

Innocence and Experience:
Early Childhood Education and Industrialisation
in England and Wales, 1767-1876



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*For where-e'er the sun does shine,
And where-e'er the rain does fall:
Babe can never hunger there,
Nor poverty the mind appall.*
– William Blake (1789)

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Writing this thesis involved thinking a great deal about the formative, early childhood experiences of others. At various times along the way, I have given into the temptation of self-analysis. I have wondered to which early teachers and experiences I owe thanks, but my memories of these early years are partial and unreliable. I regret that educating young children must remain a thankless job in my case, although I have no doubt my anonymous ‘dames’ exercised considerable patience in caring for me. Others cannot remain anonymous. This thesis is for ‘Baba’ Rose, whose immense capacity for care, in our better moments, is reproduced across generations of Hendersons.

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Short Abstract

This thesis argues that early childhood learning played a crucial role in shaping the skills of the adult workforce during the first industrial revolution in England and Wales. Drawing on a mix of economic, historical, and psychological perspectives, I highlight the theoretical importance of ‘sensitive periods’ for learning and analyse historical educational provision at the turn of the nineteenth century from a life-course perspective.

In particular, I suggest that changing how education was distributed across early and late childhood could result in higher levels of human capital under certain conditions. I demonstrate that customary school-entry age varied widely, and many children did not attend school until very late by contemporary standards. Additionally, I examine the intellectual influence of Locke, Darwin, and Rousseau, among others, to argue that a more developmental theory of learning only rose to prominence in the later nineteenth century. I argue that under these conditions, earlier school enrolment would improve human capital outcomes.

Earlier school enrollment derived from greater child-care demand, as schools provided child care and education jointly and had developed to effectively meet the needs of young children. Where mothers and elder siblings who would otherwise be caring for young children participated more intensively in the labour market, the demand for child-care arose earlier in the household life-cycle. Using a case study of London between 1760 and 1830 and a detailed analysis of the 1851 census returns, I demonstrate that higher

female wages, and to a lesser extent demographic factors like smaller family size and longer spacing between surviving children, led children to attend school earlier over time and in areas where women and children were employed in industry. I also demonstrate that early education was associated with a more rapid acquisition of basic literacy and likely made subsequent skill development more efficient.

Long Abstract

Drawing on an interdisciplinary literature from economics, economic history, psychology, the history of childhood, and historical demography, I argue that learning in early childhood represented an important source of human capital accumulation during the first wave of industrialization in England and Wales. Levels of primary school enrolment and signature rates on legal documents have led historians to argue that technological change in this period was not conducive to investment in human capabilities.¹ The form of human capital accumulation, however, may have simply taken an unexpected shape.

Economists have recently incorporated insights from a psychological literature on human development into more sophisticated models of human capital investment.² These include the notion of ‘sensitive periods’ during which facets of cognitive or non-cognitive development are more sensitive to shaping by the external environment and thus more amenable to investment. They also incorporate complementarity between early and late periods of learning. One implication is that later human capital investment cannot efficiently make up for poor early investment. Thus there are theoretical conditions under which changing the distribution of human capital investment across periods of early and late childhood would, in itself, increase the level of human capital.

1. David Mitch, “Education and Skill of the British Labour Force,” in *The Cambridge Economic History of Modern Britain* (Cambridge: CUP, 2004), 332–356; Alexandra de Pleijt, “Human Capital Formation in the Long Run: Evidence for Average Years of Schooling in England, 1300–1900,” *Cliometrica* 12 (2016).

2. Flavio Cunha and James Heckman, “The Technology of Skill Formation,” *American Economic Review* 97, no. 2 (2007): 31–47; Douglas Almond and Janet Currie, “Human Capital Development Before Age Five,” in *Handbook of Labor Economics*, vol. 4b (Elsevier, 2011), 1315–1486; John F. Tomer, *Integrating Human Capital with Human Development: The Path to a More Productive and Humane Economy* (Basingstoke: Palgrave Macmillan, 2016).

In particular, I show that if two conditions are met, the model of human capital accumulation developed by Flavio Cunha and James C. Heckman implies this is true of an increase in the ratio of early to late investment. The first condition is that these households initially underestimated the degree of complementarity between early and late human capital investment. In other words, they expected the value of late education not to depend on earlier education and the age a child attended school to have little effect on their achievements. The second condition is that households initially invested more in late than early human capital.

I marshal qualitative evidence to demonstrate that these conditions held in England and Wales until at least the early nineteenth century. First, I explore the intellectual history of education and highlight the importance of John Locke's empiricism. I trace how it came to be understood that experience acted upon nature's script, thereby introducing a more developmental and complementary vision of learning, through the influence of Darwin, Rousseau, and other major intellectual currents. Finally, I present data on the ages of school enrolment of elite children, which remained remarkably late from the sixteenth to nineteenth centuries, with a high degree of dispersion. This evidence, I argue, reflects a lack of concern over coordinating biological age with learning and thus a lack of concern with educational complementarity.³

Earlier attendance arose, however, from households' need for child care. When members of the household responsible for caring for young children went to work, those children were placed in care outside the home, usually at school, although education may not have been the primary objective. I develop a model applying to life-cycle variations in child-care costs to show that higher female wages, lower male wages, larger intervals between surviving children, and smaller family sizes are likely to lead to earlier attendance at school, and I present evidence that this occurred in

3. Philippe Aries, *Centuries of Childhood: A Social History of Family Life*, trans. Robert Baldick (New York: Alfred A. Knopf, 1962), pp. 189-90; Linda A. Pollock, *Forgotten Children: Parent-Child Relations from 1500 to 1900* (Cambridge: Cambridge UP, 1983), p. 240.

London between 1760 and 1830. I argue London labour markets at this time likely shifted in favour of increased household labour supply and this example provides micro-level evidence about the effects of similar changes operating elsewhere.

Earlier attendance had an importance consequence. Those who attended earlier apparently found themselves in a ‘sensitive period’ for learning to read. I find that those children aged four to six in the care of parish nurses, who also educated the children in their care, learned to read almost two years sooner than those aged seven to ten, suggesting that earlier instruction was more efficient, in line with predictions from the model.

I argue that private dame schools operated in a similar way and that an effective market maintained their quality. The supply of these neighbourhood private schools was relatively elastic so that class sizes remained sufficiently small for teachers to provide individualized attention, which contemporary research suggests is an important component of educational quality in early childhood.⁴ I also argue that reading served as a signal of the quality of care in these settings. Small class sizes marked these schools as different from the more formal infant schools, where large-scale simultaneous methods were adopted. In consequence, I show that attendance at small private schools in early childhood remained popular throughout the nineteenth century using regression methods to correct for known under-enumeration of such schools in the first half of the nineteenth century.⁵

Next, I demonstrate a causal relationship between industrialization and early childhood attendance at school using detailed data from the digitized 1851 census and instrumental-variable regression. Through the effect of complementarity

4. Alan B. Krueger, “Experimental Estimates of Education Production Functions,” *The Quarterly Journal of Economics* 114, no. 2 (1999): 497–532; Jennifer Neitzel et al., “A Comparative Analysis of the Early Childhood Environment Rating Scale-Revised and Early Childhood Environment Rating Scale, Third Edition,” *Journal of Early Childhood Research* 17, no. 4 (2019): p. 417.

5. B. I. Coleman, “The Incidence of Education in Mid-Century,” in *Nineteenth-century Society: Essays in the Use of Quantitative Methods for the Study of Social Data*, ed. E. A. Wrigley (Cambridge: Cambridge University Press, 1972), 397–410.

described above, earlier attendance may have, perhaps unintentionally, made subsequent investment in human capital more efficient—in apprenticeships, other day schools, learning-by-doing, or even the Sunday schools, which served a remedial role for many.⁶ I explore these relationships between early attendance and later channels of human capital investment at the national level to suggest that human capital acquired in early childhood likely facilitated the acquisition of industrial skills.

Finally, I conclude by drawing outward comparisons. Enabling legislation for compulsory education introduced in England in 1870 settled on a lower-bound enrolment age of five. This was lower than any contemporary school act I was able to identify, and Britain's compulsory school age remained comparatively low into the twentieth century. Legislators drafted this legislation very much in consideration of the needs of industrial households to balance care, education, and market income, among whom early attendance was already an established norm.⁷

Historians have looked for a role for human capital in Britain's early industrialization but found few schoolchildren. This thesis contends that they were sitting on the dame's knee, and the human capital they acquired there underlay the training and skill of Britain's adult workforce.

6. Nadav Ben Zeev, Joel Mokyr, and Karine van der Beek, "Flexible Supply of Apprenticeship in the British Industrial Revolution," *Journal of Economic History* 77, no. 1 (2017): 208–250; H. M. Boot, "How Skilled Were Lancashire Cotton Factory Workers in 1833," *Economic History Review* 48, no. 2 (1995): 283–303; Jane Humphries, "Rent Seeking or Skill Creating? Apprenticeship in Early Industrial Britain," in *Regulating the British Economy, 1660-1850*, ed. Perry Gauci (Abingdon: Routledge, 2016), 235–258; Jane Humphries, *Childhood and Child Labour in the British Industrial Revolution* (Cambridge: Cambridge UP, 2010), p. 321.

7. R. Szreter, "The Origins of Full-Time Compulsory Education at Five," *British Journal of Educational Studies* 13, no. 1 (1964): 16–28.

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Chapter 1

Human capital and childhood in industrial Britain

Modern economic growth is characterized by an intensive use of human capital, the stock of education, talent and capability that augments labour in production.¹ Economists have considered human capital as an important input into the production of ideas, which, being non-rivalrous in their use, exhibit increasing returns.² Large cross-country growth accounting exercises suggest that stocks of human capital explain much of the growth of GDP per capita over the past two centuries, and differences in human capital explain as much as 90 percent of the variation in productivity between countries.³ Such heroic analyses, however, are liable to fray in the details.

The archetypal ‘first’ case of British industrialisation looks to be one such detail. Historians of this period have rallied evidence on schooling, literacy, and skills that, on balance, suggests Britain was not precocious and indeed may have regressed along these dimensions in the late eighteenth and early nineteenth centuries, while GDP

1. Oded Galor, *Unified Growth Theory* (Princeton, NJ: Princeton University Press, 2011); Charles I. Jones, *Introduction to Economic Growth* (New York: W. W. Norton & Co., 1998), pp. 47-68; Daron Acemoglu and David Autor, “What Does Human Capital Do? a Review of Goldin and Katz’s *The Race Between Education and Technology*,” *Journal of Economic Literature* 50, no. 2 (2012): pp. 426–63.

2. Paul M. Romer, “Increasing Returns and Long-Run Growth,” *Journal of Political Economy* 94, no. 5 (1986): pp. 1002–37; Paul Romer, “Endogenous Technological Change,” *Journal of Political Economy* 98, no. 5 (1990): pp. s71–s102.

3. Robert Tamura et al., “Economic Growth in the Long Run,” *Journal of Development Economics* 137 (2019): 1–35.

per capita continued to rise.⁴ For some, a “pessimist” account of the standard of living at this time explains the irregularity.⁵ For others, it was the machinery of industrialisation itself that was biased towards unskilled labour.⁶ In this light, the first industrial economy looks to be an outlier from the gate; narratives fill the breach, seeking to emplot the exceptionalism.⁷

This may not yet be the full story. The threads of technological improvement, skill, and education are difficult to unwind. As influential a writer as Adam Smith described how the simplification of work tasks could focus human ability and attention, multiplying the ingenuity applied to improving each task in isolation.⁸ Such changes have equally been described as ‘deskilling,’ with women, children and black-legs pushing out the respectable artisan and his traditional skills.⁹ Yet Smith, playing the optimist, saw potential genius where others saw despoliation:

In the first fire engines, a boy was constantly employed to open and shut alternately the communication between the boiler and the cylinder.... One of those boys, who loved to play with his companions, observed that, by tying a string from the handle of the valve which opened this commu-

4. Mitch, “Education and Skill of the British Labour Force”; Pleijt, “Human Capital Formation in the Long Run: Evidence for Average Years of Schooling in England, 1300-1900”; Stephen Broadberry et al., *British Economic Growth 1270-1870* (Cambridge: CUP, 2015), p. 204.

5. Stephen J. Nicholas and Jacqueline M. Nicholas, “Male Literacy, ‘Deskilling,’ and the Industrial Revolution,” *Journal of Interdisciplinary History* 23, no. 1 (1992): 1–18.

