category. Their first process cuts across both of our process categories. Hess and Holloway stress the importance of educational behaviours and the learning environment in the home but do not treat it as an explicit aspect of parent-child interactions.

In a later classification of family process factors essential for normal cognitive and social development, Ramey and Ramey (2000) identify seven 'psychosocial developmental priming mechanisms'. We quote these in full because they demonstrate well how the separate categories of parent-child interaction necessarily merge in the reality of those interactions:

i. "encourage exploration with all the senses, in familiar and new places, with others and alone, safely and with joy;

ii. celebrate developmental advances – learning new skills, little and big and becoming a unique individual;

iii. protect from inappropriate disapproval, teasing, neglect, or punishment and comfort appropriately;

iv. guide and limit behaviour to keep a child safe and to teach what is acceptable and what is not, i.e. the rules of being cooperative, responsive and caring.

v. mentor in basic skills, showing the whats and whens and the ins and outs of how things and people work;

vi. rehearse and extend new skills, showing the child how to practice again and again, in the same and different ways, with new people and new things;

vii. communicate richly and responsively with sounds, songs, gestures and words."

We recognise that many of these suggestions might equally well be thought of as aspects of each of our two categories. For example, the first of the Rameys' admonishments encompasses elements of both of our categories of interaction, namely learning ("exploration"), as well as parenting quality in terms of discipline ("safely") and warmth ("joy").

Thus, the classification of the elements of family process is difficult but is a necessary stage in analysis if one is to attempt measurement and evaluation. A standard measure of parenting quality is the HOME Scale (the Home Observation for Measurement of the Environment, Caldwell & Bradley, 1984). This inventory assesses parental quality in terms of *emotional support*, i.e. measures of warmth and discipline, as well as *cognitive stimulation*, i.e. household resources, such as reading materials and the physical appearance of the home. Therefore, it combines elements we are describing here as proximal process with aspects considered as characteristics of the family context. This is unfortunate for our attempt to assess the separate links in our overall model.

Fathers

Societal changes over recent years have and continue to force adjustments in both popular and scholarly conceptualisations of the family, especially in terms of the role of the father. According to Pleck & Pleck (1997) we have seen the evolution of father ideals from the distant breadwinner, to the modern involved dad, to the father as co-parent. Changes in paternal role and its responsibilities have led to a renewed interest in the research questions such as: How will changes in the roles and expectations of fathers affect children's development? What type of inter-generational legacy will be left by the fathers and sons of today?

However, much of the literature on parenting has tended to focus on the role of mothers and that is reflected in the discussion in this section.

2.1.2 Causality

The studies described in this section have mainly been undertaken with methodological perspectives from fields of psychology in which the focus is often on establishing that measures developed to assess a feature of parenting demonstrate sufficient validity to predict outcomes. This indicates that the instrument is a good one, not necessarily that parenting is a causal factor in policy terms. The foundation for a hypothesis of underlying causality tends to come rather from theory, qualitative or practitioner evidence. However, the implication is that care must be demonstrated in interpreting the results in the current context.

A related, important distinction between these studies and those reported in section 5 on distal factors is that they tend to be drawn from small samples. In the methodology

commonly adopted in sociological, epidemiological or economic studies, the aim is often to build large samples with a broad range of variables so that it is possible to condition out confounding bias and so assess causality in a representative sample. In the branches of the psychology literature considered here, the method adopted tends to be based on collection of data from small but homogenous samples. Thus, unobserved differences are conditioned out by the sampling frame rather than through the use of multivariate regression.

Each method has advantages and disadvantages depending on the objectives of the study, the assumptions made and the validity of the data and measures. For our purposes, a number of studies that have provided simple correlational evidence are reported because they demonstrate the validity of the measures and that proximal processes can be assessed reliably. Where possible we then turn to studies using longitudinal data with value-added results to establish causality. However, for many important and much discussed links in the model there are no such studies (see Collins et al*.,* 2000) for a discussion). This is a serious gap and one that we hope will be rectified in the years to come. It is rarer still for the endogeneity of parenting quality to be addressed.

However, the evidence reported does show that the instruments designed to evaluate the hypothesised causal processes have sufficient reliability and validity to indicate that the processes are stable and are important features of development.

2.2. Parenting style

2.2.1 The effects of parenting style on child development

Warmth

An extensive literature documents connections between aspects of warmth in parent-child relationships and children's development and adjustment. In particular, the importance of parental warmth and secure attachment for the development of children's cognitive and behavioural competence is widely acknowledged (see Baumrind, 1967, 1971; Bowlby, 1969, 1973; Masten & Coatsworth, 1998). Secure attachment is located in the child. The importance of parental warmth may be due to its effects on the child's sense of attachment and the resulting capability to develop understanding and confront uncertainty or puzzling tasks. Thus, children who have a sense of secure attachment particularly as infants, subsequently approach cognitive tasks in ways conducive to cognitive development. Their problem solving style is characterised by more curiosity, persistence and enthusiasm and less frustration than less securely attached infants (Bretherton, 1985).

Similarly, parents who use a proactive parenting style with their children, i.e. one that is affectionate, warm, structured and consistent, are more likely to promote pro-social behaviour and academic readiness (Masten & Coatsworth, 1998). Those children whose interactions with their mothers are warm and involved are more likely to be

competent and less likely to exhibit behaviour problems than children without such positive parental interactions (Maccoby & Martin, 1983).

A large number of studies have found correlations between the warmth of parent-child interactions and later cognitive outcomes (e.g. Barocas et al., 1991; Diaz et al., 1991; McGroder, 2000). Such correlations tend not to be value-added and so, as discussed above, do not indicate causality so much perhaps as construct validity. In that sense, however, they are useful.

One longitudinal study that estimated value-added effects of parenting quality assessed in terms of warmth is that of Estrada et al. (1987). The authors found that the affective quality of the mother-child relationship when the child was four years of age was significantly correlated with mental ability at age four, school readiness at ages five to six, IQ at six and school achievement at twelve. These associations remained significant when the contributions of maternal IQ, socio-economic status and children's mental ability at age four were taken into account, suggesting that maternal IQ and SES do not explain the association between the affective relationship and children's cognitive functioning.

The authors suggest that affective relationships may influence cognitive growth by influencing:

i. parents' tendency to engage and support children in solving problems;
ii. children's social competence and consequently the flow of information between children and adults;
iii. children's exploratory tendencies, hence their willingness to approach and persist in tasks.

Patterson et al. (1989) provide evidence suggesting that maternal warmth also matters for later child behavioural competence. Children whose interactions with their mothers were low in warmth were rated by teachers as having more behavioural problems and as less competent in certain respects than did other children. Children characterised by low maternal warmth also gave self-reports of their own social acceptance and cognitive competence that were discrepant from objective information than their peers. The authors argue that these results are consistent with the idea that high maternal warmth serves as a protective factor against later adjustment difficulties. It is also possible, however, that lower maternal warmth may be a response to earlier behavioural difficulties. This endogeneity would be natural to psychologists interested in interactive relationships but is problematic when one wishes to identify econometric-style causality.

Socialisation practices

Many theories of the aetiologies of conduct problems and depression among children suggest that inconsistent, erratic and harsh parenting practices characterise a coercive cycle of conflict and parent-child interactions that lead to increased problem behaviour and depressive symptoms (e.g. Patterson, 1986; Patterson et al., 1989).

Parent-child interactions are also important for internalised behavioural outcomes, such as emotion and understanding. For example, conflict and its negotiation can also be seen as an aspect of discipline and intrusiveness. Parent-child conflict during the toddler and pre-school years is normal. It is a large part of all early relationships with caregivers and because it typically involves children's experiences with and observations of emotion, conflict is likely to be an important context in which social and emotional understanding is developed (Dunn, 1988).

Conflict can be thought of as a co-constructed process, wherein both parent and child create shared meaning out of their interactions. Hence it can be seen as either constructive (involving high levels of negotiation, justification and resolution) or destructive (not involving these positive strategies). While constructive conflict and the positive strategies employed therein can be seen as being developmentally positive, destructive conflict, in contrast, is often seen as a marker of dysfunction in relationships.

Authoritative parenting (in contrast to authoritarian or permissive parenting, see Baumrind, 1973), is marked by warm, but firm, parenting styles coupled with high expectations. Negative parenting practices are marked by harsh and/or inconsistent discipline, punitiveness (e.g. verbal punishment and physical restraint) and intrusiveness (e.g. mother taking over a task from her child.)

Many studies have found correlations between disciplinary styles in these terms and subsequent child development. For example, Steinberg et al. (1995) finds an association between authoritative parenting and academic success from early childhood through adolescence, independent of gender and socio-economic status. Negative parenting practices, on the other hand, predict negative child behavioural (Brenner & Fox, 1998; Bradley et al. 2001) and cognitive outcomes (Egeland et al., 1993; Fagot & Gauvain, 1997).

A causal perspective on these findings is consistent with Patterson's (Patterson, 1986; Patterson et al., 1989) model of the development of antisocial behaviour, which specifically implicates poor parental use of discipline as the first step in a developmental sequence that leads to potential conduct disorders.

An alternative view however, might simply suggest that the relation operates in the other direction; children with more problematic behaviours require more discipline (Bell, 1968). Steinberg et al. (1994) respond to this concern with a value-added model in which the change in developmental outcomes over a one year period is shown to relate to parenting practices, conditional on the initial level of the outcomes. This indicates, for example, that given the parenting style at period 1 and the level of the outcome at period 1, those children with more authoritative parenting will gain more over the year in terms of academic achievement and psychosocial development than those whose parents are reported as exhibiting authoritarian, indulgent or neglectful parenting. This method reduces the possibility that the results follow from a causal pathway in which the child's behaviour provokes the response of the parent rather than the other way around, since with this estimation strategy the parenting style

precedes the child's behaviour change. However, the authors recognise that it is still likely that to some unidentified extent the parenting style may have been invoked by the children at earlier stages of development, thus making causal estimation difficult. Moreover, it is also possible that the parenting practice proxies for other features of parent capability or cognition drive not just the level of the outcome at period 1 but also the change over time. However, these results indicate that parenting practices are strong indicators of children's developmental outcomes.

Rubin et al. (2002) obtained similar results for maternal intrusiveness, which predicts children's subsequent internalising behavioural problems conditioning on earlier levels of these problems. If mothers demonstrated relatively high frequencies of intrusive control and/or derisive comments, then the association between their toddlers' inhibition and four year old social reticence was significant and positive; whereas if mothers were neither intrusive nor derisive, then toddlers' inhibition and 4-year reticence were not significantly associated. Maternal intrusive behaviour is thus posited as moderating the predictive association between toddler peer inhibition and pre-schooler's social reticence; toddler peer inhibition together with maternal intrusiveness indicates risk, inhibition without intrusiveness does not.

In a study exploring mother-toddler conflict, Laible and Thompson (2002) found that the most consistent predictors of socio-emotional and socio-moral competence in infants at age three were the strategies employed by mothers during conflict and maternal resolution of conflict at 30 months. High levels of maternal justification, i.e. use of clarification, reasoning and requests for clarification (and low levels of aggravation, i.e. use of threats, teasing, or simple insistence without clarification) and maternal resolution in home conflicts at 30 months were related to higher levels of emotional understanding at age 3. Similarly, high levels of maternal justification (and low levels of aggravation) in lab conflicts were associated with high levels of behavioural internalisation in resistance to temptation.

2.2.2 The effects of prior parental education on parenting style

Klebanov et al. (1994) found evidence of an association between mother's education and parenting style as assessed by the HOME scale. Of all the familial variables studied (including family income, family size, teenage birth, female headship and ethnicity), maternal education was most predictive of parenting style.

Recent evidence from the Panel Study of Income Dynamics – Child Development Study (PSID-CDS) similarly report that mothers with less than a high school education are less likely to show their child warmth than are parents with higher levels of educational attainment. For example, 75% of mothers with less than a high school education hug or show physical affection to their child at least once a day, compared to 87% of mothers with a high school diploma, 91% of mothers with some college and 94% of mothers with college degrees. Similarly, more college-educated fathers (77%) report hugging their child daily than do fathers with less than a high school education (68%) or fathers with a high school diploma (70%) (Trends, 2002).

However, this is not necessarily an effect of education as the prior emotional development of the parents may underlay both their educational success and the warmth of their parenting.

Developmental research has also demonstrated an association between maternal education and the mother's parenting behaviour in terms of the disciplining strategies adopted. For example, Fox et al. (1995) found that scores from maternal ratings of discipline frequencies were consistently higher (i.e. greater use by parents of corporal punishment, e.g. spanking and yelling) for women with less education. In addition, younger mothers, mothers with two or more children living at home, unmarried mothers and those from middle as opposed to upper middle SES reported more frequent discipline. Studies of maternal intrusiveness have also documented statistically significant relations between intrusive behaviour and various measures of educational and economic status (Bee et al., 1969; Bradley, 1993; Phinney & Feshbach, 1980).

One frequently used strategy to discipline a child, especially a younger one, is spanking (Day et al., 1998). Research from the US shows that, in terms of attitudes towards spanking, adults who are college graduates are less likely than adults without a high school diploma or an equivalent to say that spanking a child is sometimes necessary. In 2000, 66% of men who were college graduates agreed that spanking is sometimes necessary compared to 87% of men with less than a high school education. Among women, 55% of college graduates agreed that it was sometimes necessary to spank a child, compared to 80% of those who did not graduate from high school.

Van Bakel et al. (2002) considered the determinants of the quality of parenting defined in terms of the quality of the support the parent provided their infant and overall quality of their parental interactive behaviour. Testing a sample of 129 parents and their 15 month old infants, they found that parental education explained significant and unique portions of the variance in the observed quality of parental behaviour.

The authors argue that parental intelligence is related to the quality of parenting (see also Baharudin & Luster, 1998; Bradley, 1993; Watson et al., ; Whiteside-Mansell et al., 1996). Higher educated parents might therefore be expected to provide better quality care than lower educated parents simply because they are likely to score more highly on intelligence tests. They note, however, that higher educated parents may also provide more supportive childcare for other reasons. During their years of college or university education and functioning in higher qualified jobs with more responsibilities, they may have acquired other important attitudes and competencies such as tolerance or the ability to plan tasks. There are thus many channels for inter-generational benefits of learning.

2.2.3 Summary

Overall, positive parenting styles are strongly associated with positive outcomes for children. However, the causality in the correlational evidence is unproven. Parenting

style is not exogenous, yet neither can it be allocated experimentally. It may well be that often unobserved factors such as parental well-being, stress or cognitive capabilities underlie apparent effects of parenting style on development. Evaluation evidence is useful but uncertain as authors disagree about the extent to which parenting programmes influence children's development. Magnusson's (Magnusson & Duncan, in press) view of the evaluation evidence is that parenting may exert a stronger influence on behaviour than on cognitive development. Webster-Stratton finds strong influences on behaviour, in line with the Magnusson reading of the evidence (Webster-Stratton, 1990b; Webster-Stratton & Hammond, 1997). The implication of the discrepancy between evaluation and survey-based evidence is that more work needs to be done on examining changes in parenting style in the large survey analyses. The evaluation evidence suggests that interventions succeed in altering children's school attainment substantially. This perhaps suggests that the survey analysis has been wrong in concluding that the strong correlations between parenting style and cognitive development are causal.

At first glance, one may not imagine that education would impact heavily on parental warmth which is more about enjoyment of relationships with children and parental well-being than about parental demographics. However, to the extent that education enhances efficacy and well-being it may lead to increased parental warmth. Moreover, education does appear to enhance parents' capacity to be considerate in their use of discipline. There is, therefore, an effect of education on the use of appropriate discipline and developmentally enhancing discipline. The evidence supports this theoretical conjecture but, again, there have not yet been sufficient large sample longitudinal studies to test causality as robustly as available techniques would allow.

We conclude therefore, that there is substantial theory and correlational evidence to support the view that parenting style is an important channel for the inter-generational transmission of education. In other words, parenting style is likely to be an important mediator of education effects. Parents' education influences socialisation strategy quite strongly and may also influence parental warmth. Both of these factors have been shown to be likely influences on children's development. Therefore, parenting style is a strong candidate for a key mediator of education effects. However, for the reasons given above more robust longitudinal designs would be useful in clarifying the extent to which the observed correlations are causal. The evaluation evidence suggests that parenting style may be more important for behavioural than immediately cognitive outcomes.

2.3. Educational behaviours

2.3.1 The effects of educational behaviours on child development

Educational behaviours in the home take on many different but complementary forms of parent-child interaction, for example reading to children, visiting the library, painting and drawing, learning letters, numbers, songs, poems and nursery rhymes. Such experiences are likely to influence both the child's skill levels as well as their interest in engaging in such activities. In turn, skill and interest level should facilitate

transitions to school and subsequent educational success. Wigfield & Asher (1984) suggest that factors in the home outweigh factors in the school in predicting children's desire and ability to succeed in school.

To reflect the broad domains of the many educational type behaviours discussed in the literature and their effects on children's development we break this section down into two sub-sections:

i. Reading to children and exposure to print;

ii. Cognitive environments and teaching strategies.

These parent-child interactions are clearly related and there are important overlaps between them. However, it is useful to break them down in this way to better understand their specific influences on the various domains of children's development. The influence of parent's education is similar across these related areas and therefore is not broken down in the same way, but discussed for educational behaviours in general.

