

The Wider Benefits of Learning

Part 5: Learning Spill-overs and Interplays

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Foreword

For centuries, scholars searched for a miraculous substance that would make people happy, healthy, wealthy and able to enjoy life. A panacea that would help them deal successfully with life's difficulties, better understand themselves and the world, and ultimately gain wisdom they could transmit to future generations.

Today, science has found this magic formula. The trouble is that virtually no one knows that it exists, where and how to find it and what miraculous effects it has when properly used. At the same time, renowned researchers are proving its effectiveness in increasing numbers of international studies. It works on everyone, everywhere, from infancy to old age, in all of life's circumstances and spheres. It has an unending number of side effects – all of them positive and good for people. As for how much of it to apply, the only mistake we can make is not to use enough. That's because the more of this magic formula people use and the more often they use it, the better they feel, scientists have unanimously determined. And when people feel better, statisticians have recently proven in comparisons of countries throughout Europe, so do the regions and countries where they live with others.

In fact, everyone knows this miracle substance and many are already using it. However, in most cases it cannot sufficiently produce its effects. Most people totally misunderstand it because too often, it has been prescribed incorrectly and in the wrong

dose. The miracle substance that science has discovered is nothing other than learning. But not just learning in schools and educational institutions, much too often discussed only as it relates to finding employment or enhancing corporate and national competitiveness. The real magic formula is learning in all of life's phases and aspects – lifelong and “life-wide.”

It may seem inappropriate to speak of a miracle and science in the same breath. But the human brain and its ability to learn are among the greatest miracles in our known universe. And the miracle of learning and cognition within our brain a) is only barely understood by even the best and most advanced scientists, and b) these scientists themselves admit that the more they investigate, the more they discover ever greater miracles about the brain's complexity, capacity and plasticity. More insight into these interconnections can be found in the Bertelsmann Stiftung publication entitled “Warum Lernen Glücklich Macht” [Why Learning Makes You Happy]. In short, science still considers the fact that human beings learn and how they learn to be a kind of miracle.

Researchers throughout the world have begun to investigate the positive effects of lifelong learning on individuals and society. And the more interconnections and relationships between learning and life processes they study, the more multifaceted, surprising and unambiguous their results have been. They already agree on one conclusion: If we want to unleash the

miraculous effects of learning, we first have to understand learning in its diverse forms, possibilities and effects in a completely different way.

Educational research, generating much public interest, has shown how successful schooling, vocational training and university attendance affect income and job opportunities, and how closely education and skills development are related to a society's economic prosperity. On the other hand, the public has heard virtually nothing about the happiness that is derived from learning or the pleasure of curiosity and discovery, or from personal development and the ability to continually change oneself. Too little attention is paid to the connections between learning and gains in resilience, physical and mental health, participation in social life and social solidarity, all of which have also been scientifically investigated.

To survey the current status of research on the diverse effects of lifelong learning, the Centre for the Wider Benefits of Learning at the Institute of Education of the University of London, at the request of Bertelsmann Stiftung, has prepared a comprehensive review of the literature on the social and personal benefits of learning. The scope of the published findings has persuaded the editor to present this survey thematically, in sections.

This fifth and last part of the study focuses on the Learning Spill-overs and Interplays.

The study on wider benefits of learning

Learning and well-being - a look at complex relationships

Although the term “learning” has already become central to the discussion of economic and social policy in Europe, most of these countries lack both clarity and understanding of the specific learning relationships involved. Learning is considered the key to success for individuals, organizations, regions and nations, leading to greater economic affluence for knowledge societies. But the complex phenomenon of learning is often reduced to formal education and its consequences for employability.

Similarly, scientific research into the interconnections in education has been essentially devoted to studying formal learning in school and other educational institutions. For years, data has been systematically collected on the performance of secondary and post-secondary students. The number of scientific studies and research papers in this area has risen dramatically. There have also been studies on the value of vocational training, continuing vocational training and – to a lesser extent – adult learning for the job market. But with the dominant focus on the economic consequences of formal learning processes, the holistic and social effects of learning have received comparatively little attention.

In fact, growing numbers of international scientists have begun to investigate the positive main and side effects of lifelong and life-wide learning beyond the economic impact on individuals and society: What are the effects of learning, for example, on the development of identity, self-consciousness, motivation and

resilience? On our ability to continually adjust to changing living conditions? How does learning affect our health, life expectancy and birth rate? Or, to take just one example, our ability to come to grips with an increasingly complicated healthcare system? What forms of learning result in greater well-being, greater life satisfaction and happiness? And what are the effects of learning processes on social cohesion and vitality – in neighborhoods and associations, municipalities, regions and whole societies? To what extent does learning influence personal willingness to integrate, be tolerant, show solidarity and become politically and socially engaged? And what factors can best improve the framework conditions and circumstances for every form of learning at every age?

Without exception, results of the studies by international scientists indicate that the key to future well-being, happiness, social cohesion and – as just one important positive consequence out of many – personal and national economic development in Europe lies exactly in the widely ignored effects of lifelong and life-wide learning processes. Until now, the conclusions of these studies and research have never been assembled, correlated and made available to a broader public. The following survey of the status of international research is intended to close that gap.

The study on wider benefits of learning

Intention of the study on wider benefits of learning

Within the framework of the European Lifelong Learning Indicators (ELLI) project, the Centre for the Wider Benefits of Learning at the University of London's Institute of Education was asked to assemble all internationally available scientific studies on the effects of the various forms of lifelong and life-wide learning on individual and social development, evaluate them and summarize them in a comprehensive report. In fact, this survey of the state of research on the social and personal benefits of learning reflects the findings of more than 200 international studies and research projects on the effects of learning in all phases and areas of life. We decided to split up this voluminous collection of material into five complementary categories and publish them in the form of five individual studies. Each individual study examines a central connection between the various forms and stages of lifelong learning and an aspect relevant to personality or social development.

The individual studies are not intended to provide comprehensive and final answers on the effects of lifelong learning in the particular category. Instead, they show the current science as a work in progress - and it is hoped that they will stimulate further research efforts.

Overview of the five parts of the study

Part 1: Learning and identity

The first study covers the scientific discussion of the reciprocal relationship between lifelong learning processes and the development of human identity. Numerous studies show that the forms and quality of formal, non-formal and informal learning in various phases of our lives impact our self-confidence, self-esteem, resilience and the development of social skills, and look at how they do it. And in addition, they examine how – through the concepts of self that are affected by learning processes – these forms of learning then impact future learning behavior and internal attitudes toward learning later in life.

Part 2: Learning and health

The second study collects the relevant studies on the effects of learning on physical and mental health. Numerous studies have made clear the direct relationship between the duration and frequency of learning processes in various phases of life and mental and physical well-being, health behavior, life expectancy and numerous other physical and mental health aspects. Likewise, studies show how learning behavior affects our ability to find our way through an increasingly complex medical system.

The study on wider benefits of learning

Part 3: Learning, life satisfaction and happiness

The third study summarizes findings about the consequences of learning for the well-being, quality of life, happiness and optimism of people. It examines research on the effects of both learning in school as well as adult learning on a positive attitude toward life. Besides showing a positive correlation between learning and happiness, this part of the study makes it clear that the scope of research efforts lags far behind the importance of this crucial field of knowledge.

Part 4: Learning and community vitality

The fourth study looks at a broad spectrum of research results on the effects of formal, non-formal and informal learning processes on social cohesiveness and community vitality. Given the diverse and complex interconnections it examines, this individual study is divided into four sub-chapters. The first looks at the effects of lifelong learning on social inequality, income differences, social mobility – and the influence of learning sequences on social cooperation in a society. The second discusses the effects of learning on active citizenship, the possibilities of social participation and the integration of immigrants. Also considered is how participation in learning processes can be combined with aspects of interpersonal behavior such as trust, tolerance and inter-cultural sensitivity. The third sub-chapter deals with the concept of “social capital” and describes how learning contributes to developing individual and community social capital. The final section deals conceptually and statistically with the connections between learning and criminality and thus how specific learning processes and educational interventions affect criminal behavior.