6. K. O’Rourke, A. Rahman, and M. Taylor, “Luddites, the Industrial Revolution, and the Demographic Transition,” *Journal of Economic Growth* 18, no. 4 (2013): 373–409.

7. For a methodological discussion of these questions, see Christopher L. Colvin and Alexandra de Pleijt, “Industrial Revolution and British Exceptionalism,” in *An Economist’s Guide to Economic History*, ed. Matthias Blum and Christopher L. Colvin, Palgrave Studies in Economic History (Switzerland: Palgrave Macmillan, 2018), 201–210; for examples of such narratives, see Joel Mokyr, *A Culture of Growth* (Princeton, NJ: Princeton UP, 2016); Joel Mokyr, *The Enlightened Economy: An Economic History of Britain 1700-1850* (New Haven: Yale UP, 2010); Margaret Jacob, *The First Knowledge Economy: Human Capital and the European Economy, 1750-1850* (Cambridge: Cambridge UP, 2014).

8. Adam Smith, *An Inquiry Into the Nature and Causes of the Wealth of Nations* (Edinburgh: Thomas Nelson, 1840), p. 4, <https://link.gale.com/apps/doc/U0105989781/MOME?u=oxford&sid=MOME&xid=b6d28cad&pg=1>.

9. For a classic account, see J.L. Hammond and Barbara Hammond, *The Skilled Labourer, 1760-1832* (London: Longmans, Green, / Co., 1919); Pleijt, “Human Capital Formation in the Long Run: Evidence for Average Years of Schooling in England, 1300-1900.”

nication to another part of the machine, the valve would open and shut without his assistance, and leave him at liberty to divert himself with his play-fellows. One of the greatest improvements that has been made upon the machine, since it was first invented, was in this manner the discovery of a boy who wanted to save his own labour.¹⁰

Adam Smith does not tell us if the boy could write his name or how many years of school he attended. Yet there is some mark of ingenuity in the story. Indeed, this is why Smith tells it. Economists have considered human capital as an input to the work process, observing that more educated workers are more productive workers.¹¹ They have also considered human capital as facilitating the development and diffusion of innovations.¹² Yet, how best to observe empirically this theoretical stock remains unsettled. It may be that by accepting a broader concept of human capital, such as that proposed by John Tomer, “*the mental, social, and physical attributes that are produced, are embodied in humans, are not alienable, and contribute to humans’ capacities,*” one may come closer to accepting that the boy in Smith’s story was particularly rich with human capital.¹³

To make sense of practices that look to be at odds with their modern analogues, however, one must simultaneously take a more historical approach and ask sharper theoretical questions. A more historical approach asks how historical subjects sought to broaden their ‘capacities.’ It was often not by learning to write and would thus not be captured in much of the prevailing historical evidence derived from signature rates. David Cressy, after examining pedagogical pamphlets from the early modern period,

10. Smith, *An Inquiry Into the Nature and Causes of the Wealth of Nations*, p. 5.

11. Claudia Goldin and Lawrence F. Katz, *The Race Between Education and Technology* (Cambridge, Mass.: Belknap Press of HUP, 2009); Gary S. Becker, “Investment in Human Capital: A Theoretical Analysis,” *Journal of Political Economy* 70, no. 5 (1962): 9–49.

12. Jones, *Introduction to Economic Growth*, pp. 115–25; for an empirical example, see Sascha O. Becker, Erik Hornung, and Ludger Woessmann, “Education and Catch-Up in the Industrial Revolution,” *American Economic Journal: Macroeconomics* 3 (2011): 92–126.

13. Tomer, *Integrating Human Capital with Human Development: The Path to a More Productive and Humane Economy*, p. 8.

concludes that teaching writing was ‘a subordinate part of the elementary curriculum,’ to be taken up, perhaps, in the afternoon after the more important reading lesson had been completed in recognition that ‘writing was, and still is, as much a matter of dexterity and fine motor skills as of intellect and memory.’¹⁴ The British and Foreign School Society’s 1816 teaching manual affirmed a similar pedagogical model by recommending that schools admit children into higher writing classes not according to their writing ability, but by their ability to read: ‘Experience has proved that many pupils, who when they entered the school were placed in one of the highest reading classes, but who scarcely knew how to form a letter, have learned by this plan, in six or eight days, to write syllables of 4 or 5 letters correctly, or words of 3 or 4 syllables.’¹⁵ Beyond the day schools, students learned to read at Sunday schools in numbers that rapidly grew into the millions, and a recent study has found that they were effective at encouraging occupational mobility.¹⁶ In addition, recent research suggests that Britain’s early industrialisation created a demand for skilled labour that was met by a flexible system of apprenticeship for older children.¹⁷ Such means of acquiring human capital should be given their full due.

Sharper theoretical questions are necessary too because recent theoretical developments have emphasized the complexity of interactions among skills acquired at

14. David Cressy, *Literacy & the Social Order: Reading & Writing in Tudor & Stuart England* (Cambridge: Cambridge University Press, 1980), p. 23.

15. British and Foreign School Society, *Manual of the System of the British and Foreign School Society of London, for Teaching Reading, Writing, Arithmetic, and Needle-Work, in the Elementary Schools* (London: Longman / Co., 1816), p. 21, <https://hdl.handle.net/2027/hvd.32044096982871>.

16. Frank Smith, *A History of English Elementary Education 1760-1902* (London: University of London Press, 1931), p. 60; Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 337.

17. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, ch. 9; Ben Zeev, Mokyr, and Beek, “Flexible Supply of Apprenticeship in the British Industrial Revolution”; Naomi E. Feldman and Karine van der Beek, “Skill Choice and Skill Complementarity in Eighteenth Century England,” *Explorations in Economic History* 59 (2016): 94–113; Morgan Kelly, Joel Mokyr, and Cormac O’ Gráda, “Precocious Albion: A New Interpretation of the British Industrial Revolution,” *Annual Review of Economics* 6 (2014): 363–389; Alexandra de Pleijt, Alessandro Nuvolari, and Jacob Weisdorf, “Human Capital Formation During the First Industrial Revolution: Evidence from the Use of Steam Engines,” *Journal of the European Economic Association* 18, no. 2 (2020): 829–889.

different stages of the life-course¹⁸ and thus the importance of the human capital investment schedule, as much as its sheer quantity. This view arises from the work of James Heckman and Janet Currie, who with various co-authors, have described human capital acquisition as a dynamic, self-complementary process, drawing upon decades of research in developmental psychology.¹⁹ In their view, the efficiency of investments in human capital in the present depends upon human capital investments which have occurred at prior stages of neurological and physiological development.²⁰ Human capital investment during early childhood, in this perspective, thus becomes outstandingly important because it establishes the base of skills upon which later learning builds. Further, this literature has emphasized what it calls ‘noncognitive’ skills, i.e., behavioural attributes that are associated with school performance and positive later-life outcomes beyond what can be measured through I.Q.²¹ For example, one influential and well-designed experiment carried out in the mid-20th-century involving random assignment to preschool found, among many other benefits, that those who attended the preschool had higher achievement in high school, were less likely to have been charged with a crime by age 40, were less likely to be unemployed, and earned 11-34% more for men and 19-36% more for women over their lifetimes.²² Interdisciplinary economists like John Tomer have further tied these models of human capital to the psychology of human development and noted the importance of

18. I use life-course to denote the pattern of change over time associated with individual development, and I use life-cycle to denote the pattern of intergenerational development within a family.

19. Flavio Cunha et al., “Interpreting the Evidence on Life Cycle Skill Formation,” in *Handbook of the Economics of Education*, ed. Eric A. Hanushek and Finis Welch, vol. 1 (Elsevier, 2006), 698–812; Douglas Almond, Janet Currie, and Valentina Duque, “Childhood Circumstances and Adult Outcomes: Act II,” *Journal of Economic Literature* 56, no. 4 (2018): pp. 1360–446.

20. Specifically, they propose versions of the constant elasticity of substitution (CES) function; see. Cunha et al., “Interpreting the Evidence on Life Cycle Skill Formation,” pp. 780-793; Almond and Currie, “Human Capital Development Before Age Five,” p. 1324.

21. Almond and Currie, “Human Capital Development Before Age Five,” p. 1433-4; David Blau and Janet Currie, “Preschool, Day Care, and After School Care: Who’s Minding the Kids?,” in *Handbook of Economics of Education*, ed. Eric A. Hanushek and Finis Welch, vol. 2 (Amsterdam: Elsevier, 2006), pp. 1221-6.

22. Clive R. Belfield et al., “The High/Scope Perry Preschool Program: Cost-Benefit Analysis Using Data from the Age-40 Followup,” *The Journal of Human Resources* 41, no. 1 (2006): 162–190, <https://www.jstor.org/stable/40057261>.

developmentally-appropriate experiences: ‘Certain parts of the brain have sensitive periods during which a person’s experience can easily modify the neural circuits in those parts.... For optimal neurodevelopment, it is crucially important that the lower brain systems develop first in a healthy fashion; otherwise, development of higher, more complex parts of the brain will not be able to occur satisfactorily.’²³ This body of theoretical work is not likely to have been on the minds of a nineteenth-century family making decisions about schooling. Yet the theory draws attention to an under-examined factor in studies of human capital in the period of early industrialisation: the schedule of human capital investment over the life-course.

Modern economists, looking at modern data, have argued that investment in education in early childhood is important but undersupplied in modern economies.²⁴ In pre-modern Europe, the undersupply was apparently even more severe. Philippe Ariès argues that medieval and early modern school was often regarded as a kind of apprenticeship, defined by custom, and consequently that ‘the age at which a child started school remained indefinite for a long time.’²⁵ Children could thus go years before acquiring any formal learning, with much variation even within the same family.²⁶ David Cressy cites the case of Henry Facy, a boy from Devon who, in 1667, had been learning to write at age fourteen when his death prompted a probate dispute and his teacher was called in to testify. Apparently, no one involved in the case found remarkable the late age at which Facy was tackling the elementary curriculum, and long stretches of intermittent attendance at elementary school into the teen years were commonly described in other early sources.²⁷ Using the records of indentured servants in the American colonies in the seventeenth and eighteenth centuries, who

23. Tomer, *Integrating Human Capital with Human Development: The Path to a More Productive and Humane Economy*, p.24-5.

24. Pedro Carneiro and James Heckman, “Human Capital Policy,” in *NBER Working Papers*, vol. 9495 (Cambridge, Mass.: National Bureau of Economic Research, 2003).

25. Ariès, *Centuries of Childhood: A Social History of Family Life*, p. 190.

26. Pollock, *Forgotten Children: Parent-Child Relations from 1500 to 1900*, p. 240.

27. Cressy, *Literacy & the Social Order: Reading & Writing in Tudor & Stuart England*, pp. 28-30.

were all aged over 15, Galenson demonstrates, for both men and women, that the probability of being literate increased with age, implying the existence of much late learning.²⁸ Such instances of late enrolment persisted until at least the nineteenth century. Middle-class diarist John Gisborne, for instance, wrote in the early nineteenth century of his son Frederic first leaving for school at age 9.²⁹ From institutional records of literacy, more systematically, David Mitch finds evidence that children continued to learn to read and write during their teen years around the turn of the nineteenth century, although children generally learned these skills earlier than they had done in the eighteenth century.³⁰ Such an allocation was inefficient if, by changing the period in which the elementary curriculum was attempted to more closely accord with a child's psychological development, the same outcome could be produced with fewer years of school.

It is plausible that many children lived through a change in the sequence in which formal education was attempted in response to changing incentives and life-cycle income patterns during the industrial revolution. I develop the reasoning for this change in more detail in chapter two, but essentially an increase in household labour supply (married women and elder siblings) raised the demand for child-care earlier in the life cycle, and families turned to schools to satisfy this demand. In particular, by the time of the 1851 census, over 60% of five-year-olds in parts of the north-west were regularly attending school (chapter 6), and the age at which children learned to read was decreasing over the eighteenth and nineteenth centuries, at least in the case study I present in chapter 4.

The 1851 education census report considered that 'while upon an average the children of the labouring classes may perhaps ... have $4\frac{2}{3}$ years of schooling, a very

28. David W. Galenson, "Literacy and Age in Preindustrial England: Quantitative Evidence and Implications," *Economic Development and Cultural Change* 29, no. 4 (1981): pp. 813–29.