Reading to children and exposure to print

Just as oral language development has a history that precedes the child's utterance of his or her first word, reading development also has a history that precedes the child's ability to read. Parents play an important role in fostering literacy skills in their children. Reading to children and involving them in other activities related to literacy facilitates the development of an orientation toward print, knowledge of narrative structure and function, general knowledge of the world, phonological awareness and a positive attitude toward reading (Baker et al*.,* 1994).

The EPPE (Effective Provision of Pre-school Education) project is the first major European longitudinal study of a national sample of young children's development (intellectual and social/behavioural) between the ages of three and seven years. To investigate the effects of pre-school education for three and four year olds, the EPPE team collected a wide range of information on over 3,000 children, their parents, their home environments and the pre-school settings they attended[1]. A sample of 'home' children, who had no or minimal pre-school experiences was recruited for the study at entry to school for comparison.

EPPE findings document that the frequency with which parents read to their children is associated with higher scores in language, pre-reading, early number concepts and non-verbal reasoning at primary school entry. These results hold when the estimation controls for parents' education and SES, child's gender and age and the number of siblings. However, whether parents read to their children or not is likely to depend in part on whether their children wish to be read to or not so the measure must be treated as endogenous. The EPPE effect size is likely to an overestimate of the causal effect of parents' reading.

[1] Settings (141) were drawn from a range of providers: local authority day nursery, integrated centres, playgroups, private day nurseries, maintained nursery school and maintained nursery classes.

This endogeneity or reverse causality problem also applies to other useful results, such as those of Rowe (1991). Rowe indicates that regardless of family SES, age and gender reading activity at home has significant and positive influences on measures of students' reading achievement and attitudes towards reading. There was a strong interdependence between students' attitudes towards reading and reading activity at home, both of which had significant positive influences on reading achievement.

Sénéchal et al. (1998) splits literacy experiences with parents into informal and formal experiences. Informal literary activities are those which focus on the message contained in the print, whereas formal exposure centres more on the print itself, for example talking about letters, providing names and specific sounds. Following this in a five-year longitudinal study Sénéchal and LeFevre (2002) assessed the relative importance of parent storybook reading with children and parents' reports of teaching on children's language, later written language skills and reading acquisition.

Exposure to storybooks was used as the measure of informal literary activities and parental reports of how frequently they taught their child about reading and writing as the formal measure. Their findings highlight the importance of home learning, both formal and informal, on later literacy abilities, suggesting clear links from home literary experiences, through early literacy skills to fluent reading. It is interesting and somewhat surprising however, that parents' reports of teaching (i.e. formal) and storybook exposure (informal) were uncorrelated.

Cognitive environments and learning stimulation in the home

Growing up in a home rich in cognitive stimulation and educational opportunities not only influences literacy development but also has a lasting impact on a child's desire to learn (Gottfried et al., 1998). The EPPE research documents the importance of a young child's home learning environment. EPPE research uses an index of cognitive stimulation in the home (the Home Learning Environment, HLE) which includes measures of reading to children, encouraging playing with and teaching letters and numbers, teaching songs and nursery rhymes, painting and drawing and visits to the library. While distal factors such as mother's educational level and family SES are highly significant, the Home Learning Environment exerts a significant and independent influence on attainment at 3-plus years of age, as well as later at entry to primary school (rising 5s) and progress during this pre-school period (see also McGroder, 2000). Thus, conditioning on parents' level of education and SES, family characteristics such as the number of siblings, whether English is their first language and child gender are considered. The HLE is the strongest variable in predicting cognitive and non-verbal skills as well as all four measures of social/behavioural development assessed (co-operation/conformity, peer sociability, confidence and anti-social behaviour).

The home environment is clearly conceptually relevant to academic intrinsic motivation, i.e. the pleasure found in school learning. Availability of cognitive stimulation in the home such as exposure to learning-oriented opportunities and activities would be expected to stimulate children's orientation toward enjoyment of

learning through engaging in as well as by valuing such activities. Hence, cognitive stimulation and the provision of learning experiences in the home will be positively related to children's academic intrinsic motivation. However, these assessments of home environment are as related to the responsiveness of the child to cognitive stimulation as are the educational behaviours discussed in the previous sub-section. Therefore, one must worry again about the potential over-estimation of pure causal effects in econometric terms. Nonetheless the patterns of association are interesting and informative.

Using longitudinal data Gottfried et al. (1998) showed that children whose homes were higher in cognitive stimulation (measured at age 8) had higher academic intrinsic motivation from ages nine through thirteen controlling for SES. The authors argue that these results strongly suggest that the effect of home environment is continuous as cognitively stimulating home environment predicts subsequent motivation through earlier motivation. However, alternative interpretations of these findings are possible and so we cannot infer causality.

In a recent study, Hubbs-Tait et al. (2002) examined more specifically the influence of parental language during teaching strategies on child development, arguing that the support and guidance used by parents during problem solving tasks are markers for children's cognitive performance. They state that in general, the more parents make use of statements that challenge children to use representational thought, i.e. evaluate their own competence ("Are you ready for the third step?") or assess their own performance ("Well, what do you think?"), the better the child's cognitive understanding and performance. In contrast, greater parental use of statements requiring only referential thought, i.e. requiring more simple statements of labelling or observation or including no challenge for thinking, the lower the children's cognitive performance.

Parental involvement is also considered an important component in children's educational and cognitive development (Reynolds, 1992). Feinstein (Feinstein & Symons, 1999) finds strong associations between teachers' assessments of their pupils' parents' interest in learning and the attainment of children. In this longitudinal design the change in attainment between eleven and sixteen years is related to the parents' interest predicted by the child's teacher when the child was age seven. It seems likely, therefore, that this is not just a misreport by the teacher who sees a pupil doing well and infers parental interest falsely. However, this variable does not refer to parental involvement explicitly and may pick up the effect of parent cognitions (aspirations and expectations) rather than parental behaviours.

Desforges (Desforges & Abouchaar, 2003) summarises evidence that highlights the specific importance of only 'at home' parental involvement as having positive effects on pupil achievement and adjustment. He states that there is no private or public benefit from other forms of parental involvement. Home involvement is separated into two types, that associated with discussing school activities (home discussion) and that associated with monitoring the child's out of school activities (home supervision).

The most significant of these was home discussion. Parental involvement in the form of home supervision is negatively related to achievement presumably because this form of involvement is increased when a pupil is having difficulties[2].

2.3.2 The effects of prior parental education on educational behaviours

Education may provide parents with important cognitive resources that enable them to better support and facilitate their children's learning. The EPPE project shows a relationship between parents' education and educational behaviours. They use an index of cognitive stimulation in the home (HLE) which includes measures of reading to children, encouraging playing with and teaching letters and numbers, teaching songs and nursery rhymes, painting and drawing and visits to the library. The HLE and mother's qualifications are significantly correlated (r = .35), more so than measures of parental SES.

The EPPE project's findings have been interpreted as suggesting that what parents do is more important than who they are. While mothers' highest educational qualification showed a strong, positive and consistent impact across all five cognitive outcomes assessed, actual parenting behaviours, such as reading to children, were better predictors of children's outcomes. However, since part of the education effect is mediated by these behaviours the fact that in an ordinary least squares regression the coefficient on behaviours is greater than that on education does not mean that behaviours are more important than education as the behaviours variable is an additional indirect channel for education effects. The question requires a more sophisticated analysis.

However, the result does indicate that these behaviours and aspects of the environment are not just simple proxy measures for aspects of economic or cultural wealth, but real independent forces. This is an important result with implications for programmes such as Sure Start. For example, if this result is accurate, young mothers with few qualifications, whose children typically show a higher incidence of low attainment, can improve their children's progress and give them a better start at school by engaging in those activities in the home that foster children's learning.

For the US, data from the National Household Education Survey and the Federal Interagency on Child and Family Statistics (Trends, 2002) show that mothers' education is consistently related to whether children are read to by a family member. Young children are more likely to be read to if their mothers have completed higher levels of education. For example, in 2001, 73% of young children whose mothers had graduated from college were read to every day by a family member. In contrast, 60% of children whose mothers only had some college education were read to every day, compared to 49% whose mothers had only finished high school and 42% whose mothers had not finished high school (see also Laosa, 1983).

[2] Note that there are also gender effects and ethnic differences here. Females report considerably more home discussion than males and white families engage in significantly more home discussion than do Asian and Pacific Island families.

Early work by Hess & Shipman (1965) found associations of mother's education and educational behaviours. They showed that in a group of African American mothers, those with more formal education provided more structure, verbal guidance and elaboration when teaching their pre-school children a problem solving task (see also Harris et al., 1999). Similarly, Diaz et al. (1991; see also Laosa, 1983; Uribe et al., 1993) found maternal education to be significantly related to maternal teaching strategies during problem solving interactions. Hoff-Ginsberg (1991, 1992) found differences associated with parents' level of education and mothers' conversational behaviour. Notably, high school educated mothers addressed less speech to their children than college educated mothers did. They also asked fewer conversation-eliciting questions and fewer on the children's topics.

In a recent study by Bradley and Corwyn (2003) the authors focused on the extent to which learning stimulation in the home mediated the relation between indicators of SES and various measures of child development (verbal ability, achievement in reading and maths and behaviour problems) for children ages four through fourteen. This study not only highlights the influence of parents' prior education on cognitive stimulation and the home learning environment but also the additional link from cognitive stimulation to children's development.

Relations were examined for three developmental periods, early, middle-childhood and adolescence and for three ethnic groups, African Americans, European Americans and Latin Americans. Learning stimulation was defined at each developmental period by items from the HOME-SF, the short form of Caldwell and Bradley's original HOME inventory made up from a combination of observer ratings and mothers' reports on aspects of the home environment (Caldwell & Bradley, 1984). Items included frequency with which the child is read to, encouragement to start and keep up hobbies and visits to museums and other cultural activities.

Using data from the NLSY, maternal education generally had as strong or stronger relations with children's scores in verbal ability and achievement in maths and reading than did a composite measure of SES. These differences were most pronounced during early childhood and were negligible during early adolescence. It is interesting to note that learning stimulation mediated the role between maternal education and these three child measures to about the same degree as it mediated the relation between SES and the three child measures. However, during adolescence, maternal responsiveness mediated the relation between maternal education and verbal ability to a much greater extent than the relation between SES and verbal ability (see also Davis-Kean & Schnabel, 2001; Smith et al., 1997).

More educated parents have a greater knowledge about the environmental factors that influence children's development (Clarke-Stewart, 1973; Stevens, 1982) and are more accurate in assessing their children's developmental skills (Gottfried et al., 1998). Thus more educated mothers may simply be more aware of what is necessary for intellectual development and school success and act on this knowledge to provide the experiences and the setting that facilitate such achievement.

2.3.3 Summary

Overall, there are clear empirical and theoretical grounds to suggest that educational behaviours are important and have real and considerable effects on children's development, particularly in the cognitive domain. EPPE (Sammons et al*.,* 2002) concludes strongly that what parents do is much more important than who they are. Moreover, the effects of parental education on educational behaviours in the home are also apparent. Taken together we conclude that educational behaviours are an important mediator of effects of parents' education on children's outcomes. However, the magnitude of this effect has not been fully identified and as the evidence for the causal role is not robust to reverse causality problems. There are strong grounds for the view that educational behaviours are likely to be an important source for the inter-generational transmission of educational success, although the distinction is not always an easy one to make.

3. The importance of context

3.1. The meaning of context

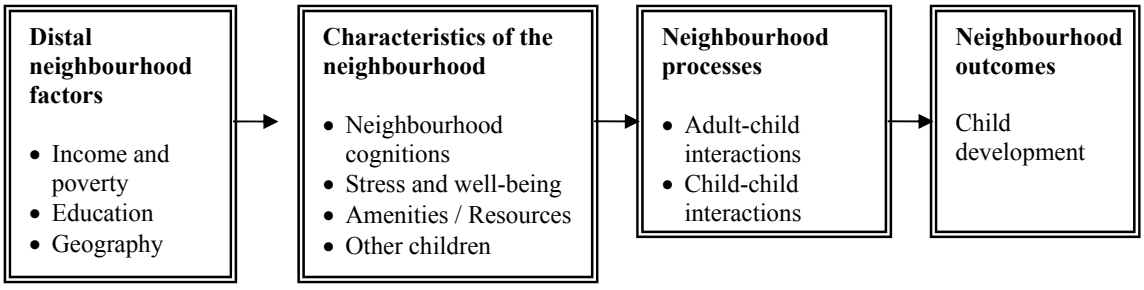
Ecological models of human development (e.g. Bronfenbrenner, 1979; Lerner, 1986; Sameroff & MacKenzie, 2003) depict development as occurring within a multilevel environment such that the family is not the only context that matters for child development. There are many important contexts in childhood, including the family, neighbourhoods, pre-schools, schools and peer groups. These contexts matter not only in that they are channels for the effects of distal factors but also because they are causal factors in their own right. They have characteristics that impact on proximal processes and the subsequent experiences of the child. They may in many cases be driven by distal factors but to ignore the characteristics that matter or to fail to specify them is to leave a gap in the understanding of the determinants of development.

To give one example, income (a distal factor) impacts on resources in the home (a characteristic of the family context) which, in turn, impact on educational behaviours (the proximal process). It may be income that drives the process but the resources are a non-trivial link in the chain that may be broken or influenced (moderated) by other factors at any point. Thus, it is the relationships between the elements of our framework that is paramount. A higher income does not mean that increased familial resources will be used to buy more books for example, nor that provided books will be read. It is these interactions that make the ecological model not just a static description of individual associations but a dynamic perspective on development.

3.1.1 The importance of other contexts

As noted, we focus specifically on the family context. Other contexts interact both with the family context and so shape the development of the child as well as directly influencing the experiences of the child. However, these other contexts can be modelled within this same distal/proximal conceptual structure. For example as shown in Box 6, the quality or characteristics of neighbourhoods are influenced by neighbourhood-level distal factors such as the educational level, affluence and social class of the residents of the neighbourhood.

Box 6: Conceptual model for the influences of neighbourhood



Cook et al. (2002) note the distinctions between a context's structural features (distal factors) and its more micro-level processes (proximal processes). Structural features of the neighbourhood include, for example, neighbourhood socio-economic status and racial composition, while process takes account of neighbourhood social cohesion and social control, aspects of the interactions between community members (see also Sampson et al., 1997).

In addition, the key characteristics of neighbourhoods are in many cases the same characteristics that matter in the home but assessed at the neighbourhood level, i.e. factors such as local resources and neighbourhood beliefs and attitudes. The difference in level makes the nature of the links different, but many if not all the key characteristics are the same. Similarly, the proximal processes include the same issues of discipline and cognitive stimulation as at the family level but at a local level in terms of multi-faceted relations between individuals in complex communities.

Moreover, while the interactions between contexts are crucial they can also be modelled in this framework. Cook et al. (*op cit*) also investigated the interconnectivity across social contexts. The authors considered the influence of four developmental contexts; the nuclear family, neighbourhoods, schools and peers, taking into account the interactions between these contexts. Effects were generally cumulative across the nine outcomes studied so that each good context promoted healthier development and thus may have provided some buffering effects against poor contexts, but no combination of contexts implied a special degree of protection. Rather, each context produced particular effects some having stronger or unique links to some outcomes. Families tended to show greatest influence on changes in participation in conventional out of wedlock activities, lack of misbehaviour and positive self-image; neighbourhoods were most often associated with school attendance and participation in social activities; peers were more potent in influencing negative social behaviour, such as less acting out and drug use; schools led to positive changes in attendance, academic performance and participation in conventional out of school activities. No single, individual context was dominant on all outcomes. Moreover, contexts overlap and a given context can operate as either a risk factor or a protective factor depending on its characteristics.

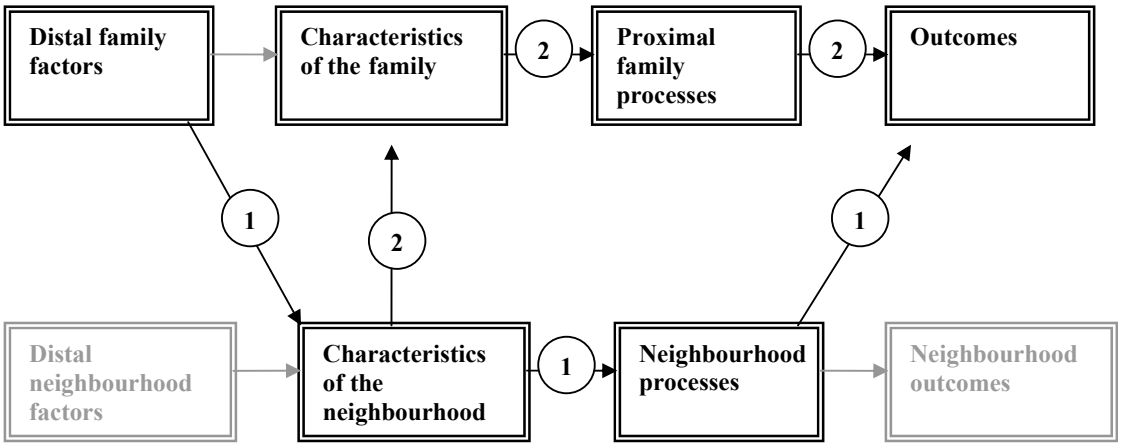
It is also important to acknowledge that the effects of different social contexts vary with the particular characteristics of the child. For example, relations within a neighbourhood change considerably with age and so influences on a young child are very different than for an adolescent. Handler et al. (1995), for example, suggest that as children age, community-based organisations seem increasingly less relevant making it ever more difficult to keep them attached to the groups wanting to serve them while concurrently some activities and areas seem both more dangerous and exciting than earlier (Cook & Murphy, 1999).