Part 5: Learning spill-overs and interplays

The fifth and last study describes the numerous positive “side effects” of learning, which cannot be directly ascribed to the categories already listed but are of substantial importance for human well-being and the positive development of societies. Unlike the previous four categories of the accompanying study, which look at the more or less direct effects of learning processes on individual and social development aspects, this section looks at some more complex reciprocal effects of learning and living processes. Thus it illustrates how positive learning experiences impact people’s future learning behavior, followed by the complex relationships between learning and occupational prospects. In addition, it explores the multifaceted impacts of learning on family situations. These include, for example, the influence of the educational and learning level of parents on the development of their children or the effects of learning processes in which parents and children participate together. The influence of the learning behavior of adults on their children’s academic success and birth weight, family structure and size, marriage and divorce and parental behavior in early and later development phases of their children is also described. Finally, the study discusses the influence of the learning behavior of adults on their immediate neighborhood and accordingly how learning affects processes of sustainable development and the search for social justice.

This thematic structure of the survey of research results offers a better overview of the diverse aspects of the positive impacts of learning on people and societies. However, interdependencies between the various areas should not be ignored because in the final analysis, the individual and social effects of learning are never one-dimensional or limited to specific spheres of life.

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Instead, every learning experience influences the whole person – and accordingly the society in which that person lives.

This survey of research results on the positive impacts of learning on people and society is another important component of the ELLI project as a whole, to continue to complete the picture of lifelong learning and its positive effects on people and societies. As a mirror of the status quo of research, it is intended to provoke new and different ways of thinking about the meaning and design of formal, non-formal and informal learning processes for both individuals and society.

Focus: Learning spill-overs and interplays

Focus: Learning spill-overs and interplays

Introduction and overview

Generally, discussions about education focus on the benefits of learning on acquiring knowledge and specializations, expanding skills, competencies and abilities in order to achieve success in the job market. It is apparently not immediately obvious that learning for its own sake is also of major importance. And yet the results of numerous scientific studies make it clear that no learning relationship is more important and useful than this one. Why? Because those who enjoy learning the first time will continue to enjoy learning. Studies confirm that good learning experiences in childhood and adolescence as well as in adulthood are the key to lifelong interest in learning – with lifelong positive effects on individuals, the people they know and the society they live in.

This fifth and final section of the survey of research on the personal and social effects of learning focuses on these and numerous other spillovers. Unlike the other four sections, which examined relatively direct interconnections between learning processes and individual and social development aspects, the following looks at the more complex benefits of learning.

Scientists have shown, for example, how the learning behavior of one person can “spill over” on the learning behavior of others. It passes from parents to children, from grandparents to grandchildren and even within a neighborhood. The influence of the educational level of parents on mental development and the educational, academic and occupational success of their children has been examined from many different perspectives, along with the effects of early childhood and elementary school learning processes on career prospects. Moreover, researchers

have discovered different facets of how learning affects family situation, family structure and size, marriage and divorce, early or late parenthood and birth weight as well as the influence of education on early and later development phases of subsequent generations.

Lifelong interest in learning, learning success and career development

With respect to the development of a lifelong interest in learning, it turns out that it is never too early to have positive learning experiences. Numerous studies show the vital significance of early childhood education. Educational success by the very young directly affects their learning success in school, and researchers have shown it is very likely to result in lifelong interest in learning, higher qualifications and new, positive learning experiences throughout all phases of life.

On the other hand, a lack of early childhood learning opportunities turns out to be a decisive cause of a wide-ranging refusal to learn and numerous problems later in life. UK studies have shown that the less developed the cognitive abilities of five-year-olds, the worse their ability to read and do math will be as 10-year-olds. The result: Most such young people, by the time they are 16, have become disillusioned with school and want to leave as quickly as possible, even without a diploma. And their general attitude is to consider learning pointless – for their life, for starting a career or achieving success. This has negative effects on their health, self-confidence and life satisfaction and is accompanied by a significantly greater likelihood of being unemployed and falling into criminality.

Focus: Learning spill-overs and interplays

In Germany, for example, it is easy to see the extent to which young people are affected by a long-term process of stringing together negative learning experiences. Every 14th student there drops out of school, even though for most school dropouts, unemployment insurance and welfare are the only prospects awaiting them. More than 2.7 million people over the age of 15 in Germany do not have a high school diploma. About half a million are registered as unemployed. In many of Germany's Länder, up to 30% of secondary school students are considered to be at risk and likely to face this fate in the future.

But not all school dropouts or failures lose their desire to learn for the rest of their lives. Many manage to regain motivation and take advantage of a second chance. Scientific studies prove that even at an advanced age, positive learning experiences lead to a new desire to learn and achieve learning success. People who start to catch up on their education later in life and have new learning experiences are more likely to continue and seize other learning opportunities, obtain diplomas or degrees and find work.

Influence of learning on parenting ability, child development and family life

Researchers have been unanimous in finding that educational level and affinity for learning in parents is decisively important for learning success and lifelong interest in learning in children. Parental influence on learning development and the life opportunities of their children is as immense as it is diverse. It turns out to be the central factor influencing the cognitive development and socioeconomic success of their children throughout their lives.

Health, language development, social integration, test results, completed educational level and job success – all these and other aspects correlate positively with the educational level of the mother and father. Even when the effects of income differences are included in the study, the latest research indicates that parental education is by far the most important factor affecting the cognitive and non-cognitive development of children.

Extensive cohort studies show that children of adults with a low educational level generally have a much harder time finding their way in school than their classmates, even when the parents are equally willing to help their children with learning and memorizing, for example, their numbers, letters, shapes or colors. Parents with more education show greater interest in school processes and better cooperation with teachers. And studies confirm that they attempt to influence school processes and the educational system far more frequently and invest more time and effort in school selection as well as observing and supporting the educational development of their children. They read more often to their children, talk to them more and use more a complex and varied vocabulary. They offer, researchers say, a more stimulating cognitive environment to their children – and at the same time are more demanding and expect them to learn more.

Still, scientists have made it clear that neither the number of years of schooling nor the educational level achieved by parents are sufficient indicators of educational competence and learning motivation by themselves. Instead, it is their personal teaching abilities, the educational content they choose, their attitude and views and their own learning experiences that play an important role.

Focus: Learning spill-overs and interplays

Studies of the relationship between parenthood and adult learning are of special interest. The participation by mothers in formal, non-formal and informal learning opportunities in particular has extremely positive effects. When mothers take the time to regularly leave their family to attend classes, gain some objectivity, disrupt routines and experience the company of other adults, it can make a significant contribution, say the results of studies, to maintaining or restoring their identity as autonomous adults. In surveys, mothers' descriptions of themselves and the impact of this learning range from improving their wellbeing to preserving their mental health. Another interesting example: Mothers who have taken part in learning experiences between the birth of their first and second child not only improve their education, but the probability of a premature birth and low birth weight of their second child was clearly lower and the probability of marrying rose significantly.

In addition, learning experiences and the educational level of people play an important role in determining family structure, whether and when parents marry or divorce, whether and when they have children and, not least important, how many children they have. Thus, for example, learning behavior has a decisive influence on how people actually find each other and get together. Studies show that generally and increasingly, people with the same educational level – and above all – the same readiness to learn are likely to marry. Involvement in school turns out to be ten times more important an influence factor than the level of education completed. In addition, numerous studies have examined the complex effects of learning behavior on the stability of relationships, divorce rates and the effects of parental separation on the mental health and development of their children. These connections are of special interest in the wake of the drastically rising divorce rate in Germany and elsewhere. For example, it turns out that in divorces, the educational level of the mother is one of the most important factors in protecting children from the negative

effects of divorce. This is especially important since further studies have proven that children of single mothers generally have greater difficulty in school than children from intact families.

There is also a broad spectrum of studies concerned with the influence of educational level and willingness to learn on the age at which women have children. This confirms a much discussed trend – already evident in numerous differentiated observations – that better school performance and more education leads to women waiting longer to have children. The extent of the influence of different educational levels is especially interesting: British studies, for example, show that women under the age of 23 without secondary diplomas are six times more likely to become mothers than women with such diplomas – and 75 times more likely than women with university degrees. This is regardless of other influence factors, such as social origin, emotional values, financial situation or whether women had wanted children when young or their own mother had children at a young age.