29. John Gisborne, *A Brief Memoir of the Life of John Gisborne Esq.*, (London: Whittaker, 1852) p. 107 qtd. in Pollock, *Forgotten Children: Parent-Child Relations from 1500 to 1900*, p. 246.

30. David Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy* (Philadelphia: University of Pennsylvania Press, 1992), pp. 139-40.

considerable part of their instruction is imparted during what may be described as the “infant period.”³¹ The expert opinion of educationists, they continued, ‘admitted ... that unless a good proportion of the schooling which a child receives be given above the age of six, its value is considerably diminished, and cannot be looked upon as adequate.’³² Perhaps this poor assessment of early education in 1851, in light of the emphasis on this critical period in recent literature, ought to be re-examined. Before undertaking an analysis of the causes and consequences of this phenomenon, however, a review of prior literature on the broader subject of human capital in the first industrial revolution is attempted, with an emphasis on different stages of the life-course.

1.1 School

In 1859, the vice president of the Privy Council of Education, Charles Adderley, would describe a neatly demarcated educational system, in which male children of three classes had a proper place and everything an occasion:

General education for boys ... extends over the first twenty-one years of life.

Its first stage, that of childhood, is up to the age of ten. The instruction belonging to it is rudimentary, in reading, writing, and arithmetic, and it is alike for all classes of society. Boys of the upper class spend it chiefly at home; of the middle classes either at home or at preparatory schools; of the labourers’ class, at national schools, and there their general education, for the most part, ends, and their apprenticeship to work begins.

The second stage of general education is that of boyhood, from the age of ten to eighteen. Boys of the upper class spend this time at private

31. *Parliamentary Papers*, Command Paper 1692, Census of Great Britain, 1851 Education: Report and tables (London, 1852), p. 23.

32. *Ibid.*

schools or public schools such as Eton, Harrow, Rugby³³, and others; those of the middle class at private commercial schools or public endowed grammar schools; and here their general education, for the most part, ends, and their apprenticeship to business begins.

Only boys of the richer classes, or destined for liberal professions, remain at the last stage of education, which they get at the universities.³⁴

Adderley's description of an ordered march through institutions for human capital investment associated with particular stages of the life-course, differentiated by social class, was compelling but unrealistic. In particular, the first stage of 'rudimentary' education was bewildering in its variety and disjointedness. Children attended different schools at different ages, with various intervals between.³⁵ Although Adderley spared no words for girls' education, they attended too.³⁶ Schools may have been sex-segregated or not.³⁷ They were supported by ancient endowment, grants, fees or voluntary contributions, and they combined these supports in various permutations. For some historians, this variety has discouraged attempts to look directly at primary schooling rates in favour of relatively uniform measures of educational outcomes, such as signature rates on marriage documents.³⁸ Autobiographical sources overcome many of these methodological difficulties by reporting school experiences, however brief or disjointed, across the life-course, and Humphries has used these

33. Adderley uses the convention of calling this set of elite private schools 'public' schools, but throughout the remainder of the thesis I use the term public school to refer to a school receiving funds from the public purse.

34. C.B. Adderley, "An Address on Education," in *Transactions of the National Society for the Promotion of Social Science* (1859), pp. 76-77, qtd. in Neil Smelser, *Social Paralysis and Social Change: British Working-Class Education in the Nineteenth Century* (Berkeley: University of California Press, 1991).

35. Beryl Madoc-Jones, "Patterns of Attendance and Their Social Significance: Mitcham National School, 1830-39," in *Popular Education and Socialization in the Nineteenth Century*, ed. Phillip McCann (London: Methuen, 1977), pp. 52-3.

36. June Purvis, *Hard Lessons: The Lives and Education of Working-Class Women in Nineteenth-Century England* (Oxford: Polity Press, 1989), pp. 72-3.

37. *Ibid.*, pp. 88-9.

38. Pleijt, "Human Capital Formation in the Long Run: Evidence for Average Years of Schooling in England, 1300-1900," p. 104.

sources to demonstrate that the mean number of years of school reached a nadir of 1.11 years in 1791-1820 for girls and 2.8 years in 1821-50 for boys.³⁹ However, understanding the institutional development of schools is important because they responded at different times to different needs. In particular, one way to make sense of the diversity of elementary schools extant by the early nineteenth century is to view them as providing, to an even greater degree than imagined by Adderley and in a very different configuration, specialization in the provision of education for different stages of childhood.

In late medieval England, schooling was provided by religiously motivated charity, occasionally directly delivered by monasteries and religious orders, or through various kinds of private provision, and these origins shaped the kind of education that was available.⁴⁰ Laypeople could attend schools attached to cathedrals and monasteries, although they were not likely to have completed a full course of religious training.⁴¹ The ‘song schools’ attached to chantries usually provided basic instruction in reading so that the souls of their deceased benefactors would not suffer the indignity of poorly pronounced hymns sung in their honour for all eternity.⁴² The independent grammar schools, although founded with a mandate for teaching a secondary curriculum in classical languages, nonetheless offered training to “petties” in elementary subjects.⁴³ Ideally, some of these petties would go on to the grammar school after having been sufficiently prepared, although others may have gone on to writing schools that taught

39. Jane Humphries, “Girls and Their Families in an Era of Economic Change,” *Continuity and Change* 35 (2020): p. 327.

40. Nicholas Orme, *Medieval Schools: From Roman Britain to Renaissance England* (London: Yale University Press, 2006), pp. 251-3, 278-87; John Lawson and Harold Silver, *A Social History of Education in England* (London: Methuen & Co. Ltd., 1973), p. 70.

41. John William Adamson, *A Short History of Education* (Cambridge: CUP, 1930), pp. 7-10, 13.

42. Adamson, *A Short History of Education*, pp. 5-6, 85; Lawson and Silver, *A Social History of Education in England*, pp. 43-4, 62; Orme, *Medieval Schools: From Roman Britain to Renaissance England*, pp. 237-8.

43. Richard L. DeMolen, “Ages of Admission to Educational Institutions in Tudor and Stuart England,” *History of Education* 5, no. 3 (1976): p. 210; Orme, *Medieval Schools: From Roman Britain to Renaissance England*, pp. 66-8.

Table 1.1: Varieties of nineteenth-century elementary school

Type	Founded	Curriculum	Funding	Other Names
Common day	<18 th c.	r w a c	f	ABC, day, adventure
Private	<18 th c.	r w a c +	f	commercial, superior day, boarding, ladies', preparatory
Dame	<18 th c.	r c	f	reading, initiatory
Craft	<18 th c.	r c	f	straw-plait, lace, button, sewing
Charity	<18 th c.	r w a c m	e v	endowed, village, SPCK
Sunday	1780	r m	v	
Industry	1790s	r c	v p	workhouse, reformatory
Voluntary	1800	r w a m	e v p	monitorial, mutual, public, British, National
Evening	<17 th c.	r w a +	f v	
Infant	1818	r m	f v p	
Ragged	1844	r w a m c +	v p	

NOTE: Symbols used are reading (r), writing (w), arithmetic (a), craft skills, needlework, knitting, etc., (c), moral and religious (m), and additional advanced subjects (+); for sources of funding, they are fees (f), endowments (e), voluntary subscriptions (v), public money (p).

SOURCE: For an overview, see S. J. Curtis and M. E. A. Boulton, *An Introductory History of English Education Since 1800* (London: University Tutorial Press, 1966), pp. 1-20, and see text for details.

formal scripts and other skills prerequisite to careers in business and law.⁴⁴ However, educational institutions and the motivations of pupils were sufficiently eccentric to render a complete description of elementary education as a self-consistent system of teaching impossible.⁴⁵ Moreover, impressionistic evidence suggests that there was no customary age at which someone might take up school in the medieval period, with

44. Adamson, *A Short History of Education*, p. 74, 77, 152.

45. Jo Ann Hoepfner Moran Cruz, *The Growth of English Schooling, 1340-1548: Learning, Literacy, and Laicization in Pre-Reformation York Diocese* (Princeton, N.J.: Princeton University Press, 1985), pp. 21-62; John William Adamson, *Pioneers of Modern Education, 1600-1700* (Cambridge: CUP, 1921), pp. 191-3, <https://archive.org/details/in.ernet.dli.2015.209294>.

adolescents and children taking lessons alongside one another.⁴⁶

Change followed the reformation. The monasteries and chantries were dissolved and their assets sold off.⁴⁷ Although many boroughs and parishes were able to recover these assets and maintain the schools they supported, this represented a blow to elementary-level teaching.⁴⁸ In contrast, the grammar schools were mostly unaffected.⁴⁹ Dioceses founded in the place of dissolved monasteries were instructed to maintain grammar schools, and grammar schools whose endowments were attached to chantries were usually spared if the chantry itself was not.⁵⁰ Moreover, the sixteenth century was a period in which many new grammar schools were founded.⁵¹ Behind all of this, there was a basic churn of private tutors and teachers who filled the gaps. Many were licensed under the bishop's authority, although female teachers were not, and it may be in these unlicensed private schools that the so-called 'dame' schools have their origins.⁵² Other forms of private education were created to meet emerging needs. Following the 1662 'Act of Uniformity,' which strengthened the Church of England's hold over education at all levels, academies were founded to accommodate members of dissenting sects in higher education.⁵³ 'Commercial' schools teaching a curriculum of arithmetic, modern languages, geography, etc., also appeared around this time, catering to middle class children.⁵⁴

This was the tangled rootstock onto which reformers 'for the children of such day labourers and other inhabitants least able to pay for the instruction of their

46. Aries, *Centuries of Childhood: A Social History of Family Life*, p. 196; Lawson and Silver, *A Social History of Education in England*, p. 49.

47. Colin Heywood, *Childhood in Modern Europe*, *New Approaches to European History* 56 (Cambridge: CUP, 2018), pp. 65-6.

48. Cressy, *Literacy & the Social Order: Reading & Writing in Tudor & Stuart England*, p. 167.

49. Hugh Cunningham, *Children and Childhood in Western Society Since 1500*, 3rd (London: Routledge, 2021), p. 95.

50. Lawson and Silver, *A Social History of Education in England*, p. 96.

51. *Ibid.*, pp. 103-7.

52. Cressy, *Literacy & the Social Order: Reading & Writing in Tudor & Stuart England*, pp. 37-9.

53. Adamson, *A Short History of Education*, pp. 191-2; Lawson and Silver, *A Social History of Education in England*, pp. 164-6.

54. Adamson, *A Short History of Education*, pp. 229-30; Lawson and Silver, *A Social History of Education in England*, pp. 202-8.

children’, looking backward at beginning of the eighteenth century, sought to graft their projects.⁵⁵ Some earlier charters survived the tumult with provisions for basic education, other institutions may have reorganized and maintained schools, new grammar schools were founded, and private tutors sold their services too. Still, educational achievements were relatively modest. For instance, David Cressy notes that only about half of the children admitted to Great Yarmouth Children’s Hospital between 1698 and 1715 could read at all, and there was no apparent improvement with age, nor did scholars seem to attend school for much more than a few years.⁵⁶ However, it must have been this system that accounted for much of the sixteenth- and seventeenth-century decline in illiteracy, however halting the process.⁵⁷

The Society for Promoting Christian Knowledge (SPCK), founded at the turn of the eighteenth century in London, sought to make inroads by founding schools supported by endowment and/or subscriptions. These ‘charity schools’ taught reading, writing and arithmetic to the poor, alongside a religious and conservative moral curriculum, and channeled their graduates into apprenticeship and service.⁵⁸ The SPCK represented an early attempt to impose order. It offered an institutional structure and national organization for provincial philanthropists to replicate, and its regular dissemination of pamphlets, reports, and instructional materials likely encouraged uniformity.⁵⁹ The schools’ regulations limited the age at which children could be admitted, usually some time between the age of seven and 12, and many of them

55. The quote is representative of many eighteenth-century school endowments, given in M. G. Jones, *The Charity School Movement: A Study of Eighteenth Century Puritanism in Action* (London: Frank Cass / Co., 1964), p. 22.

56. Cressy, *Literacy & the Social Order: Reading & Writing in Tudor & Stuart England*, p. 29.

57. Cressy, *Literacy & the Social Order: Reading & Writing in Tudor & Stuart England*, pp. 142-74; Pleijt, “Human Capital Formation in the Long Run: Evidence for Average Years of Schooling in England, 1300-1900,” p. 113.