Relationship between family and neighbourhood contexts

Given the importance of these other contexts, we now briefly consider the reciprocal influences and relations between the family and other contexts, again taking the

example of neighbourhood. Key elements are illustrated in Box 7 below. Many other inter-relationships might also be described but we focus on two. In Box 7 some features are reproduced in grey in order to foreground the two aspects discussed.

Box 7: Conceptual model for multilevel interactions between family and neighbourhood



First of all, we note that neighbourhood is a pathway for the effect of family-level distal factors such as income (arrows 1). Family-level distal factors influence neighbourhood-level (or other level) characteristics in the sense that richer families choose leafier suburbs or more educated families choose neighbourhoods with more successful schools. These neighbourhood characteristics in turn influence outcomes.

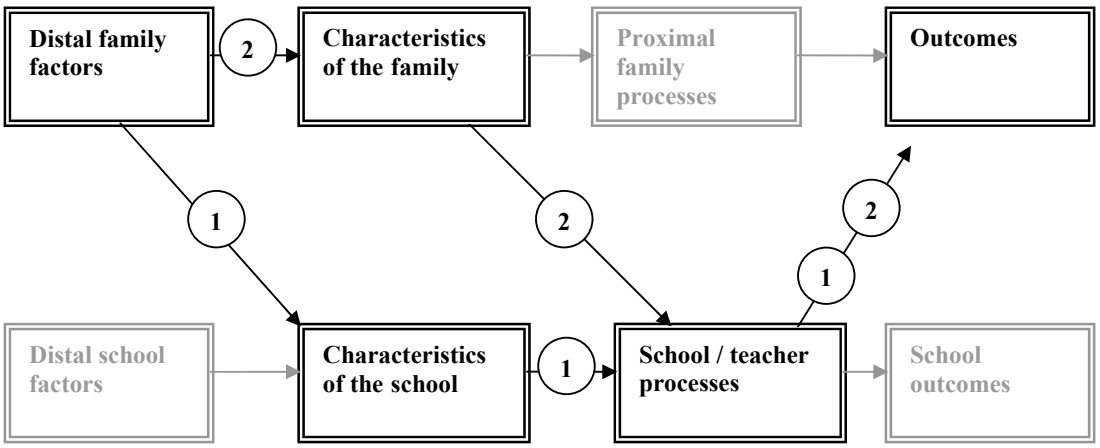
Secondly, we note that neighbourhood characteristics influence family characteristics (arrows 2). The values and well-being of families are not immune to their wider context. Thus, neighbourhood characteristics impact on family process and so on child development through the family as well as through the extra-familial relationships of children[3].

Relationship between family and school contexts

To take another example, consider the interactions between family and school contexts (Box 8). Distal family factors influence the characteristics of a given school in a similar way as they do for neighbourhoods. More affluent families, for example, are able to choose better resourced and more desirable schools and more educated parents may be better equipped to assess quality and so choose the more successful, higher achieving schools. These school characteristics, again, influence outcomes through the mediating channel of school and teacher processes (arrows 1).

[3] Neighbourhoods may also impact on our distal factors, though we do not pursue this here.

Box 8: Conceptual model for multilevel interactions between family & schools



A second channel for the effect of family distal factors is through an impact on the relationships with teachers and the school (arrows 2). This has been studied mainly in terms of social class differences (Bernstein, 1990, 1996). In qualitative analysis of data collected from sociolinguistic experimentation over a series of years with children from working class and middle class backgrounds, he found that the language used by classroom teachers, which he termed restricted codes, were constrained to favour their middle class students over their working class peers. Comparable problems with language and identity were identified in an ethnographic case study of a working class teacher in a London Education Action Zone (EAZ) (Burns, 2001). Her study found that the teacher had to severely restrict her language and pretend to adopt a middle class culture in order to progress in the school.

It has also been hypothesised that teachers may have higher expectations for middle class children and so treat them preferentially leading to a relationship between family background on perceived background and pupil teacher interactions. Similarly, the cognitions and values of parents are important characteristics of the family context. Parents bring these characteristics to the interactions they have with their children's school. They may, for example, be more proficient in interacting with teachers as well as better able to support and reinforce traditional academic goals (Hess & Holloway, 1984; Slaughter & Epps, 1987). Similarly, teachers are likely to recognise these characteristics of children and their parents and may respond more positively to them.

Teachers may come to make assumptions about parents' cognitions and values from signals provided by distal elements of social class (parental education, income and occupational status) or on features of family structure without these necessarily being mediated by actual family characteristics. These in turn can impact on teacher's views of pupils (Mortimore & Blackstone, 1982; Mortimore et al*.,* 1988). These child-teacher interactions are thus a channel for the effects indicated by arrow 2 in Box 8.

Important developmental contexts

Because of the influences of different contexts and the interactions between them, we include in this section evidence on the importance of three particularly important contexts for development:

i. neighbourhoods;

ii. schools;

iii. pre-schools.

One characteristic of context is the characteristics of other children. Peers are an integral part of contexts such as the neighbourhood and schools and we recognise their importance. However, for simplicity we present information on the importance of peers within the two topics of neighbourhood and schools rather than as a separate context.

For each context, as we did for each proximal process, we consider the theory and evidence for:

i. its importance as an influence on children's development;

ii. an influence of parental education on the context.

3.2. Neighbourhoods

3.2.1 The effects of neighbourhoods on child development

Theoretical models and evidence for understanding the ways in which neighbourhoods exert their influence on children and adolescents focus on two central mechanisms: local infrastructure (including physical infrastructure, institutional resources and networks) and collective socialisation. For contextualisation, these are reviewed briefly below and then discussed together with reference to multiple and compounding risks. We then present some of the empirical evidence looking at the effects of neighbourhoods on child development.

Local infrastructure

The institutional model suggests that neighbourhood effects operate through the quality of resources in the local area. Libraries, family resource centres, literacy programmes and museums in the community are likely to foster children's school readiness and achievement. The availability of social and recreational activities, including the presence of parks, sports, art and theatre programmes, is likely to promote their physical and social development. Brooks-Gunn et al. (Brooks-Gunn et al., 1993, 1996; see also Crane, 1991) report that low SES neighbourhoods generally provide fewer and lower quality resources than more affluent neighbourhoods. Thus poorer children may fare badly in part because of their neighbourhood communities, not simply because of their family's economic situations. Similarly, Neuman & Celano (2001) found that low income communities provide children with fewer

literacy resources, such as books, libraries and printed material than middle-income communities in a large industrial city. Such differences in access to print resources may have important implications for children's early literacy development.

Neighbourhood also influences the availability of social supports. Several studies have indicated that support systems may serve as protective moderators of negative life stressors, enhancing adults' psychological well-being and consequently impacting upon parenting efficacy and behaviours (Campbell & Lee, 1992; Taylor et al*.,* 1993).

Collective socialisation

Collective socialisation (Jencks & Mayer, 1990) posits that local adults pass on their behaviours to youths in the same neighbourhood. Neighbourhood role models and monitoring provided by more successful adults are thus considered as important ingredients in children's socialisation.

Brooks-Gunn et al*.* (1993) examined the impact of neighbourhoods singly and in concert with family-level variables, on school leaving and out of school childbearing among teenagers. They found that to the extent that economic characteristics of neighbourhoods affect child development, it appears that the absence of affluent neighbours is much more important than the presence of low income neighbours (see also Duncan, 1994). These authors suggest that neighbourhoods with dense concentrations of white-collar workers provide children and young people with models of more conventional behaviour which serve to reproduce the same or similar behaviours in the next generation of residents.

Peer groups are also likely to influence the neighbourhood. Peer group effects have been linked to school dropout rates, teenage pregnancy and labour market participation (Case & Katz, 1991; Evans et al*.,* 1993) and are posited to 'infect' youngsters with negative behaviour and attitudes.

Multiple risks

Bringing these three mechanisms together neighbourhoods influence the kinds of stresses with which parents must cope and the complexity of day-to-day family management tasks. Eccles (Eccles et al*.,* 1992) and Furstenberg (Furstenberg, 1992), for example, show that families living in high risk, low resource neighbourhoods have to rely more on in-home strategies to help their children develop and to protect them from the dangers of the neighbourhood. Conversely, families from low risk neighbourhoods are better able to use resources from their community, such as organised youth programmes, in order to help their children develop the same talents and skills. Fewer risks also mean that neighbourhoods are comparably safer and thus the need to protect children from the potential hazards of their environment is not so pressing.

Additional empirical evidence

Much of the large sample, quantitative research looking at the impact of neighbourhoods on children's development comes from the US. Direct applicability to the UK is limited by differences in terms of the funding of institutional resources and the different composition of communities, among other factors. However, there is little UK research looking specifically at the relationship between neighbourhood characteristics and children's and adolescents' development so we use this US evidence as a basis. One exception is Gibbons (2002) who finds in the 1958 UK cohort that neighbourhoods explain a small proportion of the variation in school performance once family background effects are controlled for.

In general, studies on child development find that neighbourhood conditions, particularly measures of neighbourhood SES, are accounted for, in part, by family SES. However, living in an economically deprived neighbourhood may have a negative effect on children's achievement independent of family and school characteristics (Garner & Raudenbush, 1991; Leventhal & Brooks-Gunn, 2000).

3.2.2 The effects of prior parental education on neighbourhoods

Distal factors, such as familial income and social class, limit where families live either by impacting on their preferences or their constraints (Massey & Denton, 1993; Wilson, 1997). Thus, although there is little evidence looking specifically at the effect of prior parental education on location, there are strong theoretical grounds to expect a relationship between parental educational level and location. More educated families may choose to (or be able to choose to) live in neighbourhoods with better amenities such as high quality pre-schools, successful schools, low crime and open areas.

Gibbons (2002) looked at the relationship between the educational strength of an area and house prices. Conditioning on other factors, neighbourhood house prices increased with the presence of more educated neighbours. Gibbons argues that the education levels of a neighbourhood and its community matter because of spillovers in the production of human capital in children. He concludes that house purchasers are prepared to pay to live in neighbourhoods with greater potential for human capital formation. Similarly, Gibbons and Machin (2003) show a positive effect of school quality, measured by national league tables and property prices. These findings suggest that parents value characteristics of a good neighbourhood, such as its educational richness and the quality of its schools. If parents' own education influences the development of their children's educational opportunities and their aspirations for them the implication is that there is a strong relationship between parents' education and their choice of neighbourhood.

3.2.3 Summary

We conclude that there is substantive and relatively robust evidence to support the view that neighbourhoods matter for children as a developmental context, although the effect is not a major one. Parental education impacts on neighbourhood choice

through income, aspirations and lifestyle. The stratification of neighbourhoods by social class and education is not total but is strongly apparent in most urban environments. Evidence strongly supports this association. However, although the theoretical grounds for an effect of parents' education on neighbourhood choice are strong, to our knowledge there is no evidence that identifies and establishes empirically a causal role for parents' education. We conclude therefore, that neighbourhoods are a mediator of education effects, but only moderately so.

3.3. Schools

The literature on the role of schools and schooling for children's achievement and attainment is voluminous and covers influences such as pedagogy, curriculum and assessment, size of school and teacher effects, teacher expectations and pupil-teacher interactions and the impact and consequences of school choice and diversity. However, the focus of this paper is not to describe in detail the determinants of effective schools but to situate within our framework the school as an important developmental context.

As noted above developmental contexts other than the family can also be modelled using an ecological framework and there are many channels for interactions between these contexts. As with the family context, influences operate at distal, characteristic and proximal process levels. For example, the characteristics of the schools make them differentially effective so that pupils make greater educational progress in some schools than in others. Equally the processes within schools, such as pupil-teacher interaction and the influences of peer groups, are important for development across a variety of developmental domains.

3.3.1 The effects of schools on child development

The Coleman report, Equality of Educational Opportunity (Coleman et al*.,* 1966), was one of the first attempts to provide a comprehensive insight into understanding the critical factors relating to the education of minority children. One of its main findings relates to the variation between schools in terms of achievement and explores the question; what accounts for this difference? The report claims that schools are remarkably similar in the effect they have on achievement of their pupils when the socio-economic background of the student is taken into account. Thus when controlling for these characteristics the differences between schools account for only a small fraction of differences in pupil achievement. He notes however, that schools do differ in the degree of impact they have on different ethnic groups with the white pupil's achievement being less affected by the school's facilities, curricula and teachers than is that of the average minority pupil's.

Coleman also finds that the variability between individual pupils within the same school is approximately four times as large as the variability between schools.

More recently, however, Mortimore et al. (1988) examined the progress of 2000 pupils in 50 London primary schools and found that the effects of schools on primary

school progress were much larger than the effects of pupil background characteristics. For example, school membership accounted for 24% of the variation in reading progress during primary schools, compared to only 6% due to background factors. In other words, the school was approximately four times more important in accounting for differences in reading progress than background factors.

The wealth of evidence that exists in this area, however, suggests that schools are differentially effective. For example, pupils make greater progress in schools with more socially advantaged intakes. Similarly, children from lower socio-economic backgrounds are more likely to attend socially-deprived schools and, in turn, make comparatively less progress than their socially advantaged counter-parts. Value-added analysis of pupil progress during KS1 in Wandsworth LEA showed that the composition of a school's intake can have a substantial effect on child outcomes over and above effects associated with individual prior attainment of family background (Strand, 1997; see also Feinstein & Symons, 1999; Mortimore et al*.,* 1994; Robertson & Symons, 2003). Moreover, league tables may give schools an incentive to 'cream skim' their students, i.e. select children in order to maximise their performance results.

Ability grouping

Ability grouping practices are often justified by a person-environment fit perspective: people will be more motivated to learn if the material can be adapted to their current competence level. However, much of the available evidence suggests that such practices only serve to widen the attainment gap; students assigned to high-ability allocation streams do better than in mixed-ability groups while placement within low-ability groups has a negative impact on pupil attitudes to school and motivation. Evidence here suggests that pupils in lower ability groups are disadvantaged primarily because they are often provided with an inferior education experience and diminished support (see Ireson & Hallam, 2001).

Peer group influences

As noted above peers are an important context in and of themselves. However, as within the context of neighbourhoods, peer groups are an integral part of children's experiences at school. Much of the classic work on peer group influences, however, has focused on the negative effects of the peer context. More recently, investigators have given greater credence to the positive influences of peers as well. The evidence suggests that children cluster together in peer groups sharing similar motivational orientations and preferences and in doing so further strengthen in-group identification (e.g. Ball, 1981; Berndt et al*.,* 1990). Positive and negative influences thus depend on these group characteristics. High achieving children who seek out other high-achievers develop even greater positive academic motivation over time. Conversely, children with lower motivational achievement are at increased risk of becoming even less motivated (see Brown, 1990; Kinderman, 1993).

Both theory and evidence here suggest children should be able to focus attention and thus learn if they feel socially supported and well liked by both peers and adults in their learning context (e.g. Goodenow, 1993; Ladd, 1990)[4]. For example, studies focusing on social competence and motivation at school have shown that children who are accepted by their peers and who have good social skills do better in school. They have more positive academic achievement motivation and place greater value on learning generally. In contrast, socially rejected children are at increased risk for negative outcomes (e.g. Asher & Coie, 1990; Hinshaw, 1992; Wentzel, 1993).

The role of peers as co-learners is also relevant (Slavin, 1990; Stevens & Slavin, 1995). Peers aid understanding and learning through group discussion, sharing of resources and modelling of academic skills. These aspects of pupil-pupil interaction should influence achievement and related behaviours through its impact on children's expectations for success, self-evaluation and self-efficacy.

Such peer group effects are likely to vary across age. As children get older and become adolescents the role of the peer group becomes more salient. Group acceptance is more important and the time spent with peers is increasingly unsupervised. Consequently, adolescents are likely to be especially susceptible to peer group influences on their interests, goals and values (see Eccles et al*.,* 1989; Wigfield et al*.,* 1991).

Pupil-teacher interactions and teacher expectations

Researchers studying pupil-teacher interaction and the classroom climate have separated factors such as teacher personality and warmth from teacher instruction and managerial style. As within the context of the family, these proximal class/school processes are influenced on other aspects of a teacher's cognitions and related practices. For example, student achievement and attitudes are maximised when teacher warmth and supportiveness occur alongside clear and efficient structured and focused teaching (Fraser & Fisher, 1982; Moos, 1979).