Learning and neighborhoods

With respect to the effects of learning in and on neighborhood relations, investigators have shown above all that the general educational level and willingness to learn of adults in a neighborhood, street or district will influence the school performance of the children living there – particularly because adults act as learning role models for them. While the statistical importance of this effect decreases if other factors are included in the social context of people with lower educational levels, investigators have nevertheless concluded that promoting demand for learning in adults is probably the most effective and least cost-intensive way to improve interest in learning and performance among children and adolescents.

Focus: Learning spill-overs and interplays

Research results in detail

1. Progression to further education or achievement and employment

While progressing to further learning is not necessarily a goal of learning, there is evidence from cohort studies that successful learning experiences constitute a predictive factor for future participation in learning. For example, staying in education after compulsory schooling predicts educational progression in adulthood. In turn, it might be expected that greater exposure to learning offers the individual more opportunities to experience the benefits of learning discussed in this report. Other factors that predict progression to further learning are family background, socioeconomic circumstances in adulthood, age, gender, ethnicity and region of residence (Sabates et al. 2007). The evidence presented below relates to the UK.

1.1 Early education performance, school experiences and their relation to later learning

Parsons and Bynner (2008) found that those in the 1970 British cohort with the poorest grasp of literacy or numeracy were less likely to have had formal pre-school educational experiences. As early as age 5 they had performed less well in cognitive assessments, falling further behind by age 10, as revealed by scores in the reading and mathematics assessments.

At age 16, men and women with low (entry level) skills were the most likely to be disillusioned with school, and the vast majority wanted to leave at the first opportunity. They were four times more likely than those with level 1 (the most basic school-leaving qualification) or higher skills to hold negative views on the value of education for future employment opportunities and on their chances of success in the labor market. In comparison

with men who had level 1 or higher skills, men with entry level skills were more likely to hold low career aspirations and far less likely—perhaps realistically—to hold professional or managerial job hopes. Men with entry 2 literacy presented as the most disillusioned and disappointed of all, while men and women with level 1 or higher numeracy were the most positive and aspirational.

Indeed, men and women with the poorest grasp of literacy or numeracy, when assessed in later years, were by far the most likely to have left full-time education at the earliest opportunity with no qualifications. Men and women with level 1 or higher skills had a more continuous acquisition of qualifications.

Sabates et al. (2007) describe the characteristics of adults who return to learning to take level 2 (school-leaving equivalent) qualifications and their pathways to progression, using the 1958 British cohort and the British Household Panel Survey. Their key finding was that progression to level 2 qualifications and beyond during adulthood (for those who did not obtain level 2 between the ages of 16 and 23) was strongly associated with being engaged and relatively successful in a range of learning activities at earlier ages—including learning during childhood, staying in education during adolescence and undertaking courses during adulthood, whether leading to qualifications or not.

In particular, adults who gained a level 2 qualification between the ages of 23 and 33 were likely to be characterized by staying on in education at age 16, receiving training between ages 16 and 23, and being enrolled in courses leading and not leading to qualifications between 16 and 23. Those who achieved level 2 by age 42 were characterized by taking courses not leading to qualifications between 23 and 33, receiving training lasting three or more days between 23 and 33 and improving numeracy

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skills between 23 and 33 (by any form of educational provision). This last result is similar to that found Sabates et al. (2007) using the 1970 British cohort.

Jenkins et al. (2003) also used data from the 1958 cohort, and found that those who left school with school-leaving qualifications were much more likely to acquire a qualification between the ages of 33 and 42 than those without such qualifications. Most of this learning led to occupational qualifications; only 4 percent of the sample obtained an academic degree. This effect was important for both men and women, but particularly important for women. The authors also found that acquiring a qualification between the age of 33 and 42 was associated with an increase of 10 to 11 percentage points in the probability of being a learner at age 42.

1.2 Post-16 education and learning experiences

Bynner and Parsons' (2006) work showed that improvements in basic skills during adulthood were associated with attainment of qualifications, as well as with other positive outcomes in adulthood such as mental health, wellbeing and civic participation. Men who improved their literacy and numeracy between the age of 21 and 34 were more likely to have gained some kind of formal qualification by the age of 34. This suggests that factors that occurred previous to the attainment of qualifications, such as the learning experience that resulted in improving basic skills, might be fundamental in explaining progression in education.

Although men and women in Parsons and Bynner's (2008) study with entry level skills were as likely as others to read newspapers and/or magazines, they were the most likely never to pick up a book. Of more concern was the exclusion of adults with the poorest skills, particularly literacy, from the digital

revolution that had taken place over the previous decade. In comparison with those with level 1 or higher skills, far more men and women with entry 2 skills were without a computer (48 percent to 16 percent of men, 40 percent to 17 percent of women) or access to the internet at home (62 percent to 19 percent of men, 62 percent to 23 percent of women). Even if there was a computer in the home, they were the least likely to use it on a regular basis.

A study of effective teaching and learning in reading by Brooks et al. (2007) found that, of 339 adult learners enrolled in further education colleges, 87 percent continued after their first course. Of this group, data were available on 265, and of these, 62 percent (163) had achieved a qualification. Of the 265 returns for whom data were available, 65 percent (171) had either returned to continue the same course or had started a new one. Morrell et al. (2005) found that of 1,900 learners in adult and community learning courses, over an 18-month period, 73 percent of the sample had engaged in some learning since their first interview, with 32 percent staying within their subject and progressing to a higher level. Fifty-nine percent were studying different courses, and 28 percent had gained or expect to gain a qualification.

Brooks and Pilling (2007) used data from 1,649 adult literacy, numeracy and English for Speakers of Other Languages (ESOL) learners during 2004–06 and found that there were modest but statistically significant improvements in adult language, literacy and numeracy and also in ESOL, when comparing learners who return to learning with non-learners with similar characteristics. Hartley and Horne (2005) report on Beder (1999), who investigated the outcomes (changes in learners) and impacts (wider social changes) associated with adult literacy education in America. Twenty-three studies were selected as most credible from a total of 115 identified studies that examined outcomes and

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impacts. In general, it is likely that participation in adult literacy education has a positive influence on continued education, as well as improved self-image and parents' involvement in their children's education.

1.3 Progression for 'hard to reach' adults

A qualitative study focusing on adults who had difficulties in learning (Barton et al. 2004) investigated the connections that adults made between learning and their everyday lives. The authors found positive effects of integrating literacy and numeracy in vocational programs in terms of retention and achievement for 'hard to reach' adults. Learners valued knowing what progress they had made, which could have important implications for further progression.

1.4 Learning and employment prospects

Workers from similar observable family backgrounds but with more schooling tend to find jobs that offer more sense of accomplishment, more autonomy, and more opportunity for social interaction (Oreopoulous and Salvanes 2009). Even among workers with roughly similar incomes, the more educated have more rewarding jobs. Cecas and Seff (1989) also suggest that occupational prestige and self-esteem are related.

Furthermore, some economists believe that more schooling not only makes individuals more attractive to employers, but more attractive in general. For example, men and women with more earnings potential or with more prestigious jobs become more appealing in a competitive marriage market (Becker 1973). For further discussion of learning and marriage, see below.

2 Parenting, child growth and family life

2.1 Parental education and childhood development

Parental schooling strongly relates to children's development and social-economic success throughout life: health, social integration, test scores, and labor market outcomes all correlate positively with both mother and father's attainment (Oreopoulous and Salvanes 2009). Differences in income may explain some of these relationships. For example, limited resources and an aversion to or lack of knowledge about financial aid may limit a child's access to college (Belley and Lochner 2007). Differences in birth weight could arise from poor mothers not being able to afford good nutrition or time to exercise (Currie and Moretti 2002).

On the other hand, conditioning on income does not eliminate these kinds of intergenerational relationships, and it might be that schooling itself improves the skills needed for parenting. Recent research on the determinants of human development underscores parenting as the most important determinant for children's cognitive and non-cognitive development, even among families with similar incomes (Cunha and Heckman 2009).