58. Ivor Morrish, *Education Since 1800*, Unwin Education Books 1 (London: George Allen / Unwin, 1970); Jones, *The Charity School Movement: A Study of Eighteenth Century Puritanism in Action*, pp. 22-3, p. 5-6.

59. Smith, *A History of English Elementary Education 1760-1902*, p. 42; Jones, *The Charity School Movement: A Study of Eighteenth Century Puritanism in Action*, pp. 76-9; Lawson and Silver, *A Social History of Education in England*, p. 184.

punished irregular attendance with expulsion.⁶⁰ By the beginning of the nineteenth century, there were roughly 150,000 children in the charity schools.⁶¹ Much like the previous century, such figures are out of proportion to the growth in literacy from signatures evidence in the eighteenth century, and much heavy lifting must be left to the “residual” of private schools.⁶² Charity schools’ limited success is usually attributed to political and religious rivalries, but if later nineteenth-century events are informative, it may also have been the case that the system’s rigidity did not work for the children of the poor, whose attendance was characteristically intermittent.⁶³

Westminster began to take an interest in education around the turn of the nineteenth century. Its first actions were regulatory and piecemeal. For instance, the Health and Morals of Apprentices Act of 1802 sought to compel masters of parish apprentices to provide for a teacher in reading, writing and arithmetic for the first four years of an apprentice’s service.⁶⁴ Since the early textile factories were particularly large employers of parish apprentices, this was largely aimed at them, prompting protest and failure to comply.⁶⁵ Robert Owen’s act of 1819 prohibited the employment of children under nine years of age, although it only applied to the cotton mills.⁶⁶ A more successful effort was made in 1833 with the first of the so-called ‘factory acts’, under which children under 13 had to either certify that they attended school regularly or face a fine, but the regulation did not apply to workshops or the silk

60. Adamson, *A Short History of Education*, p. 200.

61. Eli Halevy, *England in 1815*, pp. 526-7, qtd. in Smelser, *Social Paralysis and Social Change: British Working-Class Education in the Nineteenth Century*, p. 383n14; Jones, however, has emphasized the unreliability of these estimates Jones, *The Charity School Movement: A Study of Eighteenth Century Puritanism in Action*, pp. 25-7.

62. Thomas W. Laqueur, “Working-Class Demand and the Growth of English Elementary Education, 1750-1850,” in *Schooling and Society: Studies in the History of Education*, ed. Lawrence Stone (London: John Hopkins University Press, 1976), pp. 192-3.

63. Jones, *The Charity School Movement: A Study of Eighteenth Century Puritanism in Action*, pp. 110-30; Phil Gardner, *The Lost Elementary Schools of Victorian England* (London: Croon Helm, 1984), p. 46.

64. Katrina Honeyman, *Child Workers in England, 1780-1820: Parish Apprentices and the Making of the Early Industrial Labour Force* (Aldershot, Hampshire: Ashgate, 2007), p. 48.

65. *Ibid.*, pp. 48-50.

66. B.L. Hutchins and A. Harrison, *A History of Factory Legislation* (Westminster: P.S. King & Son, 1903), p. 24.

industry.⁶⁷ Enforcement was also improved by the establishment of an independent inspectorate, although evasion continued.⁶⁸ A later factory act in 1844 instituted the “half-time” requirement for children in textile mills, who would now attend school for half of the day, although the minimum age of employment was also reduced.⁶⁹ The school requirement could be met at any school, but some employers established factory schools of dubious quality in response to this legislation, which were anyway not very numerically relevant, with estimates of 9,316 and 15,781 children under twelve attending factory schools in 1843 and 1846 respectively.⁷⁰

Around the same time, two denominational societies were founded and began to compete to establish new schools on a charitable basis. These were the National Society for Promoting Religious Education, the Anglican society founded in 1811, and the British and Foreign School Society, its non-conformist competitor founded under a slightly different name a few years earlier.⁷¹ These societies formed schools on the monitorial system, or the closely related ‘Madras’ system, whose primary merit was that it enabled very large numbers of students—generally more than 100 per adult teacher—to receive instruction under one roof at very low cost.⁷² This ‘mass-produced’ education was made possible by a division of labour in which older children, dubbed ‘monitors,’ taught lessons to their younger peers.⁷³ In practice, this

67. Clark Nardinelli, “Child Labor and the Factory Acts,” *Journal of Economic History* 40, no. 4 (1980): p. 741.

68. Hutchins and Harrison, *A History of Factory Legislation*, p. 40; Lawson and Silver, *A Social History of Education in England*, p. 273.

69. Nardinelli, “Child Labor and the Factory Acts,” pp. 741-3; Lawson and Silver, *A Social History of Education in England*, p. 275.

70. Louise Tilly and Joan W. Scott, *Women, Work, and Family* (London: Methuen, 1987), p. 106.

71. Smelser, *Social Paralysis and Social Change: British Working-Class Education in the Nineteenth Century*, pp. 70-1; S. J. Curtis and M. E. A. Boulton, *An Introductory History of English Education Since 1800* (London: University Tutorial Press, 1966), pp. 8, 10.

72. David Mitch, “The Impact of Subsidies to Elementary Schooling on Enrolment Rates in Nineteenth-Century England,” *Economic History Review* 39, no. 3 (1986): p. 378; Curtis and Boulton, *An Introductory History of English Education Since 1800*, pp. 10-2; Morrish, *Education Since 1800*, pp. 8.

73. Leopoldo Mesquita, “The Lancasterian Monitorial System as an Education Industry with a Logic of Capitalist Valorisation,” *Paedagogice Historica* 48, no. 5 (2012): 661–675.

was likely quite rote.⁷⁴ The monitorial system would eventually be abandoned, with the pupil-teacher system introduced in 1846 intended to improve the quality and quantity of teachers, but it was slow to die out and the National and British society schools remained wedded to large classroom sizes until well into the second half of the nineteenth century.⁷⁵

From these charitable origins, the National and British schools began to receive grants after 1833 and formed the basis of what would eventually become the public system.⁷⁶ Grants were distributed in a way that tended to reinforce existing provision, first with a system of matching local initiative and later through “payment-by-results.”⁷⁷ Geographically, because supported schools were already clustered around London and the south midlands, as in figure 1.1, this likely reinforced spatial disparities in the public provision of school. The supply of such schools was possibly also hindered by denominational jealousies.⁷⁸ Nonetheless, enrollments at these schools doubled between 1833 and 1851 to reach 8 percent of the population.⁷⁹ These ‘voluntary’ schools increasingly subsidized school fees over the nineteenth century, but estimates of the elasticity of enrollment to increases in subsidies only account for about 12 percent of the growth of primary education nationally, leaving a substantial part of this growth to find other explanations.⁸⁰ This is no small feat for the public system, but it suggests that fees were not the main barrier to education.

From a welfare economics perspective, David Mitch argues that if the private return to education is greater than the average return on other investments, education

74. Morrish, *Education Since 1800*, pp. 8-9.

75. Lawson and Silver, *A Social History of Education in England*, p. 286-8; Curtis and Boulton, *An Introductory History of English Education Since 1800*, pp. 59-60; Mitch, “The Impact of Subsidies to Elementary Schooling on Enrolment Rates in Nineteenth-Century England,” p. 377.

76. Morrish, *Education Since 1800*, p. 12.

77. Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, p. 116-9; Morrish, *Education Since 1800*, pp. 15-7.

78. Smith, *A History of English Elementary Education 1760-1902*, p. 173.

79. Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, p. 125.

80. Mitch, “The Impact of Subsidies to Elementary Schooling on Enrolment Rates in Nineteenth-Century England,” p. 389.

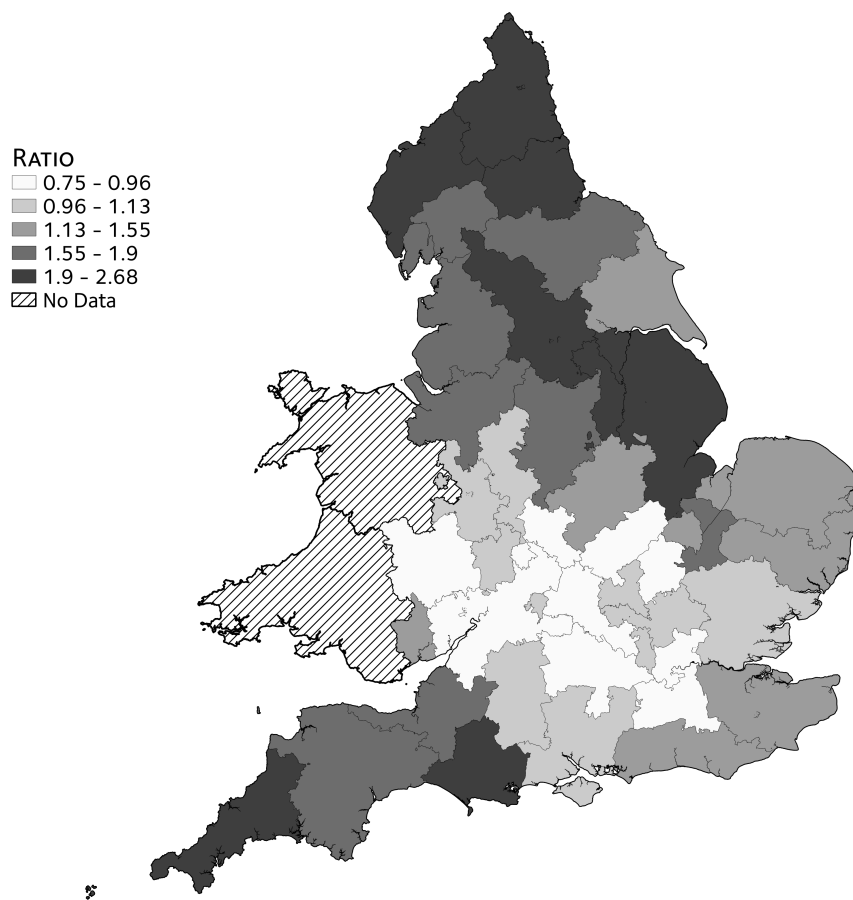


Figure 1.1: Fee-paying school to supported school ratio, 1833

Source: *Parliamentary Papers*, House of Commons Papers 62 XL.1 XLII.1 XLII.1, Abstract of Answers and Returns on State of Education in England and Wales, Volumes I., II., III. (London, 1835)

must be socially under-supplied, and this is true until the point at which these two rates of return are equal.⁸¹ Using marriage certificates, Mitch estimates significant returns to literacy in 1839-43 and still larger returns in 1869-73.⁸² Arguing in a similar direction, recent research by Benjamin Milner, has identified significant increases in

81. David Mitch, "Underinvestment in Literacy? The Potential Contribution of Government Involvement in Elementary Education to Economic Growth in Nineteenth-Century England," *Journal of Economic History* 44 (1984): p. 558.

82. Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, *passim*. Mitch, "Underinvestment in Literacy? The Potential Contribution of Government Involvement in Elementary Education to Economic Growth in Nineteenth-Century England."

male social mobility and movement into literate occupations following the introduction of school boards in 1870, suggesting unrealized opportunities in the preceding period.⁸³ Mitch's range of estimates for comparable social returns suggest that literacy was under-supplied in this period, but this was only unambiguously true for males.⁸⁴ However, because the fees charged for education were very low, Mitch's estimates of the potential contribution to national income from making these investments is similarly low.⁸⁵ The implication is that even if undersupplied, more human capital would not drastically affect national income and could not therefore have played a major part in the growth of national income.⁸⁶ Critically, however, this kind of estimation only accounts for compensated, pecuniary returns to education; Mitch's low estimate of the return to education for women, and thus his implicit conclusion that low literacy rates for women were socially optimal, should be understood in this light. Generally speaking, these approaches overlook externalities, including the inculcation of religious values and social benefits that were arguably far more important to those providing education in this period, as well as possible technological spillovers.⁸⁷ Taking these externalities into account would strengthen the case for regarding human capital as undersupplied in this period and add to the purported benefits of additional human capital.⁸⁸

Further institutional innovations occurred outside of the "voluntary" system in response to poverty and crime. In 1818, Lord Brougham formed a committee whose membership resembled a "who's who" of early political reformers, including Evan-

83. Benjamin Milner, "Essays on British Labour Markets During the Second Industrial Revolution" (Ph. D. Thesis, University of British Columbia, 2020).

84. Mitch, "Underinvestment in Literacy? The Potential Contribution of Government Involvement in Elementary Education to Economic Growth in Nineteenth-Century England."