One common claim in the literature is that working class pupils receive a smaller amount of teacher time and attention than their middle class peers (see Foster et al*.,* 1996) for a review). These classroom inequalities are often explained as the product of differential teacher attitudes towards or expectations of pupils from lower SES backgrounds. Other investigators highlight the differences in teacher expectations according to socio-economic factors. For example, Mortimore et al*.* (1988) found that even when conditioning on reading, writing and maths attainment, social class background was still related to teachers' ratings of pupils' abilities. Though a small effect, teachers nevertheless tended to have a more favourable view of those from non-manual backgrounds, i.e. underrate the ability of working class children and overestimate that of middle class children. The findings from school effectiveness literature compound such classroom inequalities by highlighting high teacher

[4] However, separating out the unique contribution of peer group effects is empirically very complicated and so we cannot be sure that peer group influences do not also include aspects from other processes such as pupil-teacher interactions and ability grouping.

expectations as a key determinant of effectiveness and pupil progress (Sammons, 1999).

3.3.2 The effects of prior parental education on schools

From theory parental education is implicated in the schools context, namely through the channels of cultural and social capital as well as income. For example, a large body of qualitative evidence highlights the increasing importance of the quasi-market in terms of the impact and consequences of school choice and diversity. For example, middle class parents are more inclined and have greater capacity to engage with the education system (Gewirtz et al*.,* 1995). Middle class parents and their children might be better equipped with the cultural capital needed to 'succeed' within the school context (Bernstein, 1977; Bourdieu, 1973). Many authors argue that both curriculum and pedagogy favour those with more education in terms of their language codes and the discourse used and the age appropriateness of educational behaviours in the home with classroom practices.

In addition, the feedback loop from prior attainment in relation to aptitude selection and ability grouping is also influenced by parental education. Children from more highly educated families are more likely to be doing better in their early years. In turn, schools that select on attainment may, in turn, benefit those from better educated backgrounds. Similarly, there are important interactions between neighbourhood and school contexts. Higher income parents are better able to buy houses in the catchment areas of 'better' schools.

3.3.3 Summary

In summary, there is strong and robust evidence that schools are important for child outcomes although since the Coleman report, (1966) schools have been seen as less important than families as influences on children's attainments. Nevertheless they are clearly important.

Education has important benefits for parents in terms of their capacity and desire to manage the system, finding good schools and monitoring schooling in such a way as to create an effect of education on school quality. In a similar way as for the contexts of neighbourhood and pre-schools, this specific role of parental education operates largely through income, aspirations and cultural capital. Therefore schools mediate the effects of education in an important way, being part of the explanation for the inter-generational transmission of education. However, this well-founded theoretical hypothesis would benefit from robust, large sample empirical analyses.

3.4. Pre-schools

Pre-schools and childcare are also salient social contexts for young children and may act as mediators of distal parental factors and education on children's outcomes. There are many different types of pre-school settings and there is interesting evidence on its differential effects (Gregg & Washbrook, 2003; see also the EPPE project). The

nature of effects may depend on mothers' employment and occupation as well as the engagement of fathers and other adults in the household. To simplify presentation we focus on pre-schools. The availability, accessibility, affordability and quality of pre-schools are also influenced by neighbourhood characteristics, indeed the quality of local pre-schools may be thought of as a neighbourhood characteristic.

3.4.1 The effects of pre-schools on child development

As with educational behaviours in the home such as reading to children and exposure to print (section 2.3), participation in an early childhood education programme can provide pre-school children with skills and enrichment that can increase their chances of success in school. Many studies report on the association of good pre-school quality with a variety of positive outcomes for young children. High quality, developmentally appropriate childcare in the pre-school years is associated with enhanced social, emotional, and, in some cases, linguistic competence for low and middle income children alike.

An influential study from the US by Schweinhart et al. (1986) investigated pre-school systems for children in Ypsilanti, Michigan considered to be at risk of failing at school. They randomly selected a group of children to receive pre-school education, finding that the average Stanford-Binet IQ of the treatment sample rose by 27 points during the first year. The control group's average IQ rose by only 4 points. By age seven the average IQ of the treatment group had stabilised at between 90 and 100 compared to between 85 and 90 for the control sample. One of the most important findings of this study was that different curricula in pre-school seem to have different effects.

Early British research by Osborn and Milbank (1987) used the British 1970 Cohort Study (BCS70) and found large and significant benefits of pre-school experience on most of their attainment measures at five and ten years. US findings similarly reported positive relations between good quality pre-school experiences and later attainment (Howes, 1990; NICHD, 1997, 1998; Ramey & Ramey, 1998).

More recently, the EPPE project has investigated the impact of attending a pre-school centre. EPPE has demonstrated the positive effects of high quality provision on children's intellectual and social/behavioural development. Pre-school attendance improved all measured aspects of children's cognitive development and social behaviour, such as independence, concentration, co-operation, conformity and relationships with other children at entry to primary school. Children with no (or limited) pre-school experience had poorer cognitive attainment, sociability and concentration when starting school. These findings hold when observed differences between the pre-school and home groups in child, family and home environment characteristics were taken into account[5].

[5] In comparison with sample children who attended a pre-school centre, home children differ considerably in some of their socio-demographic characteristics. For example, home children are

In addition, EPPE research indicates that pre-school can play an important part in combating social exclusion and promoting inclusion by offering disadvantaged children, in particular, a better start to primary school. EPPE's findings indicate that whilst not eliminating disadvantage, pre-school experiences can help to ameliorate the effects of social disadvantage and can provide children with a better start to formal education. These findings on quality are consistent with other large scale longitudinal research including data from the NICHD (National Institute of Child Health and Development) and CQO (Childcare Quality and Outcomes) in the US.

It is important to emphasise that the benefits of pre-school participation for disadvantaged children are likely to be eroded if the intervention or programme does not extend beyond the early years (Ramey et al*.,* 2000; Ramey & Ramey, 1992). Thus pre-school programmes are very important but are not a panacea for all social ills.

3.4.2 The effects of prior parental education on pre-schools

As has been noted for the contexts above, the direct influence of parents' own education on their choice of pre-school arrangements and settings has rarely been the primary focus of research. However, there are clear grounds for a relationship. More educated parents are likely to be better able to assess the quality of pre-schools as well as have greater and easier access to them.

Research by EPPE (Melhuish et al*.,* 1999) examines the characteristics of parents using different types of pre-school by parents' qualification levels. Those mothers using private day nurseries had higher levels of educational qualifications than other mothers. In contrast, the majority of mothers using local authority centre pre-schools had no qualifications (see Table 1.21, p.15). The qualification levels are similar for mothers using nursery classes and playgroups. Note however, that in terms of the quality by these types of provider, EPPE finds that LEA centres (nursery schools, nursery classes and nursery schools combined with care) had scores in the good-to-excellent range. Playgroups and private day nurseries were consistently found to have scores in the minimal-to-adequate range (Sylva et al*.,* 1999). These findings reflect similar results from Ofsted reports. Therefore the expected relationship of parental education and pre-school quality may not hold in practice. However this conclusion needs to be tested in multi-variate analysis that considers not the relationship of parental education and pre-school type but of parental education and pre-school quality, controlling for type.

3.4.3 Summary

Overall, the pre-school context is an important one for children's development. The effects of pre-schools depend importantly on distal features of the family context such as family structure, size, maternal employment flexibility and opportunity. Nonetheless, there is good evidence that quality pre-schools have important benefits for children's development.

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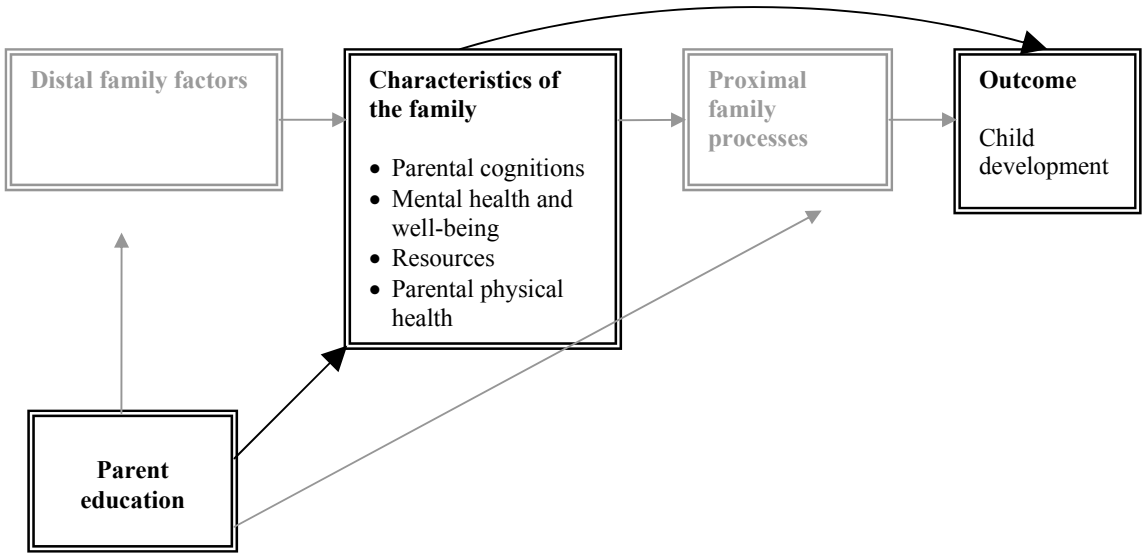
more likely to be from ethnic minority groups, larger families and have mothers with no formal qualifications.

Increasingly under current Government policy, pre-schools will be universally available. To the extent that the policy is rolled out nationally, the effect of education on provision is therefore likely to be reduced, particularly as the use of pre-schools will in any case be heavily moderated by decisions about mothers' employment. There may be an effect of parental education on pre-school quality that remains but we have not identified strong evidence to support that conjecture. Nonetheless, we conclude that until high quality pre-schools are universally available and accessible pre-schools will be strongly implicated as a cause of the inter-generational transmission of education.

4. Characteristics of the family

Box 9: Conceptual model for the influence of the key characteristics of the family



4.1. Introduction

The previous section explored the associations between prior parental education, family proximal processes and children's developmental outcomes. While much of early development is viewed primarily as a function of the quality of parenting and the child's own characteristics, the quality of parenting itself is shaped by broader factors. We now take a step back from the immediate parent-child relationship and turn to the characteristics of the family as the arbiters of the context within which these relationships occur.

In section 3 we noted the importance of other developmental contexts, namely the neighbourhood, schools and pre-schools. This section, however, focuses solely on the context of family and on the relative importance of its key characteristics. As before, for each characteristic, we consider the evidence for:

i. its importance as an influence on children's development;

ii. an influence of parental education on the characteristic.

Characteristics of the familial context identified here are:

i. Parental cognitions;

ii. Parental well-being and mental health;

iii. Resources;

iv. Parental physical health.

There is less evidence on the specific importance of characteristics of contexts for development than on the importance of distal factors or proximal processes because much of the literature concerned with contexts does so as part of more complex modelling about the links between distal factors and subsequent child development. Therefore this section is largely grounded in theory, drawing on evidence where it is available. Evidence based on more complex modelling of distal factors operating through the characteristics of a given context on development will be discussed in our conclusions in section 7.

Resources

The expenditure of resources of goods and time is the mechanism by which distal factors such as income, family structure and maternal employment achieve real impact on children's lives in the economic model. Economic models of child development (e.g. Becker, 1981) suggest that families with higher economic resources are better able to purchase or produce important goods or inputs for their children's development. Because resources mediate the effects of distal factors, evidence on resources belongs in this section. However, there are many more studies on the effect of income or family structure than there are on breaking down this effect into component resource channels. Therefore, resources are discussed in detail in section 5 and we do not provide evidence on resources here.

Parental physical health

Parental physical health is also likely to be an important influence on parents' interactions with children and infants but we do not discuss this mediating characteristic in this report as it is unlikely to be sufficiently strongly associated with parental education to be an important mediator of education effects. We emphasise, however, that parental education is likely to influence strongly the capacity of parents to deal with their own ill-health conditions or those of their children.

Interactions between characteristics

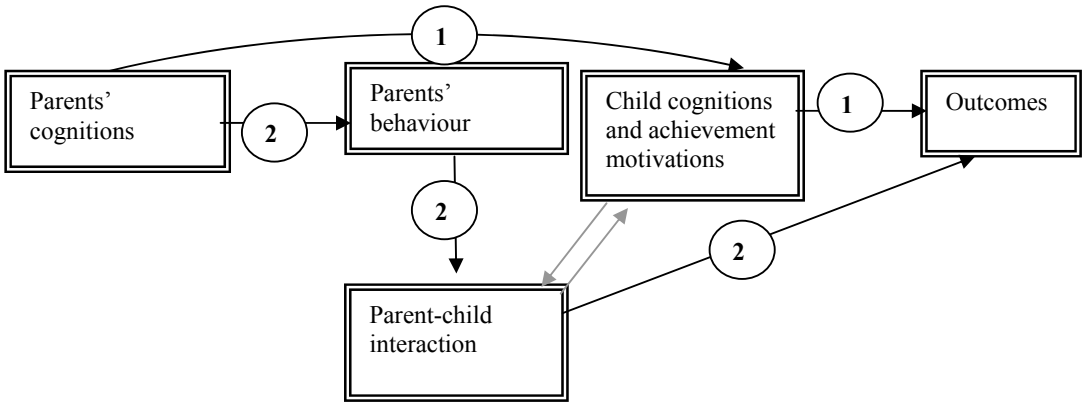
It is important to note that each category of characteristics also moderates the effects of other categories. Thus, parents' beliefs are moderated by poor parental well-being and/or high levels of stress. For example, parents who are depressed feel less efficacious in their ability to implement their parenting beliefs and goals (Elder & Ardelt, 1992). Some interesting interactions between characteristics of context will be noted.

4.2. Parental cognitions

The focus in this section is on the relationship between parents' cognitions and children's outcomes in terms of various measures of children's attainment and achievement motivations. Cognitions can take the form of beliefs (both general and more specific to individual children), attitudes (including stereotypes of gender, culture and activity), aspirations and expectations, interest, values and knowledge. These cognitions interact with each other as well as with both distal factors and

proximal family processes to influence child development in a number of ways. Box 10 below shows some of the possible pathways of influence.

Box 10: Direct and indirect influences of parental cognitions



First, parental cognitions matter in that they influence the beliefs, attitudes and aspirations etc. of children directly (arrow 1). Parental perceptions of their adolescents' abilities are significant predictors of adolescents' estimates of their own ability and interest in maths, English and sports, even when conditioning on the child's actual performance (Alexander & Entwisle, 1988; Eccles et al*.,* 1993; Jacobs & Eccles, 1992; Miller et al*.,* 1991; Pallas et al*.,* 1994).

Secondly, parents may influence the activity choices of their children through the experiences they provide and the behaviours they display during parent-child interaction (arrows 2). By providing the specific toys, home environment and cultural and recreational activities for children, parents structure their children's experiences and model what children see outside the home (D'Amico et al*.,* 1983). Such parental valuation and interpretation of reality may thus be communicated in both subtle and more overt ways.

For simplicity, this representation of parental influence holds constant the bi-directional influence between child cognitions and parent-child interaction (arrows in grey). While we recognise the importance of such feedback loops, these specific relationships are not central to our focus on the role of parents' cognitions in influencing child outcomes.

4.2.1 Perspectives of parental cognitions

Current work on the influence of parental cognitions on children's development is grounded in theoretical perspectives of motivation more generally. For example, 'attribution theory' (Graham, 1991; Heider, 1958; Weiner, 1985) emphasises how interpretations of achievement, rather than motivational dispositions or actual outcomes, determine subsequent achievement in both positive and negative ways. Bandura's (1994) social-cognitive model, 'self-efficacy theory', emphasises human

agency and perceptions of efficacy in determining achievement. Bandura proposes that individuals' efficacy expectations are the major determinant of goal setting, activity choice, willingness to expend effort and persistence. Perceived self-efficacy is determined by previous performance, vicarious learning, verbal encouragement by others and one's own psychological reactions. 'Self-worth theory' (Covington, 1992) defines the motive for self-worth as the desire to establish and maintain a positive self-image.

'Modern expectancy-value theory' (Eccles (Parsons) et al., 1983; Eccles, 1993; Wigfield, 1994; Wigfield & Eccles, 1992) assumes that expectancies and values directly influence performance, persistence and activity choice. Expectancies and values are also influenced by beliefs such as perceptions of competence, perceptions of the difficulty of different tasks and individual goals. These are, in turn, influenced by individuals' perceptions of other peoples' attitudes and expectations for them and by their own interpretations of previous success or failure.

4.2.2 The effects of parental cognitions on children

These parental and familial beliefs and expectations are conveyed to children in many subtle and more overt ways; encouraging particular activities and discouraging others, telling children what they are good at and making comments about the value of talent versus ability. For example, there is a well established association between parents' expectations for their children's educational attainment (e.g. whether or not their child will attend college) and the child's current and later achievement (e.g. (Alexander & Entwisle, 1988; Schneider & Coleman, 1993; Seginer, 1983)). In general, research here has indicated that more positive perceptions on the part of parents are associated with higher attainment in children, both in terms of a parents' perception of their own child's ability and in terms of accelerated normative expectations (Hiebert & Adams, 1987; Miller & Davis, 1992). Note however, that problems of causality are inherent here. The reciprocal relations and feedback loops between child outcomes and parents' beliefs, valuations and expectations are highly complicated and constantly shifting and so to say that one causes the other is beyond the scope of most research designs.