There is a strong and widely replicated correlation between parents' educational level and their educational attitudes and behaviors that impact upon children's cognitive development. For example, the Effective Provision of Pre-school Education (EPPE) project in the UK tested the relationship between parents' education and their educational behaviors. Sammons et al. (2002) found that mothers' educational qualifications were significantly associated with a Home Learning Environment index, which measures the quality of educational materials provided to children at home. This association played a larger

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role than parental socio-economic status. They also found that parents with higher education engaged their children in more complex and higher quality verbal interactions than parents with low levels of education.

Reading skills and stimulating home environment

Magnuson (2003) showed that the increase in the participation of US mothers in educational activities induced by the National Evaluation of Welfare to Work Strategies Child Outcome Study (an experimental design study) was linked to the provision of more stimulating home environments. Also in the US, data from the National Household Education Survey and the Federal Interagency on Child and Family Statistics showed that mothers' education was consistently related to whether children are read to by a family member (Halle 2002). Young children were more likely to be read to if their mothers had completed higher education. Hoff (2003) also found that parents with more education both talked to, and used more complex and varied language with, their children.

Adults with poor literacy and numeracy skills have children who fare worse than the rest of the children in their classroom, even though these parents are no more or less likely than others to help their young children learn to recognize numbers, the alphabet, shapes or colors (Bynner and Parsons 2006).

Possible contributing factors could include Parsons and Bynner's (2008) finding that fewer parents of cohort members with very low (entry level) skills read to their children every day when they were young (22 per cent of those with entry 2 literacy compared with 40 percent of those with level 1 or higher literacy; 30 percent of those with entry 2 numeracy compared with 44 percent of those with level 1 or higher numeracy). Their children had fewer books in the home than other children and, according

to reports from cohort members and the children (age 10+) themselves, they were less likely to read for enjoyment. Boys of cohort members with entry 2 literacy were also the most likely to have low educational aspirations.

Cohort members with lower skills were less likely to have been viewed by teachers as having parents who were interested in their education towards the end of primary school. Just 12 percent of cohort members with entry 2 literacy were viewed to have two parents who were 'very interested' in their education, compared with 36 percent of those with level 1 or higher literacy skills. Reflecting their own poor educational experiences, parents of those cohort members with entry 2 literacy were nearly three times more likely to report having current, or previous, reading difficulties than parents of cohort members who went on to have competent literacy skills (17 percent to 6 percent). Far fewer parents of those cohort members with entry 2 literacy also held aspirations for them to continue in education after age 16–27 percent compared with 51 percent with level 1 or higher skills.

Parental educational strategies

Feinstein et al. (2004) reviewed evidence on the intergenerational transmission of educational success and found that reading to children and 'exposure to print', and the presence of a cognitively stimulating learning environment at home, promoted children's development in terms of non-verbal reasoning, early number concept, literacy rates, reading achievement, social behavior development (cooperation / conformity, peer-sociability, confidence and anti-social behavior).

The authors found that there was a relationship between parental education and these kinds of parental educational behaviors, and indeed that that the most important socio-demographic, family-level, indirect influences on children's

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attainment were parental education and income. Parents' education informed their capacity and desire to manage the education system on behalf of their children, in terms of finding schools and monitoring the schooling process.

However, Feinstein and Duckworth (2006) investigated the 1958 British cohort data and found that a large proportion of the relationship between a mother's education and her parenting could be explained by her background characteristics, early cognitive development (and ability up to 16) and own parenting experiences: 73 percent of the cognitive stimulation and 89 percent of the emotional support that mothers provided their children could be explained in this way. Even when a large number of controls were in place, a small effect of maternal education on parenting (providing a cognitively stimulating environment) remained, but only for males.

The authors concluded that due to this selection bias, years of schooling should not be assumed to be an appropriate measure for the formation of the skills underlying parenting skills, since the pedagogy, curricula, ethos and experience of learning would also play a role.

Diaz et al. (1991) found that graduate mothers had teaching strategies that were different from mothers with lower levels of education during problem-solving interactions with their children. Harris et al. (1999) showed that parents with higher education had teaching styles that promoted children's development. There is some evidence that parenting styles differ by school attainment. The fraction of parents in one study who strongly agreed that "it is sometimes necessary to discipline a child with a good hard spanking" was substantially lower for respondents with college experience, with and without additional controls for family income (Oreopoulous and Salvanes 2009).

As indicated by Parsons and Bynner's (2008) work referred to above, education may also affect parental expectations. Davis-Kean et al. (2002) found that higher levels of education were significantly related to parents having higher expectations of child achievement. Using structural equation analyses, the authors found that parents' education levels had the strongest impact on parental expectations, of the family demographic variables assessed (income, employment status and ethnicity). A complementary study by Alexander et al. (1994) found that parents with education above high school gave more accurate predictions of their children's academic performance.

Another important set of empirical studies has investigated whether investment in schooling for one generation will lead to increasing schooling of the next generation (see Holmlund et al. 2006 for a review of empirical studies). Most of these studies have found robust evidence to show that parental education, measured by highest qualifications attained, staying in compulsory schooling or completing college education, has a robust statistical association with children's school attainment.

Children's academic attainment: adopted and non-adopted children

Sacerdote (2000) used data from the Colorado Adoption Project and the National Longitudinal Study of Youth in the US, and the 1958 British cohort, and found that family education (measured by years of schooling) had large effects on children's college attendance for both biological and non-biological children. Sacerdote (2004) also used information on Korean-American adoptees who were randomly assigned to families and found that having a college-educated adoptive mother increased an adoptee's likelihood of graduating from college by 7 percentage points; however, for biological children the likelihood was raised by 26 percentage points.

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Evidence from the UK (Dearden et al. 1997) showed that the impact of fathers' years of education on adopted sons' schooling was almost as large as the impact of fathers' schooling on their own children's schooling.

In Rwanda, De Walque (2005) used the fact that a large proportion of children live in households without their biological parents, and found that the education of both biological and non-biological mothers and fathers (measured by years of schooling) was important for the education of children.

In Sweden, Bjorklund and Richardson (2001) investigated the educational attainment of children adopted from abroad by Swedish parents and compared them with their biological children. They found that parents' education increased their biological children's educational attainment. For example, parents with university degrees increased the biological child's educational attainment by two years of schooling compared with children whose parents had a short high school level of education. There seemed to be no such correlations between parents and their adopted children, although the adopted children reached the same level of educational achievement as the average person born in Sweden.

For non-adopted children, a study in France (Maurin and McNally 2005) found that additional years of parents' higher education increased the educational performance of their children at age 15. This study used the events of May 1968 to identify education effects, since examinations in France were abandoned that year, and pass rates for various qualifications increased significantly, meaning that more students were able to enroll in higher education.

Black et al. (2004) used the Norwegian change in compulsory schooling and found no effect of fathers' schooling but a small

effect of mothers' schooling on the schooling of boys (measured in terms of years of schooling or an indicator for completing 12 years of education). Chevalier (2004), using a change in compulsory schooling in the UK, found a large positive effect of mothers' education on their children's education, but no significant effect for fathers' education. Also in the UK, Galindo-Rueda (2003) found a positive effect of fathers' schooling on the schooling of their sons, but no effects for maternal schooling. This study used a change in compulsory school leaving age from 14 to 15 in 1947 to identify schooling effects in the 1958 cohort. De Walque's (2005) Rwandan study found that a mother's years of education mattered more for girls, and the father's for boys.

Using data on Swedish adopted children, Bjorklund, Lindahl and Plug (2004) showed that both mothers' and fathers' college education had positive and significant effects on their adopted children's school attainment, but that the effect of fathers was larger than that of mothers. In the USA, using information from adopted children from the Wisconsin Longitudinal Survey, Plug and Vijverberg (2005) and Plug (2004) did not find a significant impact of mother's years of schooling or graduation from college on the child's schooling, but they did find a significant impact for father's schooling.

This result is also obtained in the US by Behrman and Rosenzweig (2002) and by Antonovics and Goldberger (2005). The difference compared with previous studies is that rather than using information from adopted children, these authors used information on identical twins to account for the possible impact that heritable traits may have on the intergenerational effect of education.