85. D. Mitch, "The Role of Education and Skill in the British Industrial Revolution," in *The British Industrial Revolution: An Economic Perspective*, 2nd, ed. Joel Mokyr (Boulder: Westview), 241–279, p. 256.

86. See also Mitch, "Education and Skill of the British Labour Force."

87. For a fascinating discussion of this point, see Rasmus Thonnessen and Erich Gundlach, "The Size of Human Capital Externalities: Cross-Country Evidence," *Public Choice* 157 (2013): pp. 671–8.

88. Mitch, "Underinvestment in Literacy? The Potential Contribution of Government Involvement in Elementary Education to Economic Growth in Nineteenth-Century England," p. 558.

gelicals, Whigs, Radicals, Owenites, etc., to promote the new infant schools.⁸⁹ Their motivations were to curb a rise in juvenile crime following the Napoleonic Wars by removing children from their parents' influence as early as possible.⁹⁰ The schools' methods combined songs and various props with whole-classroom 'simultaneous' instruction to provide education cheaply for hundreds of infants at a time.⁹¹ This was occasionally as chaotic as it sounds, but the schools had some success in attracting students.⁹² Samuel Wilderspin told a 1835 parliamentary committee that there were approximately 64,000 children enrolled in infant schools, while in private correspondence he candidly estimated a figure closer to 22,000.⁹³

Others looked to labour for its supposedly edifying effects. In an earlier century, John Locke recommended, as part of his proposed poor law reforms, a plan for "working schools" in which children as young as three might learn "spinning, knitting, or some other part of the woollen manufacture, unless in countries where the place shall furnish some other materials fitter for the employment of such poor children."⁹⁴ Examples of schools combining work with basic instruction in reading in this spirit can be found throughout the eighteenth century, but the "school of industry" movement took off following experiments in 1790 by Sarah Trimmer, an author of books for children as well as educational methods.⁹⁵ This method was most eagerly adopted in reformatories and workhouses, likely punitive and remediative in equal measure.⁹⁶ Much, however, could have depended on the context. The Ragged Schools also taught

89. A. F. B. Roberts, "A New View of the Infant School Movement," *British Journal of Educational Studies* 20, no. 2 (1972): pp. 154-6.

90. Lawson and Silver, *A Social History of Education in England*, p. 282.

91. W. P. McCann, "Samuel Wilderspin and the Early Infant Schools," *British Journal of Educational Studies* 14, no. 2 (1966): pp. 196-8.

92. Nanette Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970* (London: Routledge / Kegan Paul, 1972), pp. 12-3; McCann, "Samuel Wilderspin and the Early Infant Schools," p. 194.

93. Roberts, "A New View of the Infant School Movement," pp. 159-60.

94. John Locke, "An Essay on the Poor Law," in *Political Essays*, ed. Mark Goldie (Cambridge: Cambridge University Press, 1997), pp. 182-98.

95. Adamson, *A Short History of Education*, p. 234.

96. Smelser, *Social Paralysis and Social Change: British Working-Class Education in the Nineteenth Century*, p. 291; Lawson and Silver, *A Social History of Education in England*, p. 285.

craft skills, along with the three Rs, and their intended constituents were children at risk of pauperism or delinquency, but in this charitable setting there was no element of compulsion, and this difference with the workhouse system possibly improved students' qualitative experiences.⁹⁷ In 1862, Horace Mann reported that "About 43,000 scholars were found in ragged schools, orphan schools, Birkbeck schools, and factory schools," 2,683 children attended prison schools, and 35,303 children attended "pauper schools," which probably referred to workhouse schools.⁹⁸

The straw-plaiting, lace-making, sewing, and button-making schools, common in the south midlands, similarly incorporated labour and elementary teaching, although they served private interests as a rule, learning these craft skills that could be quite valuable.⁹⁹ The introduction of these industries was associated with poor-rate minded philanthropic efforts in the mid-eighteenth century in response to declining opportunities in the cottage spinning industry.¹⁰⁰ Training was provided in 'schools' for very young children that are almost universally derided as having no pedagogical value, serving only to discipline children into maintaining a high pace of work.¹⁰¹ These schools nonetheless taught some reading and offered something like a short, informal apprenticeship.¹⁰² Although life in the craft schools was likely quite difficult, the value of this skill should not be underestimated; the very best straw-plaiters could

97. H. W. Schupf, "Education for the Neglected: Ragged Schools in Nineteenth-Century England," *History of Education Quarterly* 12, no. 2 (1972): p. 165.

98. Horace Mann, "The Resources of Popular Education in England and Wales: Present and Future," *Journal of the Statistical Society of London* 25, no. 1 (1862): p. 53, <https://doi.org/10.2307/2338561>.

99. Nigel Goose, Katrina Honeyman, and Nigel Goose, eds., "Child Employment Prospects in Nineteenth-Century Hertfordshire in Perspective: Varieties of Childhood?," in *Childhood and Child Labour in Industrial England: Diversity and Agency, 1750-1914* (Farnham, Surrey: Ashgate, 2013), p. 18; W.B. Stephens, *Education, Literacy and Society, 1830-70: The Geography of Diversity in Provincial England* (Manchester: Manchester UP, 1987), p. 175.

100. Ivy Pinchbeck, *Women Workers and the Industrial Revolution, 1750-1850* (London: Virago, 1969), pp. 217-8.

101. Pamela L. R. Horn, "The Buckinghamshire Straw Plait Trade in Victorian England," *Records of Buckinghamshire* 19, no. 1 (1971): pp. 45-8; Stephens, *Education, Literacy and Society, 1830-70: The Geography of Diversity in Provincial England*, p. 175.

102. Pinchbeck, *Women Workers and the Industrial Revolution, 1750-1850*, pp. 233-4; Stephens, *Education, Literacy and Society, 1830-70: The Geography of Diversity in Provincial England*, p. 175.

purportedly earn 5s to 6s per week compared to 6d or 8d among the least productive plaiters within a single parish.¹⁰³

The private day schools—the common day schools, the dame schools, the adventure schools, the superior schools—have so far been left out of the discussion. In part, this is because they were far less likely than the more permanent institutions to leave records behind.¹⁰⁴ They were present, apparently, in the early modern period as a kind of residual whose size can only be guessed at indirectly.¹⁰⁵ They were present in much the same way in the nineteenth century, and official surveys of education were likely to undercount them.¹⁰⁶ The difficulty of successfully enumerating ephemeral private schools notwithstanding, the Kerry returns counted 57% of day-school children who attended fully private schools in 1833.¹⁰⁷

In an early influential article, E. G. West used the example of such schools to support a more general theoretical argument. In the presence of externalities, markets may not optimally supply services like education, but West saw in the many children attending fee-paying schools in this period evidence against this view.¹⁰⁸ Indeed, West maintained that the private provision of education was adequate, given the material constraints of the time, and that state intervention in education was therefore unjustified.¹⁰⁹ In response, several historians questioned West's handling of the evidence and his interpretation of events. For example, H. J. Kiesling, reinterpreting the same statistics as West had used, concluded that far more children than West had accounted for received at least partial subsidies and proposed that philan-

103. Pamela Sharpe, "The Women's Harvest: Straw-Plaiting and the Representation of Labouring Women's Employment, C. 1793-1885," *Rural History* 5, no. 2 (1994): p. 138.

104. Gardner, *The Lost Elementary Schools of Victorian England*, ch. 2.

105. Laqueur, "Working-Class Demand and the Growth of English Elementary Education, 1750-1850," pp. 202-3n2.

106. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 72-4.

107. *Parliamentary Papers*, House of Commons Papers 62 XL.1 XLII.1 XLII.1, Abstract of Answers and Returns on State of Education in England and Wales, Volumes I., II., III. (London, 1835), p. 1328.

108. E.G. West, "Resource Allocation and Growth in Early Nineteenth-Century British Education," *Economic History Review* 23, no. 1 (1970): pp. 68-73.

109. *Ibid.*, pp. 77-88.

thropists may have been more motivated by social control than welfare.¹¹⁰ Others, such as John Hurt, questioned the quality of private schools and the political context in which the statistics West drew upon were created.¹¹¹ Indeed, Mitch's analysis, discussed above, tends to support West's critics, suggesting education was socially under-supplied and that greater public intervention in support of education would have been welfare-improving.¹¹² For very young children, however, the terms of the debate are different. Here, historians of all stripes agree that private demand was decisive, but they disagree on the nature of the service that was demanded, education or child-care, and the quality of that service.¹¹³ It may be that working-class parents sent their young children to school expecting child care and nonetheless received education, an argument that is developed further in later chapters.

Phil Gardner is the historian who has given these private schools, particularly those attended by working-class children, the most sympathetic account, and much like West, he argues that their survival throughout the period of expanding public, subsidised alternatives in the nineteenth-century, really until school boards moved to close them at the end of the century, was evidence of a durable demand for what they offered.¹¹⁴ Moreover, they responded flexibly to parental demand, with some teachers actually pressed into employment by gangs of concerned parents.¹¹⁵ According to Gardner, they often taught a kind of individualized curriculum, charging separate rates for reading, writing, arithmetic, or more advanced subjects, while the dame schools tended to specialize in caring for younger children and primarily taught read-

110. H. J. Kiesling, "Nineteenth-Century Education According to West: A Comment," *Economic History Review* 36, no. 3 (1983): pp. 416–25.

111. J. S. Hurt, "West on Early Nineteenth-Century Education," *Economic History Review* 24, no. 4 (1971): pp. 624–32.

112. Mitch, "Underinvestment in Literacy? The Potential Contribution of Government Involvement in Elementary Education to Economic Growth in Nineteenth-Century England."

113. Hurt, "West on Early Nineteenth-Century Education," pp. 625–6.

114. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 3–8, 84; see also Laqueur, "Working-Class Demand and the Growth of English Elementary Education, 1750–1850"; Roberts, "A New View of the Infant School Movement," p. 163.

115. David Vincent, *Bread, Knowledge and Freedom: A Study of Nineteenth-Century Working Class Autobiography* (London: Europa Publications Limited, 1981), p. 103.

ing and knitting or sewing.¹¹⁶ Both skills were highly prized, and were often taught to boys as well as girls.¹¹⁷ These schools were chameleon-like at avoiding neat categorization. There are instances of dame schools receiving money from the parish to teach small children, sometimes under an informal arrangement but in other cases under an endowed fund like the Emery Charity in Bedfordshire.¹¹⁸ The Mayfield charity school in Sussex even hired a dame to teach some of their younger applicants before they were admitted into the main class, and many charity schoolmasters took on fee-paying students in addition to those in the charity.¹¹⁹ Thus although many children likely attended fee-paying dame or common schools, they were often mis-classified and overlooked.

By far the largest swell in this moving sea, however, was the Sunday school. Estimates of their growth in the nineteenth century are impressive: 500,000 students in 1818, 1,500,000 in 1833, 2,500,000 in 1851, 5,750,000 in 1887 and 7,500,000 in 1898.¹²⁰ The movement began in Gloucester in the 1780s in connection with Evangelicals like Hannah More and Robert Raikes.¹²¹ Willing subscribers from the congregation supported its moral aims financially, while the vast majority of teachers volunteered their time, and children often attended for free as a consequence.¹²² Historians have regarded these Evangelical origins with some suspicion, interpreting the schools as organs of social control and denominational recruitment.¹²³ However, historians like

116. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 20-2, 170-9.

117. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 357; Mary Smith, *The Autobiography of Mary Smith, Schoolmistress and Nonconformist, a Fragment of a Life* (London: Bemrose & Sons, 1892), pp. 24-5.

118. David Bushby, *The Bedfordshire Schoolchild: Elementary Education Before 1902*, vol. 67 (Kempston, Bedford: Bedfordshire Historical Record Society, 1988), pp. 35-5.

119. John Caffyn, *Sussex Schools in the 18th Century: Schooling Provision, Schoolteachers and Scholars*, vol. 81 (Lewes: Sussex Record Society, 1998), pp. 6-11.

120. Smith, *A History of English Elementary Education 1760-1902*, p. 60.

121. K. D. M. Snell, "The Sunday-School Movement in England and Wales: Child Labour, Denominational Control and Working-Class Culture," *Past and Present* 164 (1999): p. 130.