Maternal beliefs about childrearing influence parental behaviour more generally and hence the experiences of the child. Maternal knowledge of the developmental abilities of infants, for example, is associated with the mother's structuring of a stimulating physical and learning environment (Luster & Dubow, 1990; Stevens, 1984). In turn, exposure to different activities and experiences also provides children with the opportunity to develop different competencies. Having specific success experiences and acquiring specific skills are likely to influence motivation to engage in related activities through their influence on personal efficacy, self-concept and performance evaluation.

Desforges' (Desforges & Abouchaar, 2003) recent review of the impact of parental involvement and support on children's achievement and adjustment argues that parents' educational attitudes, aspirations and values are the most significant elements

of parenting. Support for this conclusion comes from both UK and US evidence. For example, Feinstein and Symons' (1999) investigation of parental interest in their children's education in the 1958 birth cohort found that both mothers' and fathers' interest had large effects on progress in secondary school, conditioning on individual, family, neighbourhood and school factors.

Ma (2001) investigated the effects of expectation and influence of students, peers, teachers and parents on participation in advanced maths. The effect of parents' expectations and plans for college were strong in predicting participation and that in their presence the effect of students' own future expectations declined. Interestingly, peer influence and teacher expectation did not have strong effects and the effects of student future expectation were independent of peer and teacher effects. Moreover, when controlling for students' prior maths achievement and attitudes toward maths, the effects of parents' expectations and plans for the future still held. (See also Fan, 2001; Singh et al*.,* 1995).

Other research suggests that parental beliefs influence not only academic outcomes but also those in other areas of children's development. Jodl et al*.* (2001) investigate the pathways linking parental values, beliefs and behaviours to adolescents' occupational aspirations. The authors highlight the potential role of parents as socialisers of values related to achievement and adolescents' occupational visions of themselves in the future. Using an ethnically diverse sample of early adolescents growing up in non-divorced families, the authors demonstrate that parents' valuation of the importance of success in academic subjects predicted youths' valuations directly rather than indirectly through parenting behaviours. In turn these valuations predict occupational aspirations. In these processes, parents' views impact on children not just because they lead parents to behave differently but because in some sense parents' views matter in themselves to children.

4.2.3 The relationships between parent and child cognitions

Extensive work by Eccles et al*.* also strongly suggests that parents' estimates of their children's academic abilities are important predictors of children's beliefs about their own ability and sense of self-efficacy. For example, path analysis using data from the longitudinal Michigan Study of Adolescent Life Transitions (MSALT) showed that parents' views of their children's ability in both maths and English had important predictive relations to the children's own self-perceptions conditioning on actual ability (Eccles et al*.,* 1989).

The authors attempted to test the causal direction implied in this relationship using longitudinal cross-lagged panel analyses in structural equation models. Mothers' perceptions of child ability at wave 1 were related to their perceptions of maths ability at wave 2 (0.78). Similarly, the child's perception of own maths ability at wave 1 were also linked to their own perceptions at wave 2 (0.61). Importantly, conditioning on the child's own ability at wave 1, mothers' perceptions at wave 1 were related to the child's perceptions of his/her maths ability at wave 2 (0.22).

It is noteworthy that there is still an effect when taking into account actual attainment. However, the role of causality in this association is still unclear. Clearly, parent and child perceptions are reciprocally related, as noted in above 4.2. Mothers' perceptions of their children's ability appear to influence change over time in the children's self-perceptions more strongly than vice versa (Eccles et al*.,* 1991). However, this evidence may be caused by greater accuracy in mothers' perceptions than in children's perceptions so that over time, children learn and the perceptions of mothers and children converge.

In a small sample of disadvantaged African American families Halle et al (1997) showed that the relationship between parents' expectations and children's later achievement remained significant even when children's beliefs were controlled for. This suggests that parents' expectations are either important determinants of attainment or that parents are particularly well able to assess ability that is not picked up by children themselves.

As with other research the dominant error was of over-estimation of achievement. The authors go on to suggest that optimistic self and parent appraisals of achievement may serve as a protective factor for these children at risk (Garmezy, 1991). Wagner and Phillips (e.g. 1992) argue that children who underestimate their academic abilities may be at risk for underachievement and low motivation. As a result of their findings however, Halle et al*.* suggest that children from disadvantaged backgrounds may be more likely to show higher motivation and greater persistence towards academic achievement if they are able to see themselves as capable and successful in school, regardless of the accuracy of their assessments. Thus, the positive attitudes of these students and their parents may aid, rather than hinder, their achievement.

4.2.4 The effects of prior parental education on parents' cognitions

A recent paper by Davis-Kean & Schnabel (2001) used data from the 1997 US Child Development Supplement of the Panel Study of Income Dynamics (PSID-CDS) to examine the link between parental education and measures of parental expectations for children's achievement. Parents' education was measured in terms of number of years of education of both mother and father. Mean for the sample was approximately thirteen years, slightly more than a high school education. Parents' expectation was measured with a continuous variable that asked the parent; 'How much schooling do you expect that your child will complete?' Choices ranged from eleventh grade or less (education = 1) to M.D., PhD, or other doctoral degree (education = 8). The mean for the sample was 5.4 indicating that, on average, the parents in this sample expected their children to graduate from college after two years.

Correlational analyses of these results showed that having a higher parental education was significantly related to parents having higher expectations of child achievement (r=.41). Subsequent structural equation analyses also showed parent education level as having the strongest impact on parental expectations of the family demographic variables assessed (income, employment status and ethnicity). The authors claim that parental education impacts directly on parental expectations of their children's

achievement as well as highlighting the mediating effect of parental beliefs and behaviours on explanations of children's outcomes here.

Ganzach also finds that parents' education accounts for significantly more of the explained variance in children's cognitive ability than other possible factors, including self-esteem, ethnic background, family composition and income. Furthermore, his findings (from US NLSY data) are consistent with an offsetting relationship between mother's and father's education; high education of one parent can offset low education of the other.

However, while an effect of parental education on parental expectations is one explanation for the correlation, it is also likely that parents with higher education have higher attaining children for whom they therefore have higher expectations. In other words expectations may be driven primarily by parents' observations of the apparent ability of their children. More useful for our purposes would be the correlation of parental education and expectations conditional on the attainment of the child.

Moreover, parents whose belief in and valuation of education was high when they were young are likely to both chose more education for themselves and to have higher valuations of education for their children. Simple correlation of educational valuation and parental education is not therefore proof of an effect of education, although the theoretical grounds for such a link are strong. For example, Ganzach find a curvilinear relationship between parents' level of education and their children's own educational expectations. This relationship suggests that for parents with fewer than twelve years of education (i.e. less than a high school graduate), the relationship between parents' education and their children's educational expectations is only slightly positive, while for more than twelve years of education this relationship is much more positive. These results also highlight the importance of children's and teenager's educational expectations in predicting their educational attainment in adulthood.

Alexander et al. (1994) found that children of more highly educated parents were more accurate in predicting their expected marks as well as more accurate in recalling previous grades. Children of parents with lower levels of education consistently overestimated both their previous and expected marks more often than children of higher educated parents.

The authors argue that these inflated expectations are socially patterned and result from differences in the human and social capital of parents and their families that originate in differences in class background and life experience reflecting social marginality. They suggest that the skills of dealing with the institution of school, understanding the flow of information from school to home and relating such understanding to their own lives are relatively lacking in lower SES and minority households. See sections 3.3 for further discussion here.

Data from the US PSID-CDS (Trends, 2002) study shows an association between the types of values that parents seek to instil in their children and parents' own level of education. For example, 74% of mothers educated to college degree level ranked

thinking for oneself as the most important quality children can learn compared to just 35% of those with less than a high school education [6]. Conversely, 34% of mothers with lower educational achievement report obedience as the most important quality for their children to learn compared with only 8% of mothers with a college degree.

In terms of maternal knowledge more generally, Brooks-Gunn et al. (1995) showed a positive association between higher maternal education (i.e. having more than a high school education) and mothers' greater knowledge of child rearing and general child development theory. This relationship held even when controlling for poverty. Note that maternal knowledge may impact on parental cognitions but can also be considered as one aspect of proximal family processes.

4.2.5 Issues of causality

Many of the points about causality made above in section 2.1.2 in relation to the evidence for the effects of proximal process apply equally to the evidence about beliefs and aspirations. It is difficult to disentangle pure causal elements in the complex interactions between attainment and the beliefs and aspirations of parents and children. Clearly, aspirations are likely to rise in response to success but, equally, positive aspirations may drive success. Identifying pure causal effects is difficult and requires a methodological focus that differs somewhat from that of the dominant authors in the field.

4.2.6 Summary

Overall, the correlational evidence for the effects of education on parents' cognitions is strong but there is not yet enough evidence to suggest that the relationship is causal. However, the theoretical grounds for such a link are strong. Similarly, the association between parents' cognitions and children's outcomes is strong both theoretically and empirically but causality has yet to be established.

From a developmental standpoint, cognitions are a key mediator of education effects. They are important in themselves and as a channel for inter-generational transmission of learning and achievement. There is correlational evidence to support this but the causal effects are thus far relatively unsubstantiated.

4.3. Parental well-being and mental health

4.3.1 The effects of parental well-being and mental health on child development

Parental mental health is a key influence on parents' interaction with infants. Both the inability to control the source of stress and the inability to cope or handle the stress itself contribute to the deleterious effect on psychological functioning (Makosky, 1982). Psychological distress, depressive symptoms and parent irritability, in turn,

[6] Parents were asked to report which of the five qualities they thought was the most important quality for their child (under age 13) to learn: obedience; popularity; independence; hard worker; helper.

may lead to less responsive parent-child interactions and other forms of poor or impaired parenting behaviour (McLoyd, 1990; McLoyd & Wilson, 1991).

Parents' ability to cope with emotional stress, financial and economic pressures and additional social stressors are known to influence the performance and attainments of children, both directly through living in a more stressful environment and indirectly through negative impacts on parenting and diminished parent-child relations. For example, proximal family processes such as rewarding, explaining, consulting and negotiating with children require patience and concentration, qualities typically in short supply when parents feel harassed and overburdened.

Even when stressful life events occur in the context of otherwise low risk families they can have a deleterious effect on parent-child interaction. Elder (Elder & Ardelt, 1992; Elder et al., 1995) suggests that increased numbers of social and environmental risks forces parents to adopt less effective parenting styles. High stress levels may prevent parents' from efficiently adapting their parenting strategies to the developmental changes in their children's needs. For example, parents may be over controlling or, at the other end of the scale, too detached and/or permissive (for example Lempers et al., 1989).

A number of recent studies have also identified specific implications of maternal depression for longer-term difficulties in infant development. Infants between 12 and 21 months have shown a range of adverse outcomes including behaviour problems (Murray, 1992), cognitive impairments (Lyons-Ruth et al., 1986; Murray, 1992) particularly in boys (Murray et al., 1996), interaction difficulties (Stein et al., 1991) and insecurity of attachment (Hipwell et al., 2000; Lyons-Ruth et al., 1986; Murray, 1992; Teti et al., 1995).

These adverse developmental outcomes have been observed in infants even in cases where mothers' depressive symptoms have remitted (e.g. (Murray, 1992; Murray et al., 1996; Stein et al., 1991) suggesting that poor outcomes can have origins in mother-child interactions from as early as two months postpartum (Murray et al., 1996). The authors suggest here that it is possible that despite the mother's recovery from depression, early negative attitudes to the infant may set up a cycle of particularly marked difficulties that come to influence later child behaviours. This view is consistent with other research (e.g. (Bendell et al., 1994; Field et al. 1993) which reports that depressed mothers' early perceptions of their infants tend to be more negative than those of independent observers and to show considerable continuity throughout the pre-school years. This re-emphasises the fact that characteristics interact with each other. Here postnatal depression interacts with maternal attitudes, both of which affect child outcomes, mediated by mother-child interactions.

It is also interesting to note that fathers may buffer the negative effects of maternal depression on their children. Hossain et al. (1995) found that infants' interactions with their non-depressed fathers were more positive than they were with their depressed

mothers. The authors suggest this indicates a non-generalisation of infants' own depressed mood style and associated negative interactions across caregivers.

Evidence on the importance of psychological well-being and stress also emerges from studies that consider how stress is the mediator for the effect of poverty on children's outcomes. The adverse consequences of poverty for families affect family well-being generally but also affect children's emotional and social well-being indirectly through the negative impacts on parents' well-being and their parenting style and practices (Conger et al*.,* 1997; Evans & English, 2002; Jackson et al*.,* 2000; McLoyd, 1990; McLoyd et al*.,* 1994; Mistry et al*.,* 2002).

Cummings et al*.* (1994) review the research on the association between parents' mental health and children's development. While they acknowledge the influence of genetics and hereditary factors, they emphasise the need to study the contextual and environmental risk factors associated with depression in families (Downey & Coyne, 1990; Reiss et al*.,* 1991; Rutter, 1990a). Their framework for examining the relationships between parental, particularly maternal, depression and children's development mediated by parent-child interaction is a good example of the application of the developmental model. However, their main concern is to show that proximal family processes mediate the effect of family characteristics on outcomes. This evidence has already been considered in section 2.

4.3.2 The effects of prior parental education on parental well-being and mental health

There are a number of reasons why education may have an effect on mental health and well-being (Feinstein, 2002; Hammond, 2002, 2003). Hammond (*op cit*.) lays out four pathways for education effects through:

i. economic factors;

ii. access to health services;

iii. health-related practices;

iv. coping with stress.

These benefits are, in turn, caused by the effects of education on efficacy, cognitive skills and communication. In Feinstein information from the UK national birth cohorts showed strong effects of qualifications on the probability of depression. Taking into account childhood abilities, health and family background factors, it is estimated that the effect on the probability of depression for women going from no qualifications to an academic Level 1 qualification is a reduction in the likelihood of depression of between 6 and 10 percentage points. For men, the effects are weaker, although a degree of benefit of 6 points is estimated for the younger sample considered[7].

[7] The information used here came from the 1999/2000 sweeps of the two cohorts; the 1970 cohort were aged 33 and those in the 1958 cohort were aged 42.

Similarly, Kubzansky et al. (1999) found that adults living in the US who had less than a high school education were almost twice as likely to suffer from the physiological costs of long-term stress as individuals with at least a college education, controlling for age and lifestyle (smoking, alcohol consumption and exercise). The strength of the association is hardly attenuated when these lifestyle factors are taken into account. The authors argue that this implies the existence of a channel by which education reduces levels of stress and hostility and consequently improves health outcomes, quite independently of health related behaviours. This association between education and well-being has also been found for adult learners (see Dench & Regan, 1999).

4.3.3 Issues of causality

The pattern of causality here is somewhat complicated. Firstly, although no single gene or polygenic site responsible for inheritance of depression and mental health problems has been conclusively identified (see Cummings & Davies, 1994) we cannot ignore the substantial evidence implicating the importance of hereditary factors. Secondly, the role of reverse causality cannot be ruled out. For example, parents of children with developmental disorders are, understandably, under increased pressures. Stress and depression may then result not from the parent but rather as a consequence of the increased demands they face (for example, (McLoyd & Wilson, 1991).

Finally, an inherent methodological problem here is that self-reported information may be influenced by the mental health and well-being of parents causing complex bias in the estimation of results and thus some caution is required. Similarly, mothers depressed by their financial situations may be more likely to perceive their children as being distressed as well. For example, Duncan et al. (1994) found that mother's accounts of their child's behaviour correlate only modestly with other sources of information, such as teachers' reports and are confounded with mother's own mental health. Thus, correlations between family economic status and maternal reports of children's problems may be a spurious reflection of the association between financial difficulties and mother's psychological distress.

4.3.4 Summary

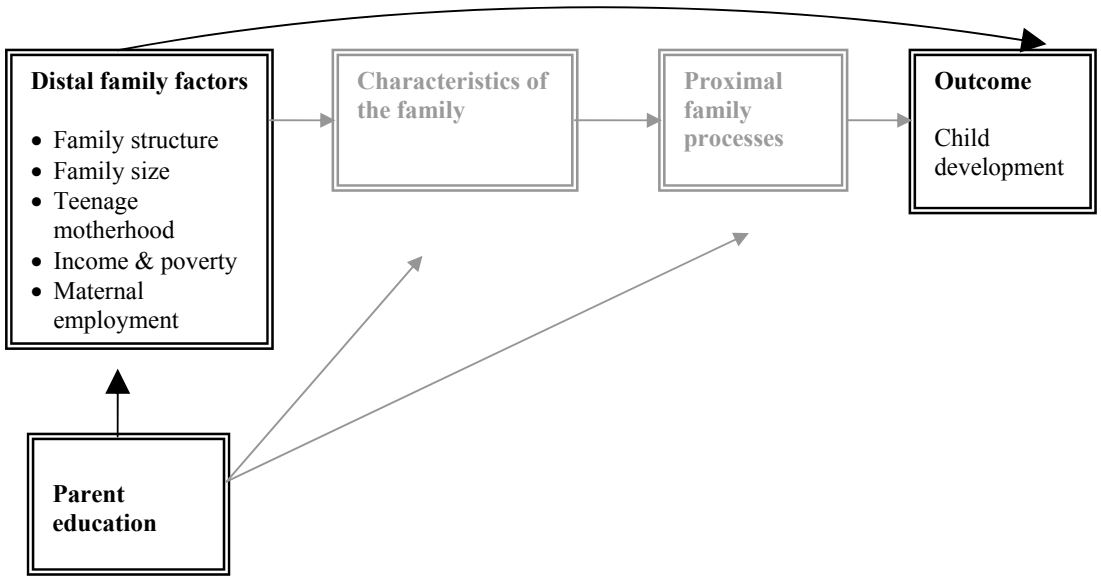
Parental mental health and well-being is an important influence on children's outcomes. It affects proximal processes in the home and can interact with other characteristics of the family such as parental cognitions. The evidence supports the view that such mediating relationships exist even if the precise causal role is unproven.