Children's birth weight

Grossman and Joyce (1990) obtained a direct estimate of schooling on birth weight for African American children in

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New York City in 1984. They found that African American women who completed at least one year of college gave birth to infants who weighed 69 grams more than the infants of women who completed between 8 and 11 years of schooling. However, the role of education cannot be clearly determined from these results, as the impact of post-secondary education on the decision to give birth falls and the incremental benefit of a high school diploma becomes statistically insignificant when selectivity bias is corrected for.

Currie and Moretti (2002) estimated the effect of maternal education on birth outcomes using data from the US Vital Statistics Natality files for 1970 to 1999. The results of their longitudinal models indicated that an increase in college education of one year would reduce the probability of low birth weight by about 0.5 percentage points. The effect on the probability of a preterm birth is smaller, at 0.44 percentage points. The result of the changes-on-changes estimates indicated that mothers who increased their education between giving birth for the first and second time reduced the probability of low birth weight and prematurity, as well as increasing their use of early prenatal care and marriage probabilities.

Chou et al. (2007) exploited a natural experiment to estimate the causal impact of parental education on children's birth weight in Taiwan. Results suggested that a mother's years of schooling had a larger effect on child health outcomes than the father's years of schooling.

For mothers who were aged 0 to 11 in 1968, an additional year of schooling reduced the probability of low birth weight, very low birth weight, and prematurity by 1.66 percentage points, 1.13 percentage points, and 1.65 percentage points respectively (instrumental variable estimates were much bigger than the

OLS estimates). An additional year of father's schooling reduced the probabilities of low birth weight, very low birth weight and prematurity by 1.28 percentage points, 0.88 percentage points, and 0.91 percentage points. When estimating the partial effects of mother's and father's education, the mother's schooling remained significant. In this case, an additional year of mother's schooling lowered the probabilities of very low birth weight and prematurity by 0.7 percentage points and 1.28 percentage points, respectively.

The natural experiment was possible because in 1968, Taiwan extended compulsory education from six to nine years, resulting in the opening of 140 new schools in 1968: a 70 percent increase. The authors estimated the impact of mothers' education on child health by using cohort exposure to compulsory education reform and newly established school density interactions as instruments for parents' education.

2.2 Parenting and adult learning

Schuller et al.'s (2002) qualitative study of adult learners found that a major benefit to parents, especially to mothers, of taking part in learning was that it provided them with a change of scene, routine and company. It enabled, or pushed, them to get away from the home and their children for a while, and to maintain or recover their sense of identity as an adult. The strength of the effect ranged from a mild benefit to a sense that their participation had saved them from severe mental health problems.

Learning provided a structure to people's lives. This could mean structure on a daily or weekly basis, in the midst of feelings of a loss of control; or in the sense of providing a focus and goal, long- or short-term, such that learners could see a way to progress beyond the current phase of their lives. Such feelings were most strongly expressed by mothers of small children.

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This study also found that learning provided the confidence, skills and opportunity to access knowledge relevant to new situations occasioned by parenting. This was obvious where it referred to specific parenting courses or other similar learning. But learning also provided people with the ability to draw on knowledge sources, notably books; and gave them the opportunity to do so by furnishing access to libraries. These were particularly important where parents faced the challenges of single parenthood or sick children.

Importantly, the research found that taking part in learning strengthened the general value parents placed on their children's learning. Parents came to understand more about specific aspects of their children's schooling, for example the curriculum in mathematics, English or computing/IT, and were able to offer direct support. In some instances, parents learnt skills directly enabling them to improve their parenting, for example, in devising games with their children or understanding their developmental patterns better, and managing their behavior more effectively. They also developed better communication skills generally. English language training was crucial for parents who did not speak English, to enable them to understand the educational and health needs of their children and to enable them to access successfully the appropriate services.

Learning was also found, in some cases, to improve relationships between partners, or between adults and their parents or the wider family. The authors suggest that this might be because it provides common subjects of interest around which communication can improve; but more generally it is likely to be because of enhanced respect and self-confidence.

However, negative or double-edged effects of learning were also possible. For example, a parent's participation in education could

reduce the time and energy available for their family, or raised aspirations could cause them to give up serving other members of the family.

Effects of adult learning on children

Bynner et al. (2001) used the National Child Development Study and the British Cohort Study, together with data from the UK Family Expenditure Survey and Family Resources Surveys, to measure both the economic and non-economic impacts of improving adult literacy and numeracy skills. Using statistical modeling techniques, they found that individuals who increased their literacy and numeracy levels were less likely to have children experiencing difficulty at school, and that these effects persisted after controlling for earlier family circumstances and educational achievement.

Feinstein and Duckworth (2006) used data from over 11,000 members of the 1958 British Cohort and found that the association between adults' participation in education post-16 and their parenting skills and educational behaviors did not appear to be causal: although there was a relationship, it disappeared under instrumental variable analysis. The authors concluded that ability, and positional ambition in society, could be confounding the relationship between staying on in post-compulsory education and subsequent parenting skills.

In the US, Kaestner and Corman (1995) associated young children's improvements on tests of reading and mathematics, two years apart, with increases in their mothers' formal education over this period. They found no effect of increased maternal education on children's achievement scores. Rosenzweig and Wolpin (1994) looked at differences in test scores between earlier-born and later-born pairs of siblings, relating these differences to increases in their mothers' formal education over

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the intervening period. They found that an additional year of maternal education has a modestly positive and significant effect on their children's achievement in reading and mathematics tests, although not on a measure of verbal IQ.

Sabates and Duckworth (2009) investigated whether the inter-generational benefits of parental adult education existed over and above the achievement of educational qualifications during schooling, and whether returns to parental adult learning were greatest for children of parents with low levels of education. Using data from the UK Avon Longitudinal Study of Parents and Children, results showed that mothers' participation in adult education was not associated with improvements in their children's academic attainment in English and mathematics at age 14. This lack of relationship held for the overall sample, and for subgroups defined by the type of adult education (accredited, unaccredited or informal learning), the intensity of learning (duration and engagement) and by mothers' prior educational qualifications.

Family learning and family literacy

Family learning has been found to be a significant contributor to children's resilience when parents work with children in problem solving (Drummond et al. 1996). Good communication skills by adult family members are likely to contribute to children's adaptation in different contexts (Greenwald 1990). Good communication and problem solving skills within families increase the length of time parents play with children, enhances proximal parenting processes (Drummond et al. 2005) and reduces or prevents psychological and behavioral disorders in children (D'Zurilla and Maydeu-Olivares 1995).

Brassett-Grundy (2002) carried out a small-scale qualitative study on parental perspectives of family learning in the UK, with

similar results to those found by Schuller et al.'s (2002) study described above. Parents identified four types of benefits of family learning: 1) child-related (where they became more aware of how to teach their children and opportunities available in everyday life); 2) other-related (where they gained from meeting new people, making friends and developing new support networks); 3) practical (where they gained new knowledge and were awarded a certificate which motivated them to want to progress to other courses, and 4) emotional (where they felt they were discovering their 'old selves', reawakening their brains and gaining more confidence).

Longitudinal type studies have been carried out on programs that support parents in helping their children to learn and also to address their own educational needs. Reynolds et al. (2001) carried out a study of children who had participated in Chicago's Child-Parent Center (CPC) Program. Approximately 1000 children who had attended 20 centers either in pre-school or kindergarten were tracked until the age of 21. Data were collected from family surveys and educational and justice system records. An alternative-program, quasi-experimental design was used in which the main sample of CPC participants was compared with a random sample of 550 eligible children who did not participate in the program but only enrolled in an all-day kindergarten program and/or preschool program.

Relative to comparison groups and controlling for socio-economic factors, it was found that center participants had a 29 percent higher rate of high school completion, a 33 percent lower rate of juvenile arrest, a 42 percent lower arrest rate for a violent offence, a 41 percent reduction in special education placement, a 40 percent reduction in the rate of grade retention, and a 51 percent reduction in child maltreatment.

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In the UK, a number of longitudinal studies have been employed to evaluate the impact of intervention programs that are aimed at improving children's development in the early years, including their learning. In family literacy programs, parents learn about how their children are taught and become better able to support their children's learning at home. The aim is that both parents and children enjoy their experience of learning together; parents become more closely involved with the school and relations with staff improve.