122. Thomas W. Laqueur, *Religion and Respectability: Sunday Schools and Working Class Culture 1780-1850* (Yale University Press: London, 1976), pp. 25-6, 109-10; Lawson and Silver, *A Social History of Education in England*, p. 282; Snell, "The Sunday-School Movement in England and Wales: Child Labour, Denominational Control and Working-Class Culture," pp. 129-30.

123. E. P. Thompson, *The Making of the English Working Class* (New York: Vintage Books, 1966),

Thomas Laqueur have countered that those who took part did not passively accept and internalize these aims and instead shaped the institution in accordance with working-class culture.¹²⁴ In support of either hypothesis, it is difficult to generalize from the available evidence, which offers scant systematic information about the social origins of Sunday-school teachers and subscribers.¹²⁵ Indeed, local studies give the impression of much regional variation in the extent to which philanthropists and Evangelicals exerted control, which seems to agree with the regional diversity of religious cultures in England at this time.¹²⁶ Examples of Sunday-school teachers with more middle-class backgrounds were common enough, while others were colliers and spinners.¹²⁷ However, by about 1830, it is fairly clear that most Sunday school teachers had come through the schools themselves.¹²⁸ For example, in 1831, 112 out of 120 teachers at the Bennett Street Sunday School in Manchester were former pupils.¹²⁹ This suggests that after a period of initial establishment, Sunday schools largely recruited teachers with humble origins. Humphries brings new material to bear on this debate through the autobiographies of working-class boys, and she finds that ‘almost to a man’, the Sunday school was fondly remembered.¹³⁰ However much their founders may have intended otherwise, it is clear that Sunday schools were valued by many working-class children.

p. 412; Snell, “The Sunday-School Movement in England and Wales: Child Labour, Denominational Control and Working-Class Culture”; Malcolm Dick, “The Myth of the Working-Class Sunday School,” *History of Education* 9, no. 1 (1980): pp. 27–41.

124. Laqueur, *Religion and Respectability: Sunday Schools and Working Class Culture 1780-1850*, pp. 274-311.

125. Dick, “The Myth of the Working-Class Sunday School,” p. 32.

126. J. B. Duffy, “The Growth of Popular Education in the Colliery Districts of Northumberland and Durham C. 1800 to 1902” (Ph. D. Thesis, University of Manchester, 1983), pp. 29-36; K. D. M. Snell and Paul S. Ell, *Rival Jerusalems: The Geography of Victorian Religion* (Cambridge: Cambridge UP, 2004), pp. 285-6.

127. Duffy, “The Growth of Popular Education in the Colliery Districts of Northumberland and Durham C. 1800 to 1902,” p. 32; Joan Hassall, “The Bennett Street Sunday School, Manchester: A Study in Nineteenth Century Educational and Social Improvement” (Ph. D. Thesis, University of Manchester, 1986), pp. 139, 144.

128. Dick, “The Myth of the Working-Class Sunday School,” p. 32.

129. Hassall, “The Bennett Street Sunday School, Manchester: A Study in Nineteenth Century Educational and Social Improvement,” p. 143.

130. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 321.

Sunday schools soon spread north and became closely associated with factory children. Sunday scholars ranged widely in age, although they generally attracted older children and often played a remedial role for children whose education had been interrupted by work.¹³¹ For instance, K. D. M. Snell notes a strong positive relationship between the prevalence of child labour and the number of Sunday schools in county-level regressions in 1851.¹³² There was also an apparently negative relationship between the number of Sunday scholars and both literacy and day-school attendance in a county, suggesting that Sunday schools substituted for day schools without teaching writing.¹³³ However, this finding should be interpreted cautiously, as many Sunday schools failed to teach writing for theological reasons, believing it was as a secular activity that should not be undertaken on the Sabbath.¹³⁴ Nor does this reluctance to teach writing mean that Sunday schools were hopelessly ineffective. Jane Humphries' study of occupational outcomes among nineteenth-century autobiographers indicates that attending a Sunday School predicted about the same upward social mobility as two more years of schooling.¹³⁵ Thomas Laqueur, drawing on teaching materials, statistical society reports, and Sunday school registers of students' progress, concludes that 'three to five hours of instruction each week for an average of four years, using specialized textbooks in small classes graded according to scholastic ability,' contributed to mass literacy and produced reading outcomes approximately equivalent to two or three years of day school.¹³⁶

131. Stephens, *Education, Literacy and Society, 1830-70: The Geography of Diversity in Provincial England*, pp. 93-4; Laqueur, *Religion and Respectability: Sunday Schools and Working Class Culture 1780-1850*, p. 101.

132. Snell, "The Sunday-School Movement in England and Wales: Child Labour, Denominational Control and Working-Class Culture," pp. 139-146.

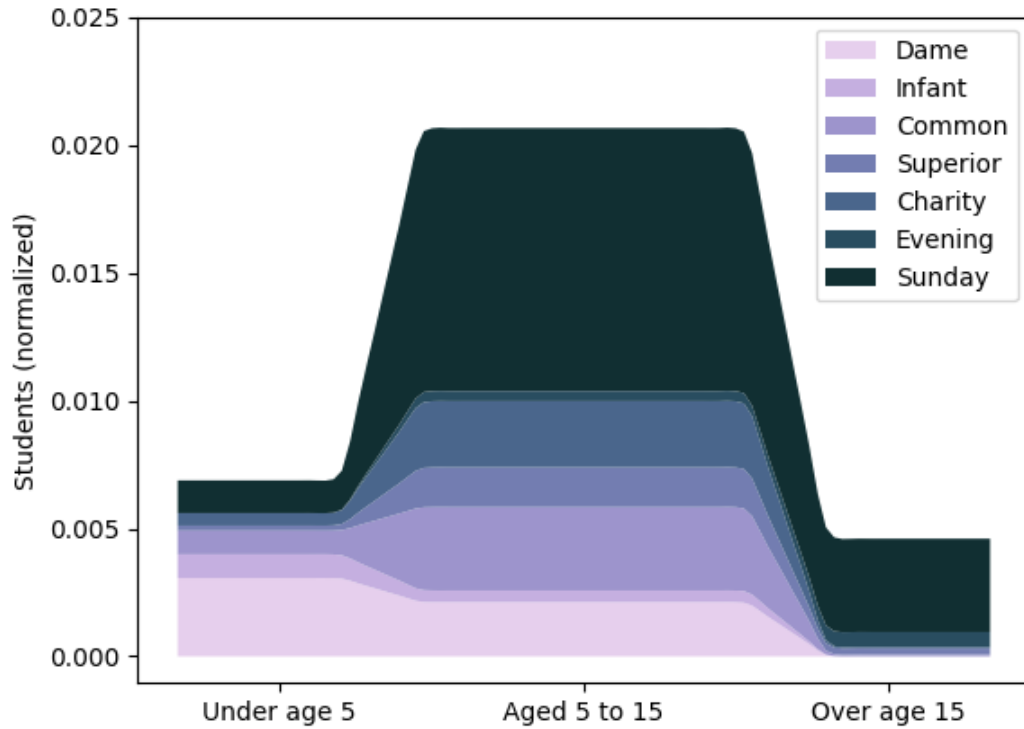
133. Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, p. 138; Snell, "The Sunday-School Movement in England and Wales: Child Labour, Denominational Control and Working-Class Culture," p. 144-6.

134. Laqueur, *Religion and Respectability: Sunday Schools and Working Class Culture 1780-1850*, pp. 124-145.

135. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, pp. 337, 348.

136. Laqueur, *Religion and Respectability: Sunday Schools and Working Class Culture 1780-1850*, p. 123.

Figure 1.2: School attendance over the life-course in Salford, 1835



Source: Manchester Statistical Society, *Report of a Committee of the Manchester Statistical Society on the State of Education in the Borough of Salford*, 1836

Figures 1.2 and 1.3 map children’s attendance at these different kinds of schools in Salford and York over the life course, using data collected by the Manchester Statistical Society. In both cases, I adopt the nomenclature used in the report. ‘Dame’, ‘Common’, and ‘Superior’ schools all referred to fee-funded schools and were largely distinguished by the value of the fees students were expected to pay. Dame schools charged the least and, as discussed, taught mainly reading and needlework, while common schools might teach writing or arithmetic, and superior schools offered the widest range of subjects and charged the highest fees. ‘Infant’, ‘Charity’, ‘Evening’, and ‘Sunday’ schools, on the other hand, were partially funded through charity and either admitted students for free or asked for a nominal fee.¹³⁷ Charity schools, in

137. See discussions in Manchester Statistical Society, *Report of a Committee of the Manchester*

this case, included the voluntary society schools and the surviving eighteenth-century S.P.C.K schools. Some children attended both Sunday schools and day schools. To avoid double counting, I only count those students who exclusively attended Sunday schools.

Additionally, I normalize the student counts by population and by the size of the age group to make them more comparable. Unfortunately, detailed data of the age distribution of children in these places is not available. I therefore divide each student count by the total population in 1831, which is reported in the Statistical Society reports¹³⁸ Next, I divide by the number of years in the age group. For the under-five cohort, although in theory children could have attended school at younger ages, in practice most of these children would have been four, three, or possibly two. I therefore divide the raw number of students in this cohort by three years. For the middle cohort, I divide the student count by ten. For the final cohort, I divide the student count by five, which is somewhat arbitrary given the wide range of possible ages someone might take part in remedial education. In practice, I assume most people stopped attending adult evening and Sunday classes around age 20 and normalize on this basis. The graph therefore indicates approximately the per capita yearly attendance rate in each age band.

During early childhood, the first stage of the life-course, in both Salford and York, the largest group of students attended dame schools. Although I develop the argument more fully in subsequent chapters (chapter 5), I argue this was because these schools developed institutional features that made them well-suited to providing child care for young children. To wit, a flexible labour market for dames kept class-sizes small, and their lack of pedagogical innovation, unexpectedly, fostered parental trust in the

Statistical Society on the State of Education in the Borough of Salford, 1836, pp. 5-12; *Report of a Committee of the Manchester Statistical Society on the State of Education in the City of York*, 1837, pp. 6-12.

138. Manchester Statistical Society, *State of Education in the Borough of Salford*, p. 3; *State of Education in the City of York*, p. 4.

institution. Infant schools catered to the same age group, although they were more popular in York than in Salford. Cultural and institutional differences do not likely explain this discrepancy. Dissenters and Evangelical Anglicans usually cooperated on local infant school committees and most infant schools in this early period were independent of the voluntary school societies, although non-conformists were possibly more ideologically committed to them.¹³⁹ Most likely, because these schools relied on middle-class subscribers for financial support, the city of York provided a deeper well of charitable funds than the textile district of Salford.¹⁴⁰ Common schools, which some historians have argued were in essentially the same category as dame schools, also provided some education for children in this age group.¹⁴¹ While these schools undoubtedly shared many features in common with dame schools, they were distinguished by offering writing instruction in addition to reading.¹⁴² Some very young children attended Sunday Schools in Salford, although these children were possibly accompanying elder siblings.

Between age five and age ten, children's education in York and Salford diverged more sharply. Whereas, in Salford, the largest group of children in this age group attended Sunday schools exclusively, in York the largest group attended charity schools, including the National and British schools. Historians have argued that the demand for child labour in textile districts raised the opportunity costs of education, resulting in lower rates of attendance in places like Salford.¹⁴³ Indeed, without its additional Sunday scholars, Salford would have only two-thirds of York's attendance rate in

139. D. A. Turner, "The State and the Infant School System," *British Journal of Educational Studies* 18, no. 2 (1970): p. 160; W. A. C. Stewart and W. P. McCann, *The Educational Innovators, 1750-1880* (London: Macmillan, 1967), p. 245; Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 12, 21-5.