There is some relationship between education and mental health and well-being but education would rank relatively low amongst the factors that directly influence mental health and well-being. The benefit of education is more in terms of managing mental health conditions and sustaining well-being rather than being a key driving force.

Therefore, overall, we do not see parental mental health and well-being as a key mediator of education effects on children, although parental mental health and well-being is an important factor in itself and there are effects of education on both. We draw this conclusion not because these relationships do not hold but because in the context of the other mediators of education effects, we believe this channel is only of moderate importance.

5. Distal family factors

Box 11: Conceptual model for the influences of distal family factors



5.1. Introduction

Parental education is not the only factor that affects inter-generational relations. Other distal factors can also affect child development through proximal processes. Children's educational attainments can be affected by factors such as the number of siblings, the structure of the family or the age of parents at first birth. These factors are distal in that while they shape the experiences of children's lives and outcomes their influence is not immediate in an ecological sense. The impact of distal features on children's development is in this sense mediated by the characteristics of the contexts experienced by the child.

For example, the evidence may suggest that the age of parents can be an important determinant of development but there is an important theoretical and empirical question as to why that should be so. Parents' age may be a specific and quantifiable variable that can be applied in the analysis of data but the raw correlation between that variable and the development of children could be due to a range of known and unknown causal connections. The developmental psychology model that we are applying uses the structure of distal and proximal features to attempt to clarify these pathways.

This section describes the most important distal factors that are commonly found to or thought to have important effects on children's outcomes:

i. Family structure;

ii. Family size;

iii. Teenage motherhood;

iv. Income and poverty;

v. Maternal employment.

Evaluating the separate effects of specific distal factors is not an easy task. The effects of distal factors may have an effect on certain developmental outcomes but their effect may well depend on children's characteristics such as age and gender and other family distal factors such as birth order and number of children. Therefore, interactions between distal factors and between distal and other factors may be very important. Although we try to separate the effect of distal factors on developmental outcomes, it is important to remember that, as discussed above, what matters for child development is not a single risk associated to a distal factor but the compounding risk. In this sense, children raised in poverty, whose parents lack qualifications and who live in a large family headed by a single parent may experience a higher risk of low achievements at school than other children raised in a one parent household out of poverty.

5.2. Family structure

Family structure can be defined according to the number of parents, either natural or non-natural, living in a household. Two categories are given in the literature on family structure: one or two parent families. Each of these groups contains subcategories differentiated by marital status and the nature of the relation between parents and children. In this sense, cohabitation differs from marriage and living with both natural parents differs from living with step, foster or adoptive parents.

5.2.1 The effects of family structure on child development outcomes

The social science literature has analysed how child development may be affected by the structure of the family in these terms. One of the main concerns is with developmental effects due to *changes* in family structure. For instance, the break-up of a family, regardless of the causes, brings new interactions between parents and children as well as new parental roles within the household. Resources at home, such as time and income, as well as the mental well-being of parents could be affected and, in turn, influence child development.

The majority of studies point out that what matters for child development, more than the presence of parents in the household as providers or care and resources, is the stability of the family and the strength of the relations between household members. These factors affect both the characteristics of the context as well as the proximal familial process described in our model.

One important theoretical basis for the role of family structure as a distal factor comes from economic models of household production. According to these models the presence of two parents in the household increases the quantity of parental investment in children's development (Haveman & Wolfe, 1995). A single parent may be not

only the main earner of the household but also the main provider of care for the children. The resulting trade-off between income and care in single parent households may also induce stress which may decrease the quality of parental resources.

Psychologists, on the other hand, focus more on the nature of parental relations in the family (McLanahan & Bumpass, 1988). In this sense, family structure is seen as an influence on the home environment (parental well-being) and proximal processes. In particular, the frequency and length of fathers' or mothers' absence from the child's home environment may affect children's sense of security and ultimately disrupt familial proximal processes (McLanahan, 1985). Similarly, these theories emphasise that unstable relations, perhaps characterised by intra-household violence, conflict or periods of parental absence, can affect proximal processes in the home impacting on children's behaviour at school and on the likelihood of gaining school qualifications (Hill et al., 2001).

Empirical evidence has shown that children who experience the breakdown of their parents' relationship, i.e. living in a one parent household due to divorce or separation, differ from those who do not in terms of their behaviour at school and completed years of schooling (Brooks-Gunn et al., 1997; Ermisch & Francesconi, 2001; Hill et al., 2001). Other evidence points to the importance of living with both natural parents for a broad set of child development outcomes that include cognitive achievements and behavioural indicators (McLanahan, 1997). In contrast, some studies suggest that the arrival of a step-parent can have both positive and negative consequences for child development (Cooksey, 1997). Among the negative effects we find low educational qualifications (Boggess, 1998) (West et al., 1995).

However, several important caveats need to be added to this evidence. Conflict and instability in the relationship between parents have negative consequences for child development regardless of the structure of the family (Joshi et al., 1999). Family structure does not influence children cognitive ability when income is included as control (Joshi et al., 1999; Peters & Mullis, 1997; Smith et al., 1997), though it may influence their educational attainments (Haveman et al., 1997; Manski et al., 1992). This suggests that the main underlying causes of the effect of family structure are the income loss and conflict associated with broken or unstable relationships. The effect of conflict can occur in one or two parent family structures and the causal pathway is not necessarily from structure to conflict but may more likely be the other way around.

5.2.2 The effects of prior parental education on family structure

Of all the distal factors, family structure has the weakest or most unclear relation to parental education. Individuals' risk of partnership breakdown depends on personal circumstances as well as on legal and social factors and on the cultural environment. Hoem (1997) suggests that education would decrease the risk of partnership breakdown if people with high levels of education are better at selecting their partners or spouses and making their relationship work. In contrast, individuals with more education stand to gain more than their counterparts with less education in ending a

relationship that turned out to be unsatisfactory. The total effect of educational attainments on partnership dissolution depends on which effect dominates.

Kiernan and Mueller (1998) suggest that the observed increase in risk of partnership dissolution among those with less education in the UK (Berthold, 2000; Hobcraft, 2000), may be in large measure due to the formation of early partnerships and poverty. Kiernan (Kiernan, 1997) and Hoem (1997) have estimated effects of education on the formation and dissolution of partnerships but family structure appears to be fairly independent of parental education.

5.2.3 Summary

We conclude therefore that family structure has effects on development through income and is therefore of medium importance as a distal factor. The area has, moreover been well researched with good longitudinal designs and replication. However, education has a complex relation to family structure, producing both positive and negative effects of the probability of parental separation. These positive and negative effects more or less cancel out. Therefore, we do not see family structure as an important mediator of education effects. It is important as a distal factor but not as a channel for effects of parental education.

5.3. Family size

Two main dimensions of the role of family size as distal factor have been analysed in the literature. As a total number, e.g. three children, family size affects the amount of resources available per child in the home context. As birth ordering, resource availability per child depends on the relative birth position as well as the age differential between dependent children.

5.3.1 The effects of family size on children's educational attainment

Because of resource constraints at the household level some economic models predict that the greater the size of the family the lower future educational attainments and earnings for children since every additional child receives relatively fewer parental resources (Becker & Tomes, 1976). This, however, may be offset somewhat by the positive externalities that exist from older children for their younger siblings (Blake, 1981), as well as by resources or activities that parents can share with one or many children without affecting individual parental proximal processes, e.g. a visit to the zoo referred to as 'public' time in Hanushek (1992).

Empirical evidence from the US and the UK suggests that children from small families tend to achieve higher educational qualifications than children raised in large families (Baydar et al*.,* 1997; Hauser & Sewell, 1983; Iacovou, 2001). However, the effect of family size on educational attainment depends on birth order (Behrman & Taubman, 1986; Dearden, 1999). First born children achieve higher educational qualifications not because of parental favouritism but by having a higher probability of belonging to a small family (Hanushek, 1992). But at the same time, younger

children tend to benefit from their elder siblings and from interactions with other children (Iacovou, 2001). In most studies the effects of family size on children's educational attainment remains significant and fairly stable. This is, on average, children raised in small families achieve higher educational qualifications than children raised in large families.

Overall, based on replication and good longitudinal evidence there is a relatively strong effect of family size on children's school achievement. Although family size and birth order matter for child development, a number of interactions remain empirically unexplained. Parental experience gained from raising the first born child may be important. This may have positive as well as negative externalities for second and subsequent children. Similarly, how much young children benefit from their older siblings is relatively unresearched. It may be the case that young children are negatively influenced by their older siblings, especially with respect to behavioural development.

5.3.2 The effects of prior parental education on family size

Evidence on the raw negative relationship between parental education and family size is robust. A simple correlation analysis shows that parents with more education have, on average, fewer children (Ferri & Smith, 2003). The interpretation of the causality of this relation is difficult.

From theory, there are four interrelated pathways by which education may affect family size, mainly via effects on parents' choices regarding the number of children. First, parents with high education may place a higher valuation of child attainment relative to child quantity which may limit family size in order to maximize children attainments (Becker, 1991; Joshi, 2000). Secondly, education may increase the opportunity cost of employment and so induces a substitution between fertility and employment (De Tray, 1973; Hobcraft & Kiernan, 1999; Mooney, 1984; Schultz, 1981. Thirdly, education may reduce childbearing time (Dale & Egerton, 1997) and, fourthly, lead to better understanding of contraception and so enable the achievement of desired family size (Blackwell & Bynner, 2002; Rosenzweig & Schutlz, 1989). It is extremely difficult to test for these mechanisms and the evidence is rather limited.

In addition, a number of unobservable factors affecting these relationships may cause confounding bias, such that what may appear to be the effect of education on family size is caused by other individual characteristics that affect both choices, for example ambition. Also important is the reverse causality of family size on education as having a child may also affect the choice to continue in schooling. As a result low education is in part attributable to early entry into parenthood. In general, weak evidence exists on the causal effects of parental education on family size, i.e. on the causal effects of education on the trade-off between child quality and quantity and on the trade-off between child quality and the labour market.

5.3.3 Summary

Overall, there is clear theory and evidence to suggest that family size is important as a distal factor with strong effects on children's development. Moreover, there is a clear inverse correlation of family size and parents' education and theory to support the view that an element of this is a causal effect of education. However, evidence for this causal role is weak. We conclude, therefore, that family size is an important mediator of education effects although the causal pathway is relatively unexplored.

5.4. Teenage motherhood

Closely related to the topics of family structure and size is mothers' age. Mothers' learning experiences may be associated either directly or indirectly with mother-child interactions and may improve parenting skills and thus children's outcomes (Conger et al., 1984). Therefore, age of the mother may have a positive impact on children's outcomes. In this section we explore the effect of age of the mother on children's educational attainment and the role of education in this relationship.

5.4.1 The effects of teenage motherhood on children school achievements

On average, children of young mothers score more poorly on cognitive measures and are at higher risk of poor school attainments than children of older mothers (Feinstein et al., 1999; Furstenburg et al., 1987). Other empirical studies suggest behavioural differences between children of teenage parents and other children (Pagani, et al. 1997). Moreover, studies of inter-generational effects show that children of teenage parents are more likely to become teenage parents themselves (Kiernan, 1997; Manlove, 1997).

One possible explanation is that young mothers may be unprepared for motherhood and may have less adequate parenting skills (Furstenberg et al., 1989). Other theories suggest that the differences in children's achievements may not be the consequence of young maternal age per se, but that teenage motherhood emerges as a consequence of prior socio-economic disadvantages, which are transmitted across generations and are responsible for jeopardizing the future of the child (Geronimus et al., 1994).

In general, empirical studies find that the effect of age of the mother, if any, is small relative to other risk factors. Once income, parental education and socio-economic status are control in the model, the effects of age of the mother tend to disappear – or become statistically insignificant. Hence, age of the mother is not a significant distal factor that affects child development on its own. The fact that children of teenage mothers tend to achieve poorer developmental outcomes is mainly due to the multiple adverse factors that tend to co-occur with teenage parenthood. However, teenage parenthood is clearly a potential risk factor.

5.4.2 The effects of prior parental education on teenage motherhood

Education affects the timing for women to become mothers through two main channels related to those for the effect on family size. First, education increases the opportunity cost of having children. Women with higher levels of education spend longer in schooling and delay marriage and childbearing. High educational attainment could increase future earnings and subsequently increase the opportunity cost of having children. Secondly, education increases women's agency, i.e. women's ability or sense of power to take control of their lives, empowering them over the choice of fertility, partly through effects on self-esteem and aspirations (Hammond, 2002), but also through changes in life possibilities. This may lead many women to delay child rearing into later adulthood.

Empirical studies show that women with low levels of educational qualifications tend to have children younger than their better educated counterparts (Rowlingson & McKay, 1998). Statistics from the UK Labour Force Survey show that less than a third of women with degrees had children by the age of 30 compared to four fifths of women with no qualifications. The correlation is clear but this may be driven by a number of underlying causal processes, which make it problematic for empirical analysis to unpack the causal relationship between education and fertility.

The main difficulty in estimating the causal effect of education is the reverse causality of fertility on education (Hobcraft, 1998). The presence of a child could prevent mothers attending school and, consequently, decrease the likelihood of high school completion; therefore fertility causes low educational attainment. In order to deal with the problem of reverse causality, Hobcraft estimates the effect of early educational tests scores on the likelihood of becoming a teenage parent, using normalised tests of educational attainment at seven, eleven and sixteen added together into a single variable. For both males and females, the odds of becoming a young parent – either a father before the age of 22 or a teenage mother – are more than three times higher for children attaining the lowest reading and maths test scores than children with the highest test scores. However, this is an effect of low cognitive attainment or ability not of educational participation.

Ermisch and Pevalin (2003) investigate the family background and childhood factors that are associated with teenage pregnancy using two types of longitudinal datasets: the NCDS and the BHPS. The age of the mother at the time of birth as the mother's education have strong effects on the likelihood of becoming a teenage mother even after controlling for a large range of child specific variables (hence reverse causality) and family variables later in childhood. Their results show a consistent association between low parental education and high likelihood of teenage pregnancy both in the NCDS and in the BHPS.

Another problem that remains in estimating the causal relationship of education on teenage parenthood is the role of unobservable factors that affect both education and mother's age, for example labour market ambition. Women with high levels of ambition tend to both choose higher schooling and delay childbearing, leading to an

association of education and age of mother that is in fact due to labour market ambition.

5.4.3 Summary

We conclude that teen parenthood is a potentially important risk factor for low child attainment or behaviour difficulties, particularly if compounded with other risk factors. However, because of the stage of the lifecourse at which the distal factor necessarily occurs (teenage years) there is not a clear causal pathway for an effect of parents' education on child development via this route. Education is implicated in the process as school failure or low school engagement may be an important cause of teenage parenthood in some circumstances. However, this is more a matter of relations with the school and academic success in childhood and early adolescence than of qualifications per se. If education is defined in terms of cognitive attainment rather than qualifications then teenage parenthood may be an important mediator of inter-generational effects of education on children's development.

5.5. Income and poverty

Studies have shown that children living in low income families have a higher probability of dropping out of school, committing crime, misbehaving at school and attaining lower educational qualifications (Hobcraft & Kiernan, 1999). Also, children from low income families score lower than children from richer families on health assessments, cognitive development, school achievement and emotional well-being (Brooks-Gunn et al*.,* 1997). In this section we consider why this may be so and how income and education interact. We restrict the concept of poverty to income and other material assets, such as housing, car ownership and durable goods, although we acknowledge the multi-dimensionality of poverty, other aspects of which are addressed elsewhere in the paper.

5.5.1 The effects of income and poverty on educational attainment

Income is a very important determinant of child development. It affects outcomes through deprivation of those material needs which aid educational success, for example a learning environment with adequate housing, books, clothing and educational games. Another important channel is through the lack of provision to meet children's physical needs which are necessary for future development. In this sense, income provides families with the means to offer their children nutrition, health and care which are essential features of the home environment.

The empirical evidence on the causal effect of income on child development is relatively robust. It utilises longitudinal data with advanced econometric methods to control for individual heterogeneity and the effect of unobservable individual characteristics. Results replicated in different studies are consistent with respect to the negative effect of income poverty on children educational attainment. Some discrepancy occurs in terms of the particular role of income poverty during the life course but overall there is clear evidence of income effects. In addition to the question

of the extent of the income effect, researchers have been concerned to establish whether the duration and timing of poverty affect children's educational attainments. Are children who always lived in poverty more likely to underachieve in school than children who lived in and out of poverty? Does poverty have worse effects on educational attainment if it occurs during childhood than during adolescence?