Brooks (2009) undertook research over 20 months to assess the impact of family literacy programs on the skills of parents and their children; family relationships; progression; and social mobility. A range of short (30–49 hours) and standard (72–96 hours) family literacy courses involving children between 3 and 7 years old were included. A total of 74 family literacy courses were evaluated, of which 59 percent were short courses and 41 percent were standard courses. 583 parents and 527 children took part in the evaluation.

The project employed both quantitative and qualitative research methods. It used established instruments to assess progress in reading and writing; carried out classroom observations; semi-structured questionnaires with local authority managers, adult literacy tutors, early years teachers and parents; and qualitative interviews with local authority managers, adult literacy tutors, early years teachers, head-teachers, children and parents.

The great majority of parents prioritized their parental role, and their prime motivation for participating in family literacy for parents was to learn about the school curriculum to help them support their children's literacy skills. Sixty-four percent of parents reported that since taking a family literacy course they had become more involved in their child's pre-school or school.

Seventy-six percent of parents said that they had changed as a person since taking the family literacy course. This was generally expressed in terms of greater confidence, but it also meant that parents felt more capable across a range of areas.

Seeking employment was not often quoted as a reason for joining a family literacy course, but many said afterwards that they thought the course had improved their options for finding work. However, many were reluctant to seek employment until their children were older and more established at school.

In terms of specific interventions, the Peers Early Education Partnership (PEEP) is an early learning intervention that aims to improve the life chances of children aged from birth to five years living in disadvantaged areas. PEEP supports parents and carers as their children's first and most important educators, as well as promoting their own learning. A number of research studies, all of which compare a group of children who participated in PEEP matched with children from a similar disadvantaged community in which the program was not available, have been carried out to estimate the benefits of parents and children's participation in the program.

Evangelou and Sylva (2003) followed three- and four-year-olds participating in the PEEP program between 1998 and 2001. The study showed that children from families engaged with PEEP made greater progress than other children in vocabulary, language comprehension, and understanding about books and print and number concepts, and also benefited in self-esteem.

Another study (Sylva et al. 2004) measured the benefits to parents and carers of participating in PEEP. The study found that PEEP parents, compared with a similar group of non-PEEP parents, reported significantly greater awareness about how to

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help their child's literacy development, had improved their socio-economic status (as measured by their job), and had taken more courses, particularly in literacy and numeracy, though had not changed their formal qualifications.

A third study, the Birth to School Study (Evangelou et al. 2005) followed over 500 children and compared the development of those who were involved in PEEP with a control group. It found that PEEP had a significant impact on the quality of parents' interaction with their children when they were one and two years old. When the children were aged two, they parents were rated significantly higher on the quality of their care-giving environment, and the parental outcomes emerged before any of the child outcomes became apparent. Child outcomes showed a significant impact on children's rate of progress in a number of literacy-related skills, as well as in measures of their self-esteem.

Other UK projects include the Realising Early Achievement in Literacy project, which involved parents in reflecting on their role of supporting children's development as well as teachers and parents sharing information about children's learning. The children in the family learning group made significantly greater gains in test scores than those in the control group (Heydon and Reilly 2007). An evaluation of the Family Literacy Pilot Project also showed that improvements in children's reading attainment were likely to be linked to improvements in the parents' literacy levels (Brooks et al. 1996).

Other programs have proven to have important benefits for parents—for example, the Adult Minorities Breaking Educational Restrictions and SHARE (a UK, school-run program where parents work with children at home)—but the benefits for children's educational attainment have not been fully evaluated.

Grandparents

Grandparents may be significant providers of childcare in some countries. For example, they are the biggest providers of childcare for pre-school aged children in Australia, where the younger the child, the more likely they are to be cared for by their grandparents, and grandparents, especially grandmothers, are preferred over other kinds of care for very young children (Greenblat 1993). Older people are therefore a significant potential resource for nurturing the literacy and numeracy skills of young children, a role whose potential is reduced for those with poor skills.

2.3 Cohabitation, marriage and divorce

Cohabitation and marriage

Learning plays an important role in shaping marriage and cohabitation patterns (Blackwell and Bynner 2002), while the structure of the family (defined as the number of parents living in the household) has been found to have a weak relation to education.

Trends in partnership formation showed that individuals with similar levels of education tend to marry each other (Rockwell 1976; Schwartz and Mare 2005), and this tendency appears to be increasing (Mare 1991). However, in Germany, Blossfeld and Huinink (1991) found that level of education was not significantly associated with the timing of marriage, but engagement in education was.

Results for the US (Brien et al. 2006) and Japan (Raymo 2003) were similar. Brien et al. found that being enrolled in school reduced the likelihood of entering into marriage, and also that years of education mattered. However, the impact of school engagement was more than 10 times greater than the impact of

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educational attainment. Raymo also found that delayed marriage was associated primarily with longer school enrolment. These findings suggest that the reason marriage was delayed was perhaps participation in education, with its demands affecting individuals' ability to marry or enter into partnership.

Dale and Egerton (1997) in a UK study found that although in general the highly qualified marry later than those with no or low qualifications, there are important gender differences. Single, childless men are found most frequently at both ends of the educational spectrum. The poorly qualified have the lowest marriage rates, with 22 percent of men with below 'O' level (school-leaving) qualifications single and childless at 33. In contrast, there is a clear gradient among women, with very few single, childless women among those with few or no qualifications (8 percent of women with below 'O' level qualifications).

Parsons and Bynner's (2008) analysis of the 1970 British cohort showed a somewhat similar picture, in that men and women with low (entry 2) literacy skills were the most likely of all groups to have never lived with a partner by age 34. However, early live-in partnerships were also most practiced among women with entry 2 skills. Another analysis of the same cohort (Ferri and Smith 1999) also found that youthful marriage occurred most commonly among young women with the least advantaged educational backgrounds: among 26 year-olds living alone or with friends in 1996, 40 percent had a degree, compared with just 12 percent who were married.

Berrington (2001) found significant intergenerational effects of education, in that women whose mothers left school early (before the age of 15) were more likely to marry their first cohabiting partners than those whose mothers had higher levels of education.

Higher qualifications appear to give women increased earning power and therefore more choice about whether or not to take a partner: hence the delay for many highly qualified women in marriage and childbearing. Recent research suggests that not only do marriage rates vary by qualification level, but also by subject studied. Analysis of the members of the UK Office for National Statistics Longitudinal Study with degrees in the different sciences found that while male graduates generally were less likely to be married than non-graduates, men qualified in health-related subjects had higher rates of marriage at age 25–34 than non-graduates (Blackwell, 2001).

A review of evidence by Feinstein et al. (2004) concluded that parents' education has both positive and negative effects on family structure, which cancel each other out. Family structure therefore does not help to explain the relationship between parents and children's educational attainment; however, it does influence the child's development through its effects on income.

Learning and the chances of divorce

A number of explanations for high and rising divorce rates have been suggested (Blackwell and Bynner 2002). They include the increasing economic independence of women, the declining earnings of men without degrees, rising expectations of personal fulfillment from marriage and greater social acceptance of divorce (Amato and Paul 2000; Kiernan and Mueller 1999).

Educational attainments can have contradictory influences on marital stability or breakdown (Berrington and Diamond 1999). Highly educated women have the greatest opportunity for economic independence, and more opportunity to meet alternative potential partners than women who work only at home. These two factors would tend to increase their chances of partnership dissolution. The highly educated also typically have

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more liberal attitudes, which weaken the barriers to partnership breakdown and marital dissolution in particular. However, they are also more likely to marry highly educated men, from whom they might expect high returns from marriage. Being well educated may help people to choose their partners more wisely and improve communication within the partnership, and therefore protect against relationship breakdown.

On the other hand, partnerships formed at an early age—most common among women with low qualifications—are more prone to breakdown. At the point of relationship breakdown, women with few or no qualifications are least able to secure employment that pays enough to support themselves and their children, have husbands who are least likely to be able to support their ex-spouses and children, and have parents who are least likely to be able to support their daughters and grandchildren (Berrington 2001). Kiernan and Muller (1998) also suggest that the observed increase in risk of partnership dissolution among those with less education in the UK might be in large measure due to the formation of early partnerships and poverty.