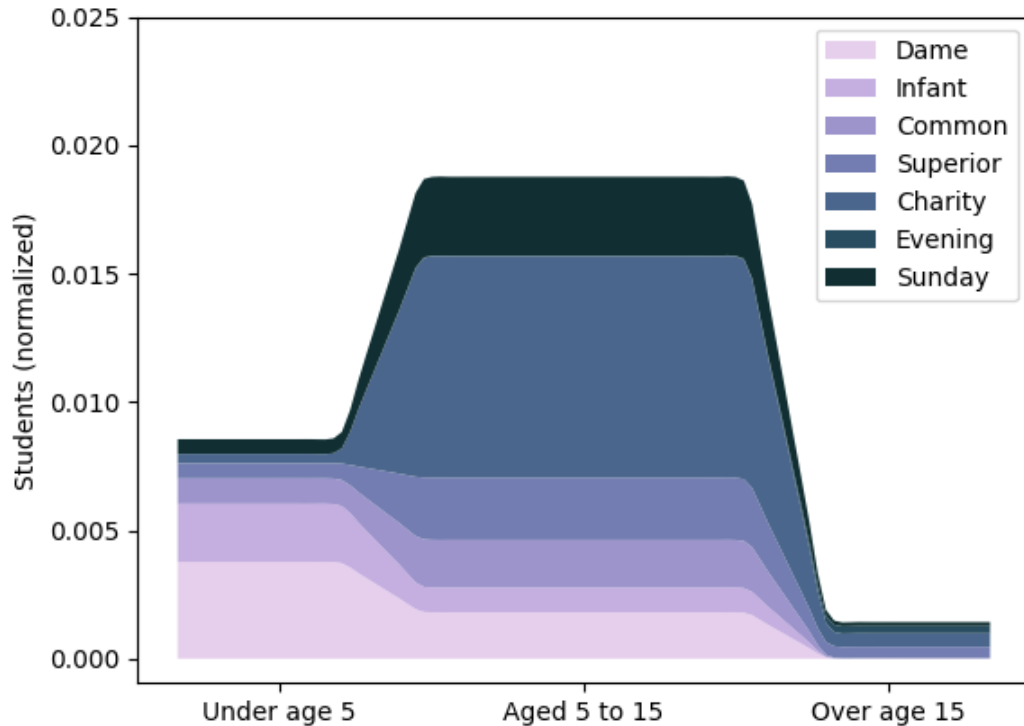
140. Jeffrey G. Machin, "The Westminster Free Day Infant Asylum: The Origins of the First English Infant School," *Journal of Educational Administration and History* 20, no. 2 (1988): pp. 53-5.

141. Roberts, "A New View of the Infant School Movement," pp. 160-1.

142. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 19-20.

143. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 318; Stephens, *Education, Literacy and Society, 1830-70: The Geography of Diversity in Provincial England*, pp. 91-7.

Figure 1.3: School attendance over the life-course in York, 1836



Source: *Report of a Committee of the Manchester Statistical Society on the State of Education in the City of York, 1837*

this cohort. These figures, however, serve to highlight how children's departure from 'school' into the world of work was not always a complete severance. Many children worked during the week and looked forward to their Sunday classes with great anticipation.¹⁴⁴ Private schools, including dame schools, continued to attract students in this phase of the life-course as well. Because the statistical societies grouped with older children those aged five and six years old, who arguably belonged with the younger group, this may simply be an artifact of the Statistical Society's methodology.

However, in both York and Salford, the rate of enrollment at 'common', 'supe-

144. Charles Shaw, *When I Was a Child* (London: Methuen, 1903), pp. 134-40; Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 321.

rior’, and ‘charity’ schools all increased from early childhood to this middle phase of childhood. These schools, not accidentally, were all schools that taught writing, highlighting another important feature of education across the life-course. Observing that children were historically taught to read and then write in sequence, historians have often assumed this was because writing was a more advanced skill.¹⁴⁵ More likely, the reasons were technological and developmental. Teaching children to spell-out words from a shared book economized on teaching materials, and all children began their schooling this way.¹⁴⁶ Writing instruction, by contrast, commonly began with learning how to prepare a quill using a pen-knife, and it was difficult to share writing materials.¹⁴⁷ It could be messy and wasteful, not to mention hazardous, to attempt this with a young child with underdeveloped motor skills. Teaching this skill therefore usually occurred later in the life-course. For example, in Pendleton in 1838, the average age at which children learned to read was roughly 6, to write roughly 9, and to ‘cipher’ roughly 10.¹⁴⁸ Some teachers, such as one schoolmaster from Rickling, Essex, avoided the difficulty altogether, reporting that the ‘chief objection made to teaching writing when it was proposed, was, that the boys merely learned to scribble on the walls and pallings’.¹⁴⁹ It was not until cellulose paper and metal-nib pens were mass-produced and available cheaply, around the middle of the nineteenth century,

145. R. S. Schofield, “The Measurement of Literacy in Pre-Industrial England,” in *Literacy in Traditional Societies*, ed. Jack Goody (Cambridge: Cambridge University Press, 1968), p. 324.

146. Anne-Marie Chartier, *Teaching Literacy in the West from the Middle Ages to the 21st Century*, Oxford, 2021, <https://doi.org/10.1093/acrefore/9780190264093.013.1652>.

147. David Cressy and J. Brinsley, eds., “Equipment for Writing,” in *Education in Tudor and Stuart England* (London: Edward Arnold, 1975), p. 75; William Jones, *The Economical and Expeditious Penman, or, An Easy Method by Which a Free, Legible, and Elegant Style of Writing May Be Readily Acquired*, 3rd (London: Harjette / Saville, 1827), pp. 3-4.

148. These estimates are fairly crude, as the report gives the age children are able to read, write, and cipher in five-year bins. I use Hajnal’s SMAM method to estimate the mean age each skill was acquired; see “Report of a Committee of the Manchester Statistical Society, on the State of Education in the Township of Pendleton, 1838,” *Journal of the Statistical Society of London* 2, no. 2 (1839): p. 80, <https://www.jstor.org/stable/2337977>; John Hajnal, “Age at Marriage and Proportions Marrying,” *Population Studies* 7 (1953): pp. 111–136.

149. G. Long, “Schools for the Industrious Classes,” in *Central Society of Education: Papers*, vol. 2 (London: Taylor / Walton, 1838), p. 357, <https://link.gale.com/apps/doc/U0105636550/MOME?u=oxford&sid=MOME&xid=3c1b8071&pg=4>.

that schools combined reading and writing instruction by having students copy out phrases in notebooks.¹⁵⁰ Thus, older children who attended day schools in this second phase of the life-course were more likely to learn to write, using the particular writing implements most readily available at the time. Where the majority of children of this age attended Sunday schools only, this opportunity would most likely be missed, as in Salford, where only 17 per cent of Sunday schools taught writing.¹⁵¹

Finally, children may have continued their education beyond age 15. In York, they seldom did so, with a few teenagers and young adults attending fee-paying schools or charity schools and an even smaller portion attending evening schools, which were never very popular.¹⁵² In Salford, in contrast, virtually no-one remained at the day schools beyond age fifteen. Rather, Sunday schools continued to play the remedial role they played earlier in the life-course, and they were supported in this by the evening schools, which were slightly more popular here than in York.

It is hard to avoid the impression that Salford and York represented two very different education systems, not unlike the regional patterns and contrasts historians have uncovered elsewhere in the country.¹⁵³ In one system, the formal day schools and voluntary schools took precedence, children stayed in these schools at older ages, and its impact could be traced in the development of reading, writing, and other skills. In the other, the day school was resigned to a brief period in early life, perhaps in a dame school in which children might only learn to read and knit, and the Sunday school played catch-up. “The parents of a numerous family,” who were interviewed by the Manchester Statistical Society in Pendleton in 1838, “represented that they had made it a rule to give each child two years at a day school, and let them have a

150. Chartier, *Teaching Literacy in the West from the Middle Ages to the 21st Century*.

151. Manchester Statistical Society, *State of Education in the Borough of Salford*, p. 39.

152. Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, pp. 378-9.

153. Alexander James Field, “Occupational Structure, Dissent, and Educational Commitment: Lancashire, 1841,” *Research in Economic History* 4 (1979): p. 272; Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, p. 147.

‘full run’ at Sunday school as long as they could get them to go.”¹⁵⁴ A similar plan was followed by a fourteen-year-old boy, also from Pendleton, who explained, “though he was sent to a day school as much as his parents could afford, yet he believed it would have done him little good had he not been to a Sunday school since. He finds it useful in refreshing his memory, and he is also making progress.”¹⁵⁵

School choice thus followed a logic set by the life-course, as children moved between schools when other life events, such as entry into work, changed their circumstances and consequently changed the aspects of schooling that were most useful to them. This could have important consequences. For example, a boy from Salford who attended a dame school in early childhood, left school young to begin work, and attended Sunday school diligently for the next four years would likely never have had the opportunity to learn to write, no matter how ably he read his lessons. The Royal Commission on Children’s Employment interviewed child after child who described a similar educational history:

Works at spades and shovels, filing. Works from half-past five in the morning till seven at night; with half an hour for breakfast, and an hour for dinner, half an hour for tea.... Gets 2s. 6d. a week.... Can read in the spelling book, easy words; was at a day-school some time; does not know how long; left when he was a young ’un; doesn’t know how young. Always goes to a Sunday-school; cannot write, was never put to it.¹⁵⁶

Such only-readers often represented more than half of literate workers. In response to an 1833 Royal Commission, fully 86 percent of factory operatives reported themselves

154. “Report of a Committee of the Manchester Statistical Society on the State of Education in the County of Rutland in the Year 1838,” *Journal of the Statistical Society of London* 2, no. 5 (1839): p. 67, <https://www.jstor.org/stable/2337820>.

155. Ibid.

156. *Parliamentary Papers*, Command Paper 430, Royal Commission on Children’s Employment in Mines and Manufactories. Second Report (Manufactures), Appendix (London, 1843), p. q19.

capable of reading, in contrast to the 43 percent who were capable of writing.¹⁵⁷ Seventy-nine percent of miners surveyed in the 1840s in Durham and Northumberland could read, while more than half of them could also write.¹⁵⁸ A survey in 1839 in Hull reported that 92 per cent of residents could read.¹⁵⁹ Further, Josiah Wedgwood told an 1818 select committee that more than three-quarters of children at his potteries had learned to read “by the old established method, of what are called Dame schools, for the very young children, and in a great measure by Sunday Schools.”¹⁶⁰

While it is tempting to think of children without the ability to write as deficient, the life-course perspective on schooling in this period suggests, more concretely, that children who could not write had not had the opportunity to develop this skill at the particular stage in the life-course when it was commonly taught. Whether this indicates a general deficiency of human capital is a different question, one which depends on whether such children had alternative opportunities for skill acquisition at this stage of the life-course.

1.2 Literacy

Historians of this period have long interpreted signature rates on parish marriage registers as indicators of literacy over time. These records required either a signature or a mark from the groom and bride, and after Hardwicke’s Act in 1753, applied to ceremonies of almost every faith but Quakerism, Judaism and the royal family.¹⁶¹ Learning generally occurred in stages, with writing being taught after reading.¹⁶²

157. *Parliamentary Papers*, technical report 167, Royal Com. on Employment of Children in Factories Supplementary Reports, part i. and ii. (London, 1834), p. 42.

158. E. G. West, *Education and Industrial Revolution* (London: Batsfords, 1974), p. 40.

159. *Ibid.*

160. *Parliamentary Papers*, Command Paper 397 III, Report of the minutes of evidence, taken before the Select Committee on the State of the Children Employed in the Manufactories of the United Kingdom. (London, 1818), p. 62.

161. E. A. Wrigley, “English County Populations in the Later Eighteenth Century,” *Economic History Review* 60, no. 1 (2007): 35–69, p. 40.

162. Pleijt, “Human Capital Formation in the Long Run: Evidence for Average Years of Schooling in England, 1300-1900,” p. 104.

Because fewer people signed their names than claimed the ability to read, and fewer still claimed the ability to write, signing ability is usually interpreted as reflecting an intermediate stage between learning to read and learning to write, and change in the proportion of marks in the registers is taken as a common indicator of illiteracy over time.¹⁶³ For reasons discussed above, there remains debate over just how much educational provision is implied by a signature. David Cressy, for instance, argues that writing was “a subordinate part of the elementary curriculum” when compared to reading. Indeed, “writing” may be better conceived of as a fine-motor skill, since it involved the preparation of quills and inks, and some teachers may have simply preferred to avoid the hassle, expense, and mess.¹⁶⁴ Historians usually address this problem by arguing that signatures remain a meaningful indicator of relative if not absolute levels of education over time,¹⁶⁵ but this answer is not entirely satisfactory if schools were adapting and specializing to provide for the needs of children at different stages of the life-course, as discussed in the above section. Signing could not be an intermediate stage of literacy in schools that never attempted writing instruction.