Empirical studies have found the effects of income on children's attainment to be substantial but importantly non-linear (Gregg & Machin, 2000; Hobcraft, 1998). Below a threshold of income the effects of poverty on children's attainments and behaviour are large and long-term. Above this threshold additional increments to income have less substantial effects although where resources are spent on educational provision for children these continue to have wide-ranging benefits. Still, the effects of wider material deprivation may not be completely captured by income. Wider material deprivation includes:

i. lack of access to institutions;

ii. lack of physical assets;

iii. financial assets (McCulloch & Joshi, 1999).

One important feature of poverty for children's developmental outcome is the duration of poverty. Some studies have found that experience of income poverty during childhood has long-term detrimental effects on educational attainments (Duncan & Brooks-Gunn, 1997; Gregg & Machin, 2000). Other studies have found that regardless of the timing of the event, one of the dimensions of poverty proxied by parental unemployment has detrimental effects on children's educational attainment (Ermisch & Francesconi, 2002).

In summary, there is clear evidence that not only does the timing of poverty affect outcomes but so does the duration of poverty. Those children who always live in poverty face the highest risk of school under-attainments. In the US studies have shown that these children have the highest probability of dropping out of school (Haveman et al*.,* 1997). Both in the US and in the UK children living in and out of poverty are also at risk compared to children who have always lived out of poverty (Haveman et al*.,* 1997) (Hobcraft, 1998).

5.5.2 The effects of prior parental education on income and poverty

There is a large body of literature that links educational attainment to income and we do not review it fully here. Useful sources are: (Blundell & Macurdy, 1999; Blundell et al*.,* 2003; Card, 1999) for estimates of the causal returns to education; (Dearden et al*.,* 2003) for changes in income over time induced by education; (Heckman & Vytlacil, 2001) for the role of ability in explaining changes in returns to education.

The Centre for Economics of Education (CEE) has carried out systematic analysis to estimate the relationship between learning and returns to education in the UK. The research has been carefully designed to control for confounding factors that affect both education and future returns such as ability. Longitudinal datasets and large scale

surveys such as the Labour Force Survey have been utilised to control for time variant and time invariant individual heterogeneity that determines educational and economic outcomes, such as motivation and affect the relationship between education and income.

Returns to education have been calculated according to qualifications, vocational and academic, as well as individual qualifications, for men and women and on different sectors of the economy (Dearden et al., 2000; McIntosh, 2004). Returns to key academic qualifications fluctuate between 16 to 26% and are similar for men and women. Returns to main vocational qualifications have been higher for men than for women; for the former between 14 and 10% and for the latter between 8 and 6%.

Focusing specifically on income poverty, low educational qualifications and low educational test scores are powerful predictors of low earnings (Hobcraft, 1998) (Hobcraft, 2000)). Even after controlling for educational success and family background, individuals with the lowest qualifications are more likely to belong to the lowest quartile of the household income distribution (Hobcraft, 2003).

Following research by the CEE we can conclude that the effect of education on income is well known and substantial. Moreover, substantial analysis has been undertaken to address the protective capacity of education in the avoidance of income poverty.

5.5.3 Summary

Income is a very important determinant of child development, well theorised in the literature, with good empirical evidence. The income returns to education are similarly well established. We conclude that income is a very important mediator of education effects, i.e. that there are substantial effects of parents' education on child development through the income benefits of education. Moreover, the stages in this mediation process have been robustly estimated. However, few studies have modelled or evaluated the full process as an education effect and more work on the interaction of parents' education and income would be of value.

5.6. Maternal employment

Maternal education has a strong link with maternal employment. In the last decades, women's educational attainments have improved together with opportunities in the labour market. At the same time, the participation of mothers in the labour force has been hypothesised to influence children's developmental outcomes, in particular cognitive ability and educational attainments. We review the evidence on the role of maternal employment as a distal factor.

5.6.1 The effects of maternal employment and type of employment on educational attainment

There are valid theoretical grounds for some potential negative effects of maternal employment on child development. The basis for these negative effects arises mainly

from the substitution of time away from the child into work related activities. It has also been argued that work may involve stress and increase tiredness which may influence mother-child relations. However, other factors such as pre-schools and quality of parenting could offset these negative effects.

The economic model argues that the choice between employment and pre-schools induces income and substitution effects that affect children's outcomes. Maternal employment increases household income and hence the availability of monetary resources to invest in developmental activities for children. At the same time, mothers' employment implies a substitution of time away from children and the activities that promote their development, which reduces future attainment. More complicated models have included factors that affect both the income and substitution effects such as availability of formal and informal pre-school mechanisms, number of hours worked, flexibility of the labour market, age of the child, part-time employment, among others.

The strength of the income and substitution effects have been subject to theoretical and empirical debates. Bianchi (2000) presents evidence from mothers' time diaries that the reduction in time devoted to children from working mothers is small compared to non-working mothers. Han et al. (2001), on the other hand, argues that combining employment with the use of pre-schools may lead to greater tiredness and more stress which could negatively impact on the child. Similarly, Anderson et al. (1999) mentions that working mothers' breastfeed for shorter periods and early switching to formulae feeding may have detrimental effect on children's developmental outcomes (Anderson et al., op cit). Joshi (2000) maintains that the income effect has the potential to counterbalance the substitution effect. She mentions that as long as employed women purchase 'quality' of pre-schools and goods and services to improve children's cognitive and educational skills, the future of their children should not be jeopardized.

Though many interesting empirical studies have tried to quantify the magnitude of the effects of maternal employment on child development, the estimation has been complicated for several reasons. First, unobservable characteristics can induce a spurious relationship between employment and outcomes, rather than a causal relation. For example, committed parents may be more attached to employment and more involved in children's education. Hence, the positive relation between employment and educational attainment is the result of parental commitment. Second, a full structural model should allow for the endogeneity of explanatory variables, such as the decision to participate in the labour market as well as the choice to have children. Finally, it is important to control for unobserved heterogeneity in the population.

Contrary to the theoretical predictions mooted above, empirical evidence has shown that there is little effect of maternal employment on child development. Most of the recent evidence finds that the role of the mother as care provider has been assisted and in some cases substituted, by availability of pre-schools, a more active role of fathers

as carers and assistance from grandparents. From the studies reviewed we find that maternal employment in the first year after the birth and particularly full-time working, has a small negative effect on children's early cognitive outcomes (Gregg & Washbrook, 2003; Hill et al., 2001; Joshi & Verropoulou, 2000), although this result is by no means universal (Ermisch & Francesconi, 2000). This effect may be more than offset by positive effects of working in the second and third years of the child's life. In any case the key moderator of any effects is the availability of pre-schools.

5.6.2 The effects of prior parental education on maternal employment

Greater educational participation for women has been matched by the attainment of better paid jobs, flexible working hours and better working conditions. In Britain, increasing trends in female education has been accompanied by higher returns to human capital, which has also driven further participation in education (Davis et al., 1996).

However, education does not have a straight-forward relationship with maternal employment, particularly in terms of the elements that may impact on child development. Education is positively related to mothers' employment opportunities and this leads to two countervailing effects. The market power of educated mothers increases their earning and so increases the opportunity cost of maternity leave. On the other hand however, with this higher market power comes better maternity rights and the ability to space work more comfortably around maternity needs. In this sense, education has both protective elements but also elements of risk. Any overall effect therefore is likely to be small.

5.6.3 Summary

Employment effects are limited on the whole, if any exist at all. The relationship between mothers' education and employment status is too complex and multi-dimensional for this to be an important channel for education effects. There may be some important benefits of mother's education in enabling mothers to manage work-life balance or obtain jobs with greater flexibility but this may be offset by the extra time demands of many higher paid jobs. Similarly, mothers' education may enhance their ability to access good quality pre-schools in such a way as to offset any possible negative implications for the child of lost time with the mother. However, this is really then an effect of education through pre-schools rather than through employment. More evidence is needed on these important interactions.

We conclude therefore, that education does not have substantial effects on child development through maternal employment effects.

6. More complex modelling

6.1. Introduction

Having reviewed the evidence at each level of our conceptual model, we now turn to full ecological models of development. As outlined in the introduction, ecological models view development as occurring within multilevel, multi-layered contexts. Thus, as we have shown, while there are direct links from parents' level of education to distal family factors, key characteristics of the family, and proximal family processes and in turn to child development, there are also important and complex pathways within this conceptual model.

These complex pathways for the effects of education have not been extensively modelled in peer-reviewed literature, although a number of authors are starting to estimate such pathways. However, recently there has been an accumulation of research looking at models of complex pathways for the influence of income on children's development and the processes and mechanisms that moderate and mediate these effects. Therefore, to demonstrate the nature and utility of more complex modelling techniques we use the example of income and review three papers that have investigated the pathways through which income influences children's development. We also draw out the implications of this evidence for the role of education. Future work at the WBL will also contribute to this research project.

Complex pathways such as this are primarily explored using structural equation modelling (SEM) because it is able to investigate multiple mechanisms of influence simultaneously. SEM allows for concurrent tests of all the associations between constructs and the direct and indirect associations of all predictors can be assessed while taking into account a variety of control variables. Note however, that these SEM models do not get at causality in an econometric sense but decompose covariation into active and inactive elements providing indications of meaningful pathways for effects.

6.2. The model of mediating process for the effects of income

In section 5 we reviewed evidence showing the well established association between distal factors such as income and the developmental outcomes of children and adolescents. However, several authors such as Yeung et al. (2002) argue that there is a substantial gap in the literature linking distal factors such as income and children's development in terms of identifying and understanding the processes and factors that mediate this relationship. They posit that this gap limits our ability to answer questions such as why income matters, when it might matter most, and why it has a stronger effect on children's cognitive achievement than on behaviour.

In relation to income researchers have started to examine the pathways through which economic deprivation operates to disadvantage children of poor families. This

research has led to the emergence of two main perspectives in the literature to explain how income matters for children's development. They are the:

i. parental investment model;

ii. family stress model.

The *parental investment model* focuses on the effect of income in terms of the family's ability to invest resources in children's development (Becker & Thomas, 1986; Haveman & Wolfe, 1994; Mayer, 1997)[8]. This perspective posits that income enables parents to buy the materials, services and experiences that benefit development and build human capital. According to the parental investment model children from impoverished families tend to do less well in education and other aspects of life because they have limited access to material resources such as childcare, schools, food, housing and stimulating learning activities and environments.

The second model, the *family stress perspective*, emphasises the effect of income through its influence on family process in terms of their parenting behaviours and practices as well as parents' emotional well-being (for example, Conger et al*.,* 2002). In addition to restraining family material resources, economic hardship may affect the ways in which parents monitor their children and respond to their needs (Brooks-Gunn & Duncan, 1997; Huston, 1995). In contrast to the investment perspective, the family stress perspective suggests that low family income is detrimental to children's development because of its association with parents' non-pecuniary capacities, diminishing parents' ability to interact with, socialise with and teach their children. For example, economic hardship adversely affects parents' psychological well-being, in turn, this psychological distress leads to less warm and supportive parenting, which consequently has negative effects for healthy child development.

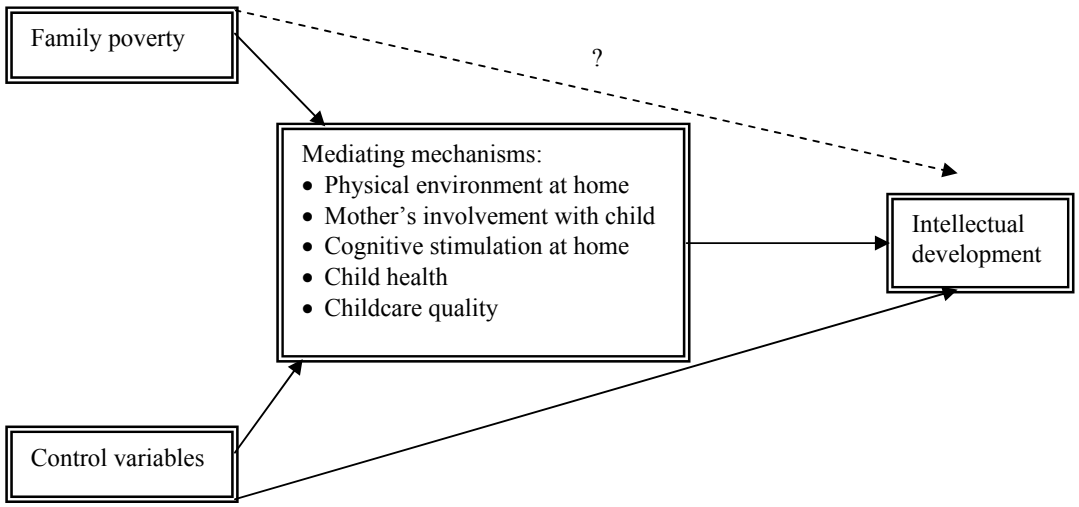
6.3. The mechanisms mediating the effects of poverty on children's intellectual development

6.3.1 Overview of the paper

Using data from the National Longitudinal Survey of Youth (NLSY), Guo and Harris (2000) examined both material and non-material mediating factors in a general ecological framework, focusing specifically on children's intellectual development. Their conceptual model can be seen in Box 12 below and specifies the mechanisms mediating the effects of family poverty, and the links between poverty, the mediating factors and intellectual development.

[8] Other terms for this perspective include 'human capital', 'financial resources' or 'investment model'.

Box 12: A conceptual framework for the mediating mechanisms of the effects of poverty on intellectual development



Source: Guo & Harris, 2000, 432

Guo and Harris' theoretical model depicts family poverty as affecting children's intellectual development through these five specific mediating mechanisms (physical environment, parenting style, cognitive stimulation, child health, and pre-school quality). In terms of the general model of this report, these mechanisms are a mix of characteristics of the family context and proximal processes. Controls are introduced for other family and child distal factors, such as mothers' education, mothers' cognitive ability, mothers' and children's age, family structure, marital status and region. The authors posit that once a comprehensive set of mediating variables have been accounted for there is no theoretical reason why poverty should affect intellectual development directly. This hypothesis is represented by the dotted line in Box 12.

They examined the links between poverty and each of these mechanisms, the links between each of the mechanisms and the child's intellectual development and the direct link between poverty and intellectual development. Two main findings emerged. First, the influence of family poverty on children's intellectual development is mediated completely by the intervening mechanisms measured by the five constructed latent variables, with poverty exerting no direct effect on children's intellectual development.

Secondly, cognitive stimulation in the home was the main mediating factor of family poverty in influencing children's intellectual development. Poverty exerts a large negative effect on cognitive stimulation in the home. In turn, this cognitive stimulation environment exerts a large positive effect on intellectual development.

The authors argue that this demonstrates that much of poverty's impact on children's intellectual development operates along this pathway.

To a lesser extent, parenting style and physical environment in the home are also mediating factors. The mediating mechanism of child health is more complicated. Child health status was measured separately at birth and in childhood. Pre-natal poverty had a significant effect on ill-health at birth, which in turn has a significant effect on both intellectual development and childhood ill-health. However, while ill-health in childhood influenced intellectual development it was not influenced by family poverty. Interestingly, family poverty did not exert a significant or sizeable effect on the quality of pre-school. Moreover, the quality of pre-school was not found to have a statistically significant or sizable effect on intellectual development.

6.3.2 The role of education

Guo and Harris's model also estimated the channels for effects of a number of other distal factors entered as controls. For example, mothers' education, number of siblings and ethnicity also exert a significant effect on cognitive stimulation in the home. It is interesting to note here that mothers' education does not directly affect intellectual development. Rather it has an indirect effect on intellectual development that operates through cognitive stimulation. Mothers' cognitive ability not only has a very strong association with cognitive stimulation in the home but also a direct effect on the child's cognitive attainment unmediated by any of the five mechanisms. Although the focus of the paper is on income and poverty, mothers' cognitive abilities are by far the most important factor.

6.4. How money matters for young children's development: Parental investment and family processes

6.4.1 Overview of the paper

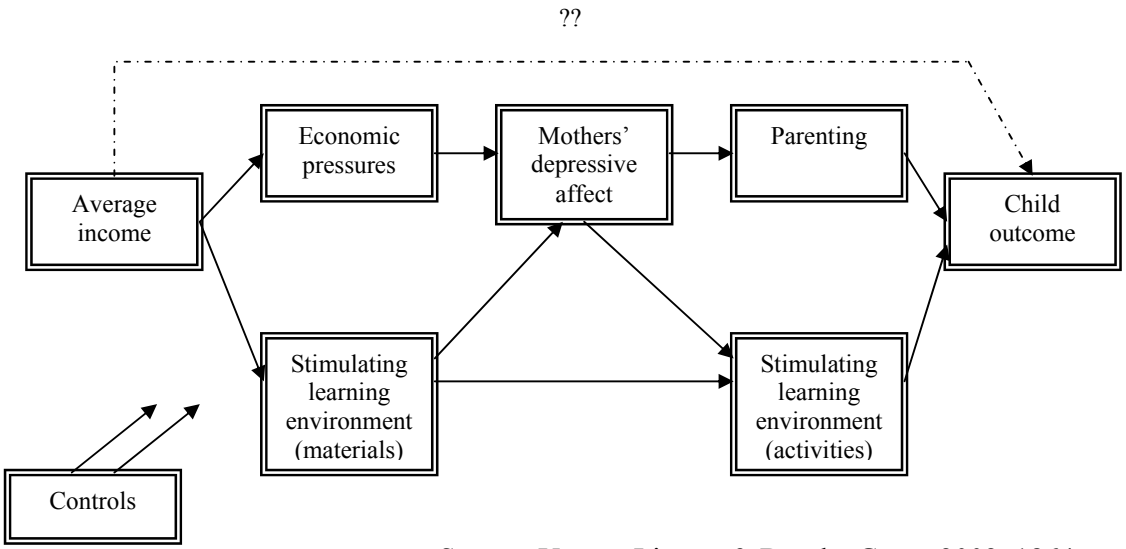
Yeung et al. (2002) also used data from a large US dataset (PSID-CDS) to investigate how family income matters for young children's development. Two sets of mediating factors were examined reflecting the two dominant perspectives outlined above (6.2):

i. the parental investment perspective;

ii. the family process perspective.