Educational attainments measured at 16 and in later adulthood are negatively associated with marital separation in that those with higher attainments were less likely to divorce. For example, in the 1970 British birth cohort study those who were divorced or separated by the age of 26 were particularly likely to have low educational qualifications. Among men, those who had experienced marital breakdown were three times more likely than those still married to have no formal qualifications, whilst women with marital breakdowns were twice as likely to have no formal qualifications (Ferri and Smith 1999). Studies from the US (Tzeng 1992; Martin and Parashar 2006) and from Finland (Finnas 1996; Jalovaara 2003) also report that couples with low levels of education are at greater risk of partnership dissolution than couples with high levels.

However, this pattern is explained by the earlier age at which those with fewer educational attainments enter marriage, and the increased risk of dissolution for early marriages (Haskey 1984; Murphy 1985; White 1990; Kiernan 1997a, 1999; Kiernan and Mueller 1999; Berrington and Diamond 1999). Once the age at which marriages and partnerships are formed is taken into account, the chances of separation among differently qualified groups converge.

Learning and the effects of divorce

Women's educational attainments and employment status act as protective factors against the negative consequences of divorce for children (Kiernan 1996). Joshi et al. (1999) looked at the relationship between family history and family structure on children's educational and behavioral development. Their analysis was based on NCDS data for Britain and the National Longitudinal Study of Youth for the USA. They found that children of lone mothers who had broken up with the child's father fared worse both educationally and behaviorally than children in intact families. However, the differences disappeared when the mother's qualifications and current income were taken into account. Rake (2000) also demonstrates that the lifetime impact of divorce on women's income varies by educational level, among other things.

2.4 Family size and age at first parenthood

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 (e.g. Ferri and Smith 2003; Jones and Tertilt 2008). Feinstein et al.'s (2004) review also found that family size was negatively related to parent's education. The interpretation of

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the causality of this relation is difficult and empirical studies are scarce. The dominant explanation is a trade-off between number of children and parental investment per child. The idea is that, since more educated people tend to work more, they also try to avoid spreading their time too thin by parenting fewer children. Recent evidence is mixed, as on the other hand, individuals who prefer fewer children may enjoy more learning and career opportunities (Jones et al. 2008).

Janowitz (1976) investigated the impact of education on family size in the US, divided into a direct effect, excluding the impact via labor force participation and age at marriage, and an indirect effect, which is transmitted or channeled through labor force participation and age at marriage. Her results suggested that, in most cases, the indirect effect of education is greater at higher levels of the wife's education, while the direct effect is greater at lower levels.

Wolfe (1980) examined the effect of more education for US women on their fertility behavior, and found that the factor that had the greatest impact on family size was the wage lost due to engagement in full-time parenthood: the higher the wage lost, the smaller the size of the family. Individuals who had strong preferences towards having children and who enjoyed raising their children and spending time with them were likely to have large families. This study used data from the US National Bureau of Economic Research–Thorndike-Hagen sample, and the effect of education on family size was analyzed through several factors: contraceptive efficiency, age at marriage, preferences toward children, desired standard of living, wage lost due to engagement in full-time parenthood, and efficiency in raising children.

Parsons and Bynner's (2008) work in the UK showed that 11 percent of women with low literacy and numeracy skills (below the level of the most basic school-leaving qualification) had four or more children by age 34, compared with 3 percent of those at basic school-leaving level or higher. However, men with low literacy and numeracy skills tended to lead a solitary life without children in their mid-30s. By the age of 34, 52 percent of these men had a child, compared with 61 percent of men with higher literacy and numeracy levels – although lower-skilled men tended to become parents younger overall. Women with low skills also tended to be single, but also to be parents.

Blackwell and Bynner (2002) find a clear relationship between education level and childbearing context in Britain: non-graduates were more likely than graduates to have a first birth before forming a partnership and to have a child in their first cohabiting union. Graduates were more likely than non-graduates to have a first child within a first marriage or after their first partnership had ended.

Since the 1970s, women's qualification rates have increased more rapidly than men's, while lone mothers were more likely than other women to have no qualifications. For example, among mothers in general, 25 percent had 'A' level (upper secondary) or higher qualifications in 1991-3, up from 9 percent in 1971-3. However, among lone mothers only 16 percent had 'A' levels or higher in 1991-3, and this qualification level was lowest among never married lone mothers, at 12 percent. Married mothers were most likely to have qualifications at this level: 28 percent in 1991-3 (Kiernan et al. 1998). Moreover, women with no educational qualifications are more likely than those with some educational qualifications to experience a non-marital birth following the dissolution of a first marriage (Jefferies et al. 2000).

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Parenthood at young age

There is no clear causal pathway for an effect of education on teenage parenthood, since both processes occur during the teenage years. Teenage parenting is seen as both a consequence and cause of educational underachievement, as motherhood closes down opportunities and choices available to young women (Blackwell and Bynner 2002). Poor school performance, lack of qualifications (by age 33) and early motherhood are all strongly associated. There is some evidence that the relationship is more a matter of young people's relations with the school, and academic success in childhood and early adolescence, than of qualifications in and of themselves.

However, empirical studies show that women with low levels of educational qualifications tend to have children younger than their better educated counterparts (e.g. Rowlingson and McKay 1998; Feinstein et al. 2004). Kiernan (1997) explores the relationship between school performance and early parenthood (defined by Kiernan as occurring before 20 years for women and 23 years for men). Women with poor school performance at 16 years were 6.7 times more likely than those with the highest educational scores to enter parenthood early.

Men with low educational scores were 3.7 times more likely to become young parents than those with high scores. These odds are net of other influences such as social class, emotional scores, the family's financial wellbeing, whether the woman wanted a child at an early age and whether her mother had been a teenage parent. Children identified by their teachers as having high academic potential at 16 were also less likely to enter parenthood before their early 20s, even after age-specific cognitive constructs, based on standardized reading and mathematics tests and teacher ratings, were introduced into the analysis.

Similarly, Hobcraft (2000) shows that educational qualifications are strongly related to childbearing before 23 years. Young women with no qualifications were six times more likely to become mothers by 23 than those with 'A' level (upper secondary) or sub-degree qualifications, and 76 times more likely to enter motherhood early than graduates.

Bonell et al. (2005) considered the relationship between dislike of school and sexual risk-taking behavior and pregnancy using longitudinal data on girls between the ages of 13 and 16, in 27 coeducational comprehensive schools in England. Schools were randomly selected either to receive a sex education intervention or to serve as a control. Even after adjusting for measures of socioeconomic status, expectation of parenting, lack of expectation of education or training, and lack of knowledge or confidence about sexual health information, girls who disliked school were twice as likely to become pregnant in their teenage years. Again, this research did not demonstrate a causal relationship, but rather highlighted the strong relationship between attitude to school and risk of teenage pregnancy.

Meanwhile, Black et al. (2004) found that increases in years of compulsory schooling in the US and in Norway reduced the incidence of teenage motherhood: the estimated effect in both countries was very similar. Being in school and devoting time to school activities and homework is a protective factor against early sexual activity (Whitbeck et al. 1999). Those who leave school at 16 are twice as likely to have a first birth before the age of 21 than those who stay on (Manlove 1997). Ninety-two per cent of teenage mothers in the 1958 British cohort had left school at 16, compared with 68 percent of post-teen mothers and 53 percent of those who were childless by 33 years (Kiernan 1997).

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As regards the relationship with literacy skills, Blackwell and Bynner (2002) found that, among 21 year-olds in the 1970 cohort, four times as many of those with very poor literacy skills (20 percent) had two or more children compared with the population as a whole (5 percent). In the later NCDS (1958) cohort, assessed at age 37, the gap remained: even restricting the sample to 16-year-old school leavers, 21 percent of the young women assessed as having very poor literacy had three or more children by the age of 25 compared with less than 7 percent of the sample as a whole (Ekinsmyth and Bynner 1994; Bynner and Parsons 1997). Parsons and Bynner (2008) found that 18 percent of women with low literacy and numeracy had been a teenage mother, compared with 8 percent of those with higher literacy and numeracy skills.

In terms of background characteristics, those giving birth before 20 were three times more likely to have no qualifications at 33 if they had grown up with no evidence of household poverty, rising to 6:1 among those in households that were clearly poor (Kiernan 1999).

Ermisch and Pevalin (2003) investigated the family background and childhood factors that are associated with teenage pregnancy using longitudinal data from the 1958 British Cohort and the British Household Panel Survey. Two factors were found to be important determinants. Firstly, daughters of teenage mothers were more likely themselves to become teenage mothers. Secondly, the educational qualifications of mothers had a significant impact in reducing the likelihood that their daughters would become teenage parents. Girls in Hobcraft's (2000) study whose mothers showed little interest in their education were almost twice as likely as those with interested mothers to become teenage parents. Fathers' interest was less influential. Girls were much more vulnerable to family influence of this kind than boys were with respect to the timing of parenthood.

In turn, mothers who themselves had children in their teens were found to be far less likely to take an interest in their own daughters' education (21 percent rated as having little interest, compared with 7 percent of older mothers, Manlove 1997). However, this is based on teachers' perceptions of parents' involvement, raising questions about the effect that teacher labeling may have on pupils' performance and subsequently fertility outcomes, as well as the direct effect of parents' actual involvement.

UK evidence shows that those with higher educational aspirations are more likely to have terminations than non-students (Social Exclusion Unit 1999; Boulton-Jones and McInney 1995). A Scottish study found that the teenage pregnancy rate was six times higher in deprived areas than in affluent areas. But whilst two-thirds of teenage pregnancies in affluent areas were terminated, only a quarter of those in deprived areas were terminated (Smith 1993).

Those from more deprived areas are more likely to feel stigmatized by abortion: those from more privileged backgrounds felt they had more to lose through motherhood (Social Exclusion Unit 1999). For young, working-class girls in deprived areas, motherhood provides a fast track to adult status and possibly an attractive alternative to repetitive and poorly paid work (Simms 1993). In a longitudinal study of women who became mothers at 16–19 years in 1984–5, only 29 percent (n = 79) were in full-time jobs at the time of conception (Phoenix 1991).

Education and late childbearing

Kravdal (1992) argues that highly educated women are more likely to have low lifetime fertility because education opens up alternatives to the role of wife and mother. Education makes it easier to find jobs in the labor market; increases earnings

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potential; makes jobs more emotionally satisfying; increases the opportunity cost of having children; increases knowledge and efficiency in contraceptive use; may make parents have higher aspirations for their children; and may cause adults to prefer alternative satisfactions to those provided by children.

McDonald (2000) argues that more educated women have greater decision-making power within the family: men are more likely to defer to the wishes of an educated wife. As women's education increases, so too does their power to determine the number of children they will have, and fertility will fall, even in the absence of a concomitant change in their labor market participation.

As an example McDonald cites Iran where the total fertility rate fell between 1986 and 1996 from 6.2 to 2.5 children per woman. Over this period women's involvement in public life continued to be restricted, but increased education and social permission for family planning were the agents of fertility change. In addition the proscriptive force of the 'motherhood mandate' is challenged most strongly as highly educated women, particularly if engaged in postgraduate education, acquire other values associated with occupational careers and alternative options. The total number of years in education was found to have a negative effect on the childbearing motivation of women, but not of men (Miller 1992, in a US study of the Longitudinal Study of Childbearing Motivation).

In Britain women with higher qualifications are more likely to delay childbearing. For example, among 33 year-old members of the NCDS (born in 1958), two-thirds of women with below school-leaving qualifications were mothers by 25, compared with only 15 percent with degree-level qualifications (Dale and Egerton 1997). Similarly, highly qualified men were less

likely to be fathers than those with low or no educational qualifications: more than two-thirds of men with below school-leaving qualifications were fathers by the age of 30, compared with 39 percent with degree-level qualifications.

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 with four fifths of women with no qualifications. However, it is possible that the presence of a child could prevent mothers from studying and, consequently, decrease the likelihood of achieving qualifications.

The influence of education on fertility varies not only by qualification level but also by subject studied (Blackwell 2001). An analysis of the Office of National Statistics' Longitudinal Study found that among women aged 25-34 in 1991, graduates were almost twice as likely to be childless as non-graduates, and that women qualified in technology subjects (engineering, architecture, surveying and computing) were significantly more likely than other graduates to be childless in this age range.

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3. Neighborhoods

The relationship between learning carried out by parents and the attainment of the children in their families has been discussed above. Meanwhile, the links between the proportion of adults in a neighborhood with no qualifications and the attainment of all school children living in the neighborhood were investigated by Jenkins (2009). He hypothesized that neighborhood skill levels in England have an impact on the test score results of children because adults serve as role models.

The study developed models of the various factors influencing pupil attainment, including the proportion of adults in the neighborhood without qualifications, using large-scale pupil-level datasets. These models focused on attainment in English, mathematics and science at age 14 as the outcomes of interest. The main objective in estimating the models was to control for factors such as pupil and family characteristics, as well as school context, and to check whether neighborhood factors had any impact once these other influences on pupil attainment were accounted for.

While there was clear evidence of a statistical relationship between areas where the adult population has few qualifications and low attainment among schoolchildren at age 14, once other factors influencing attainment were taken into account, the estimated neighborhood effects appeared rather small. However, Jenkins concluded that their value could nonetheless be sizeable given evidence on how much it costs to increase attainment in other ways.

To illustrate this he developed two hypothetical scenarios. For Scenario 1, adult qualification levels in the lowest 10 per cent of neighborhoods were supposed to improve such that there were

no longer any neighborhoods where more than 50 per cent of the adult population had no qualifications. The estimated 'spillover' benefits of adult learning in this case would be worth up to £6.2 million in mathematics for a single year group of children over three years of secondary school, and up to £5.5 million in science and up to £5.4 million in English over the course of the three years, yielding a total combined benefit across these three subjects of up to £17.1 million.

For Scenario 2 it was supposed that there was a larger-scale improvement in the skills base with the assumption that the most deprived quarter of neighborhoods saw an improvement to the extent that there were no longer any neighborhoods where more than approximately 40 per cent of the adult population were without qualifications. Here the 'spillover' benefits of adult learning would be worth up to £23.9 million for a single cohort over the course of the three years in mathematics, up to £21.1 million in science and up to £20.7 million in English, yielding a total combined benefit across the three subjects of up to £65.7 million.

Information about the project “European Lifelong Learning Indicators” (ELLI)

It is important to remember that this study is just one part of the larger European Lifelong Learning Indicators (ELLI) project. The ELLI project was launched by the Bertelsmann Stiftung in January 2008 in an effort to make the concept of lifelong learning more understandable and transparent. It is meant as a resource for political decision makers – from the European to the community level – as well as educational institutions, private industry, academics and journalists. In addition, it assists individuals in Europe who want to know more about learning in their own community, country and the rest of Europe, i.e., what learning entails and the impact it has. The ELLI project is breaking new ground by expanding its focus to include not only the formal educational system, but also learning that takes place outside of traditional educational institutions. This holistic approach is an essential component of the project, and is reflected in all of its instruments and activities.

For an overview of all activities please visit our webpage

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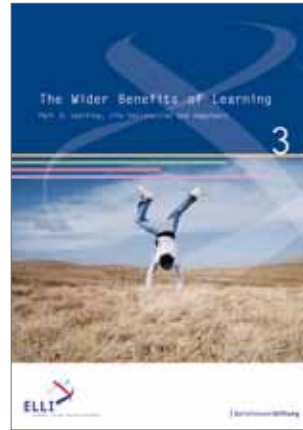
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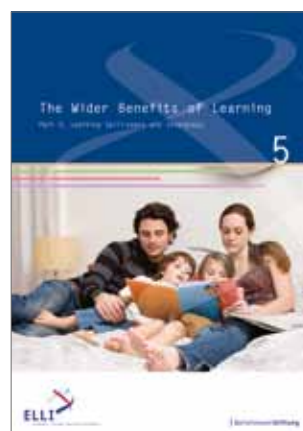
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Part 5:
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