Their conceptual model separates out elements of these two perspectives but highlights that these might interact and so should not be analysed in isolation (see Box 13 below). In addition, the authors hypothesise that the mediating pathways for achievement and behaviour problems are different. They posit that family stress constructs are likely to be more salient mediators of children's own emotional development, whereas parental investment mediators may be more directly relevant to children's cognitive achievement.

Box 13: Combination of human capital mediators (top) and family stress mediators (bottom) models



Source: Yeung, Linver, & Brooks-Gunn, 2002, 1864

This analysis arrived at two main findings. First, as predicted, different mediating mechanisms work for different child outcomes. Cognitively stimulating materials and activities were the most influential mediating mechanisms for the relation between income and children's scores for tests on letters and words. The physical environment of the home was the most important mediator between income and children's applied problems scores. In contrast, results for children's behaviour problems operated primarily through the mediating mechanism of maternal emotional distress. It is interesting to note that although parental investment mediators did not have direct effects on the child's behaviour, having a stimulating home environment was indirectly linked to lower behaviour problems through its association with lower maternal distress and better parenting practices.

Secondly, effects of family income were mediated by constructs from both the parental investment perspective and the family stress model; the explanatory power of both models combined was greater than of either model alone. Furthermore, the mediating constructs from the two perspectives interacted. For example, family income was associated with maternal emotional distress and parenting practices not only through the perception of economic pressure (family stress model) but also through familial resources (investment model). Similarly, cognitively stimulating homes and the physical environment of the home not only had positive effects on children's cognitive abilities, but were also found to relate to mothers' psychological well-being and warm parenting behaviour, which in turn were significantly linked to the avoidance of behaviour problems.

6.4.2 The role of education

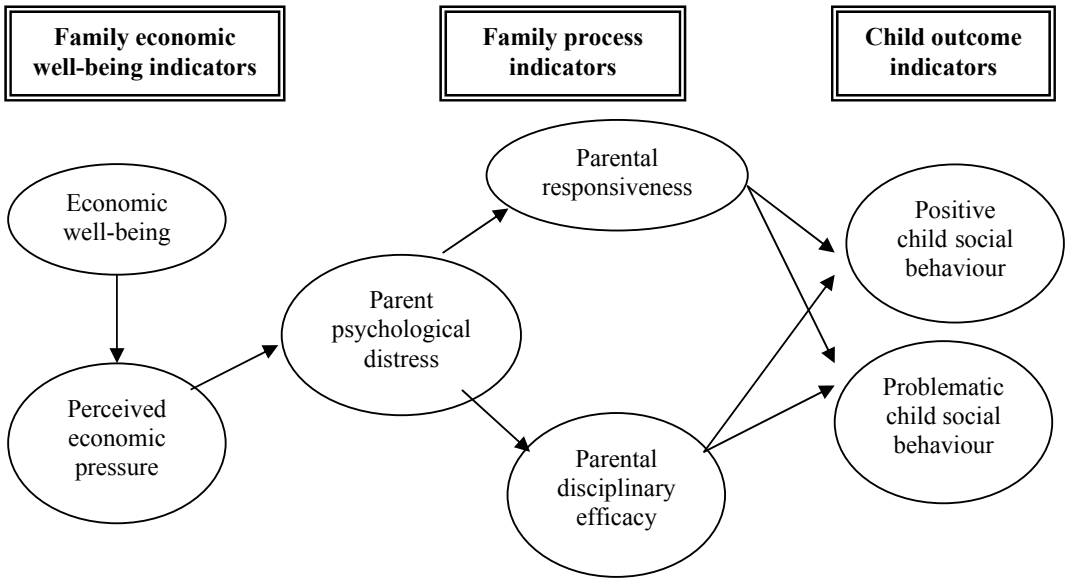
The authors controlled for a number of maternal characteristics including age, years of completed education, and cognitive ability measured with a comprehension test from the W-J Achievement Test – Revised. The results indicated the particular importance of mothers' cognitive ability in predicting children's cognitive ability, highlighting that its total effect was larger than that from family income or other mediators. Maternal education was not found to be significant when mothers' cognitive ability was added into the model. Rather than negating the possible effects of maternal education, this result is likely to reflect the collinearity between cognitive ability and completed education.

6.5. Economic well-being and children's social adjustment: The role of family process in an ethnically diverse, low income sample

6.5.1 Overview of the paper

Mistry et al. (2002) used a family economic stress model linking economic well-being to child well-being in a sample of elementary school age children to assess whether the proposed mediational processes by which economic hardship affects child well-being also held true for an ethnically diverse population. Their model showing the direct and indirect influences of economic hardship and perceived economic pressure is shown below in Box 14.

Box 14: Conceptual model



Source: Mistry, Vandewater, Huston, & McLoyd, 2002, 937

In addition to investigating problematic behaviours in pre-adolescent children (age 5-12), Mistry et al. also looked at positive social behaviours. Previous research focuses primarily on the relation between economic deprivation and negative child adjustment indicators such as externalising behaviour problems (Conger et al., 1992; Conger et al., 1994) and internalising behaviour problems (Conger et al., 1993; McLoyd et al., 1994). However, we argue that despite a common focus on problem behaviours, positive social behaviours are also indicators of well-being and mental health that can have important consequences for later adjustment. For example, social competence, such as the ability to get along with both peers and adults, follow instructions, and work independently contributes to a successful school experience (Brooks-Gunn et al., 1997).

Data for the study came from an evaluation of a demonstration program, the New Hope Project (Milwaukee, Wisconsin) that provided income supplements, job search assistance, subsidised health care and subsidised childcare to low income adults who worked a minimum of 30 hours a week. The sample was made up of 419 children aged 5-12 (M = 8.26 years; SD = 2.33; boys n = 209 and girls n = 210) and used four data sources: parent reports, child interviews, teacher reports and administrative data.

Results from multiple-group analyses suggest that for this sample, the family processes by which economic hardship influenced children's outcomes did not differ by either the child's gender or ethnicity. Therefore all subsequent analyses were performed using the full sample. Results of the structural equation modelling were consistent with the authors' proposed model, i.e. that economic hardship and related pressures affect children's social-behavioural adjustment indirectly through the impact on parent psychological distress and parenting behaviour.

There are three main patterns of association that emerge in this study. First, those parents who reported feeling greater economic pressures also reported being worried about their finances, feeling depressed and having low personal efficacy. Secondly, parent psychological distress was, in turn, significantly and inversely related to parental responsiveness and disciplinary efficacy. Finally, parenting behaviour characterised by low parental responsiveness and disciplinary efficacy predicted low levels of positive social behaviour and high levels of behavioural problems. In support of these findings, these children were rated by teachers as less socially competent, autonomous, and compliant and as being more aggressive, impulsive, and more likely to need disciplining than those children whose parents were responsive and reported high levels of disciplinary efficacy.

The results here indicate that one pathway by which economic hardship influences children's development is through its negative impact on parents' psychological well-being and less than optimal parenting behaviours.

Given the economic comparability of the ethnic groups, the authors argue that the economic contexts that families live in may be more important than ethnicity per se in determining the impact of economic hardship on family process and children's development. This is supported by Gutman and Eccles (1999) who tested the

equivalence of a model of parenting behaviour linking financial strain to adolescents' academic achievement in an economically diverse sample of African American and European American families and found no ethnic differences. Together, such findings bolster the argument that irrespective of differences across a whole host of distal factors, financial hardship affects the functioning and well-being of economically distressed families and children through similar pathways.

6.5.2 The role of education

The authors make no reference to nor test any aspect of parental education in their models.

6.6. Summary

All three papers find that economic hardship only had an indirect effect on parenting behaviour that was mediated by parents' perception of economic pressure and psychological well-being. These studies contribute to a burgeoning body of research that documents the need to assess the immediate and direct impact of low income and poverty on children's health and cognitive development (see also Conger et al*.,* 1992, 1993; Hanson et al*.,* 1997). Together, these findings underscore the importance of placing parenting practices within an ecological framework to understand why poor parents turn to certain strategies and not others. Moreover, the models reviewed suggest that we must not simply explore a given environmental context as a direct predictor of behaviour, but as a potential moderator of psychological relations as well. While this type of approach will certainly complicate empirical models, the benefits will provide a more holistic picture of families and their children's development as they navigate the obstacles of poverty.

7. Conclusions

In this report we have described a great number of inter-relationships between factors that influence children's outcomes. In the concluding section we address three issues. Firstly by way of summarising the previous sections we assess the relative importance of the different pathways considered as mediators of the inter-generational effects of education. We also make some tentative statements about the moderating effects of education. Secondly, we draw some conclusions about the priorities for future research based on our review in this report of the theoretical channels of importance and strengths and weaknesses of the evidence base. Finally, we summarise the relevance for policy makers of the ideas contained in this report, addressing the question what does the report add to what is already known and why are these mainly theoretical debates of interest?

7.1. The key channels for education effects

7.1.1 Proximal family processes

Proximal family processes are very important as channels for the effects of parents' education on their children's outcomes. This is the direct mediated effect but there may also be important moderating effects. The benefits of proximal processes do not follow in a straightforward way directly from the appropriate behaviour of parents as recommended in the parenting literature without being accompanied by the understanding of parents about why they are doing what they are doing and how their child is responding. Therefore education in enhancing these capabilities also enhances the effectiveness of developmentally positive parenting behaviours, for example (Webster-Stratton, 1998; Webster-Stratton & Hancock, 1998).

7.1.2 The importance of context

In addition to the family context, the contexts of neighbourhood, schools and pre-schools are important for children's development and as channels for the inter-generational transmission of education. Education also has important protective capabilities in offsetting the negative effects of neighbourhoods, school and pre-school settings with poor characteristics.

7.1.3 Characteristics of the family

Both cognitions and parental mental health and well-being are important influences on children's attainments and both are likely to be influenced by parental education. Cognitions seem like a particularly important mediator of the inter-generational education effect, parental mental health and well-being less so since much of the evidence here may be through effects on cognitions.

In the context of poor parental mental health and well-being, education may have particularly important moderating effects in diminishing impacts on pre-school.

7.1.4 Distal factors

Income and family size are important mediators of the effects of parental education. In some sense teenage motherhood also mediates education effects if one defines education in terms of early school attainment and engagement. Although family structure and maternal employment are not strong mediators of education effects, education does importantly moderate their effects. For example, education may provide protective capability for families dealing with the income effects following family break-up (see Blackwell & Bynner, 2002) or support them in assessing maternal employment rights, good work-life balance or quality pre-school in order to moderate any effects of employment or child development. More research on these moderating benefits of education would be particularly valuable.

7.2. Future research

From the theoretical perspectives laid out in this report the proximal family processes of warmth, discipline and educational behaviour in the home are all important separate factors in child development. They are strongly influenced by family characteristics which also play a substantial role in the transmission of educational advantage. Parents' cognitions, well-being and resources all have direct effects on proximal processes and so are major influences on children's attainments. These characteristics of the family are in turn influenced by distal factors, particularly parental education and income.

Education is also strongly related to each of these factors, all of which interact in important ways. Education not only enhances the developmentally supportive level of each important, separate factor it also eases the relations between factors and provides resilience for families when other important elements are absent or where compound risk factors are excessive.

This theoretical perspective is supported by the evidence but mainly in terms of particular links in these chains of association rather than in the whole framework. Much of this evidence is fairly ambiguous and so could be interpreted in a number of different ways. The interactions between the elements of the framework are complex and multi-layered so sophisticated modelling techniques are required to test the theory empirically. Yet these techniques are better suited to establishing pathways of association than to proving unique one-way causal hypotheses.

There is a clear need, therefore, for research that uses large sample longitudinal data and simple hypotheses that separates out particular aspects of the overall model and uses the lag structures of the data to identify elements of the overall causal picture with clarity.

For example, it would be valuable to establish how changes in parents' aspirations for children respond to changes in children's actual attainments. This would help in clarifying how much of the association of child attainment and parent aspiration is due to aspirations being matched by parents to their children's apparent possibilities

and how much to the effect of aspirations on attainment. Many other such estimation strategies are possible.

Alongside these more subtle longitudinal designs there is a requirement for instrumental variables approaches that attempt to identify causal effects. Another way forward is to make use of random allocation in interventions to establish causality with greater confidence. In future work we will add to this review of the quantitative survey evidence with a review of the experimental and intervention evidence. Through the generation of random variation in potentially causal factors it is possible to test the actual level of causal effect. This depends on the policy intervention being able to impact on the causal factor sufficiently to create the necessary variation.

Also of value will be fieldwork research that is integrated with the quantitative issues described in this report so as to shed light on the processes described. Much more could be said on this issue. Here, we simply note that in our own future research we propose to explore the issues raised in fieldwork research nested within the UK Birth Cohort studies, focusing on cases which match or contradict the expected relationships between parenting, education and attainment. Using biographical research techniques we propose to explore the extent to which the cases selected: (i) support or contradict the theoretical predictions made in this report about the relative importance of the different mediators of education; (ii) indicate that the moderating effects of education and/or (iii) provide alternative perspectives on the role of education.

7.3. Policy relevance

This paper has discussed the theory and evidence on the reasons for the inter-generational effects of education. The discussion has been somewhat distant from issues of policy delivery. This is necessary when academic research is in an exploratory phase during which conceptual work and the search for replication of results dominate. This work is of value in laying out the foundations upon which future policy advice may be built. However, we do not wish to neglect current policy needs and so in this final section a number of points are made for policy.

First, the inter-generational transmission of educational success is a key element in equality of opportunity. Differences between children in terms of their parents' educational attainment and cognitive skills are a key reason for differences in children in terms of their own attainments and cognitive development.

From this it follows that there are substantial benefits of education that accrue to individuals (and society) in terms of what education enables parents to pass on to their children. These need to be figured within the wider calculus of the non-pecuniary benefits of education in arguments within government about the returns to educational provision. Much more work needs to be done on this in estimating effects more robustly and calculating these wider benefits in monetary terms. However, in the short-term the contribution of this report has been to assess the argument that these

benefits are substantial, finding the argument to be strongly supported in theory and evidence.

We would also like to put the model presented here forward as a prism through which policy makers might view policy proposals. Understanding they way in which the features of the model interact can help in ensuring that policies run in sync with developmental processes and interactions between contexts rather than operating in opposition to these wider forces. We would invite those putting forward policies to explain how their programme will interact with the features of the model described here. This report does not lead to firm conclusions about the benefits of specific interventions, but describes the contexts within which interventions must work.

The contexts in which the inter-generational transmission of education takes place do not work in isolation. The model presented here describes some of the main interactions between contexts. Policy interventions are likely to cross boundaries between these contexts giving rise to important unintended consequences. These interactions can constrain policy success or enhance it but it is important that policy be developed within some kind of cross cutting model that recognises the interactions. The ecological model presented here is an example of the kind of holistic perspective that may help in these policy formulations.

There has been much discussion recently of the potential benefits of parenting programmes. These follow from the widespread finding that families are more important than schools as influences of children's development. Analysis of this broader context suggests the limit on the ability of the DfES to influence attainment and leads to the conclusion that engagement with parents will be very important. Yet parents themselves are engaged in multiple contexts that constrain or enhance their interactions with their children. Therefore in going beyond the school to the home in the search for enhancement to educational attainment the DfES finds itself necessarily engaged in far wider forces that cut across Departmental responsibilities. Other government departments play important roles. The Department for Work and Pensions, the Home Office, the Department of Health, the Social Exclusion Unit and the Deputy Prime Minister's Office (amongst others) all carry responsibility for elements of the interacting features described in this report. The primary call of this report, therefore, is in support of efforts to aid the integration of cross-departmental activities to enhance the effectiveness of educational support.

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WIDER BENEFITS OF LEARNING RESEARCH REPORT NO.10

A Model of the Inter-generational Transmission of Educational Success

The inter-generational transmission of educational success is a key driver of the persistence of social class differences and a barrier to equality of opportunity. This report provides a review of the role of parental education in this process. We examine theory and evidence on the key factors that impact on children's attainment and assess the ways in which education alters the related dynamic processes.

To structure our presentation of the theory and evidence we draw on the multi-level ecological model of developmental psychology. This provides a framework for presenting ideas not just from psychology but also from economics and other social sciences. It also enables a focus on the interaction between factors as well as other contexts beside the family, such as schools, pre-schools and neighbourhoods.

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