Nonetheless, contributions by Lawrence Stone, Michael Sanderson and Roger Schofield set the contours of much of this debate. Noting, for instance, that in Halifax—the sole example of a “major industrial city” in his sample—signature rates almost halved between 1799 and 1837, Stone argued that demand for child labour made this option more lucrative than schooling, with expected consequences for literacy.¹⁶⁶ Sanderson made a similar point, observing declines in signature rates in Lancashire over the late 18th and early 19th centuries.¹⁶⁷ Schofield’s national sample

163. R. S. Schofield, “Dimensions of Illiteracy, 1750-1850,” *Explorations in Economic History* 10 (1973): p. 440; Schofield, “The Measurement of Literacy in Pre-Industrial England,” p. 324.

164. Cressy, *Literacy & the Social Order: Reading & Writing in Tudor & Stuart England*, pp. 23-4.

165. For example, see David Cressy, “Literacy in Seventeenth-Century England: More Evidence,” *Journal of Interdisciplinary History* 8, no. 1 (1977): p. 141; Lawrence Stone, “Literacy and Education in England 1640-1900,” *Past and Present* 42 (1969): p. 98.

166. Stone, “Literacy and Education in England 1640-1900,” pp. 76, 103.

167. Michael Sanderson, “Literacy and Social Mobility in the Industrial Revolution in England,” *Past and Present* 56 (1972): 75-104, pp. 83-4.

showed stagnant literacy for those at school age in the 18th and early 19th centuries, before finally beginning a slow rise—led precociously by women of school age in the late eighteenth century.¹⁶⁸

Arguments linking industry to literacy clearly hinge on the timing of industrialisation. An early counterargument by Thomas Laqueur made precisely this point. Using 1774 as the birthdate of the factory system, he argues that those married in the 1790s were the first generation that could have been affected by industrialisation, yet the downward trend had begun in Lancashire forty years earlier.¹⁶⁹ He therefore favours the argument that rapid eighteenth-century demographic growth overwhelmed the provision of education, which was also suggested by Stone.¹⁷⁰ Much like Schofield's national sample, Laqueur's literacy rates in Lancashire begin to rise around the turn of the nineteenth century, and Laqueur argues that industrialisation was in fact the cause of this reversal.¹⁷¹

However, understandings of the timing of industrialisation have undergone significant revisions since the original debate. The aggregate growth curves of industrial output, and even textiles, now look much more gradual and extend further back into the eighteenth century than previously thought, even into the seventeenth century.¹⁷² The upshot is that Laqueur's argument can really only apply to the exceptional cotton industry, whose estimated share of national product is now smaller, whereas the longer-term declines in signature rates actually more closely coincide with a deeper and broader wave of industrial growth in the production of other textiles, such as woolens and worsteds, and mining.¹⁷³ A straightforward, linear relationship between

168. Schofield, "Dimensions of Illiteracy, 1750-1850," p. 446.

169. Thomas W. Laqueur, "Literacy and Social Mobility in the Industrial Revolution in England," *Past and Present* 64 (1974): 96-107.

170. Stone, "Literacy and Education in England 1640-1900," p. 92.

171. Laqueur, "Literacy and Social Mobility in the Industrial Revolution in England," pp. 98, 107.

172. N.F.R. Crafts and C. Knick Harley, "Output Growth and the British Industrial Revolution: A Restatement of the Crafts-Harley View," *Economic History Review* 45, no. 4 (1992): p. 712; Broadberry et al., *British Economic Growth 1270-1870*, pp. 203-14.

173. Broadberry et al., *British Economic Growth 1270-1870*, pp. 130-1, 144-50.

industrialisation writ large and literacy in this period, positive or negative, looks less convincing.

Arguments that look at geographic difference bring some clarity. Nicholas and Nicholas find evidence of an ‘homogenization of the workforce’, i.e., declining differences in literacy according to skill, and lower literacy in northern England in the nineteenth century using a dataset of transported convicts.¹⁷⁴ In distinction from Schofield, however, they find a very different trend over time, with male literacy reaching a peak around the turn of the eighteenth century and declining thereafter.¹⁷⁵ In an interesting twist, however, de Pleijt and Weisdorf report that the positive relationship between literacy and skilled occupational status is weaker in industrial parishes than in agricultural or commercial parishes, but industrial parishes had more skilled occupations overall.¹⁷⁶ This seems to suggest not ‘deskilling’ but the irrelevance of literacy to industrial skills. W. B. Stephens’ contribution synthesizes primary research, local history studies and unpublished dissertations to sketch out geographical differences in schooling and literacy rates both qualitatively and quantitatively. His quantitative work identifies a number of additional industrializing towns whose marriage rolls registered a decline in the proportion of signatures. At the same time, he identifies several hundred rural parishes whose rolls register improvements in signature rates over the same period.¹⁷⁷ The geographical evidence therefore generally supports a picture of educational deficiency as measured by signature rates in the industrial areas and better performance in the slow-growing rural parishes and dynamic commercial towns.¹⁷⁸ Less clear is how this translates into the skills relevant to local industries.

174. Nicholas and Nicholas, “Male Literacy, ‘Deskilling,’ and the Industrial Revolution,” pp. 9-14.

175. Ibid., pp. 9-10.

176. Pleijt, “Human Capital Formation in the Long Run: Evidence for Average Years of Schooling in England, 1300-1900.”

177. Stephens, *Education, Literacy and Society, 1830-70: The Geography of Diversity in Provincial England*, pp. 4-10.

178. Ibid., pp. 12, 15-7.

Similar patterns also appear outside of the core industrial counties. Nigel Goose has argued for a clear geographical relationship between the prevalence of child labour in the straw-plaiting industry and low signature rates in Hertfordshire.¹⁷⁹ In Leicester's cottage industries, particularly framework knitting and gloving, Elaine Brown finds similar dips in signature rates that correlate with periods of distress in those industries.¹⁸⁰ This all adds weight to a generally pessimistic interpretation in which some combination of lucrative outside employment, cyclical industrial poverty or even population growth spurred by industry kept children from the classroom.

Evidence of literacy by occupation shows a familiar decline between 1785-1814 for three "modernizing" industries: textiles, metal trades and transport.¹⁸¹ Of all the industries, textiles exhibits the largest percentage-point dip, but it is followed closely by not-so-industrial "armed forces" and "husbandmen"—with "retail" following a similar but less-pronounced pattern. Oddly, clothing manufacturers saw steady gains over the period in this sample.¹⁸² In conjunction with earlier evidence, these ambiguities perhaps suggest that whatever dips there were in literacy were not the consequence of industry per se—an overwhelming quantitative wave of illiterate factory hands—but rather of wider social changes concurrent with industrialisation.

Indeed, it is difficult to untangle changes in the wider society from the phenomenon of industrialisation, itself multifaceted, and this raises the possibility of several confounding errors. A recent revision to pre-census population growth by E. A. Wrigley has widened the disparity in population growth rates between counties in the eighteenth century, such that it would be impossible for the growth of the fastest-growing counties to be due to differences in natural increase or decrease alone.¹⁸³ If the pre-

179. Nigel Goose and Katrina Honeyman, eds., *Childhood and Child Labour in Industrial England: Diversity and Agency, 1750-1914* (Farnham, Surrey: Ashgate, 2013), p. 164.

180. Elaine Brown, "Gender, Occupation, Illiteracy and the Urban Economic Environment: Leicester, 1760-1890," *Urban History* 31, no. 2 (2004): 191–209.

181. Mitch, "The Role of Education and Skill in the British Industrial Revolution," 262–3.

182. Schofield, "Dimensions of Illiteracy, 1750-1850," p. 450.

183. Wrigley, "English County Populations in the Later Eighteenth Century," p. 59.

migration literacy rate was higher in the industrial counties than that of the average immigrants, this would also contribute to observed dips in literacy. This was a likely possibility with the Irish at the turn of the century.¹⁸⁴ There is some evidence that those who left Ireland possessed less human capital than those who stayed.¹⁸⁵ From the south, pauper apprentices also made up a significant part of the early industrial workforce, as much pushed by the strained poor law system of the metropolis as pulled by the early factory owners.¹⁸⁶ There was apparently a skill penalty to being born outside of a parish between the sixteenth and nineteenth centuries, suggesting a prevalence of unskilled migration, which was more pronounced in industrial parishes.¹⁸⁷ Migration of this sort should invite caution that observed “dips” in literacy do not stem from emigrants’ home ports.

School curricula were influenced by faith, and any literacy sampling would need to take this into account, as it could introduce potential geographic biases due to the clustering of conservative sects. For instance, Wesleyan Methodist schools were reported to prohibit the teaching of writing entirely.¹⁸⁸ This denomination was also strongly represented in the industrializing areas, and similar ideas were upheld in the region’s Sunday Schools, where a movement to suppress writing was doggedly pursued by leading Methodist Jabez Bunting.¹⁸⁹ The Anglican National Society, for its part, early in its history had planned to avoid teaching writing, but this was abandoned due to competition with the non-denominational British society.¹⁹⁰ By

184. E. G. West, “Literacy and the Industrial Revolution,” *Economic History Review* 31, no. 3 (1978): p. 372; Stephens, *Education, Literacy and Society, 1830-70: The Geography of Diversity in Provincial England*, p. 36-7.

185. Joel Mokyr and Cormac O’ Gráda, “Emigration and Poverty in Prefamine Ireland,” *Explorations in Economic History* 10 (1982): 360–384.

186. Honeyman, *Child Workers in England, 1780-1820: Parish Apprentices and the Making of the Early Industrial Labour Force*.

187. Pleijt, “Human Capital Formation in the Long Run: Evidence for Average Years of Schooling in England, 1300-1900.”

188. Stone, “Literacy and Education in England 1640-1900,” p. 89.

189. Thompson, *The Making of the English Working Class*, pp. 354, 374.

190. Laqueur, “Working-Class Demand and the Growth of English Elementary Education, 1750-1850,” p. 198.

taking signatures as the only indication of educational achievement or capability, other school experiences such as these are systematically overlooked.¹⁹¹

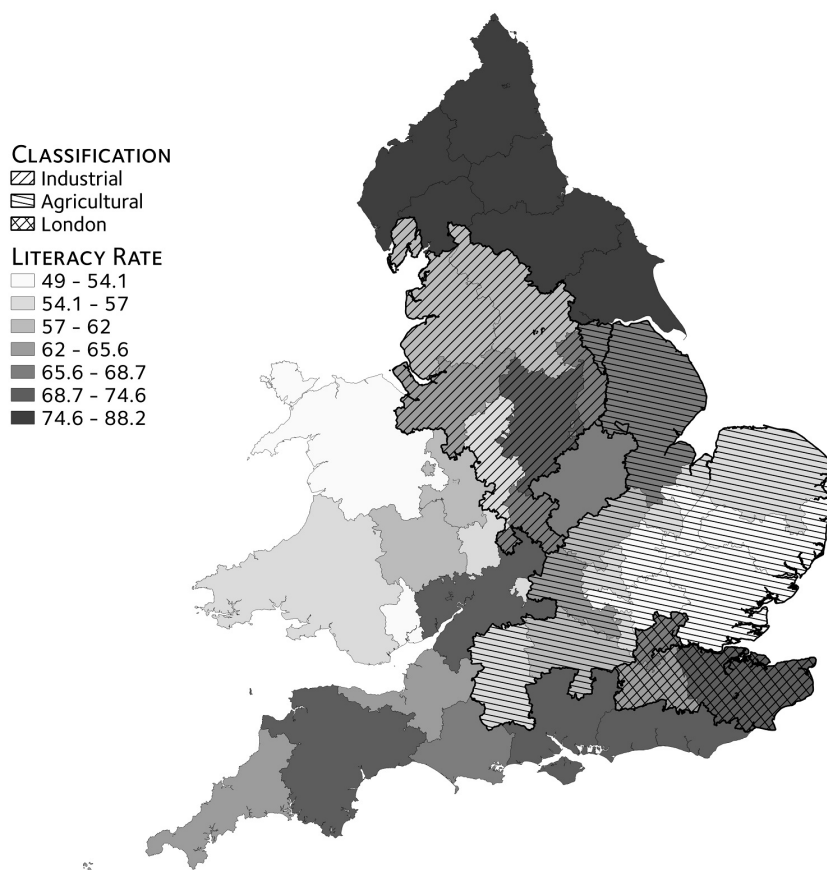


Figure 1.4: Male literacy rates, 1839-1845.

Source: *Parliamentary Papers*, technical report 967, Registrar General of Births, Deaths and Marriages in England Eighth Annual Report (London, 1845), <https://ezproxy-prd.bodleian.ox.ac.uk:4200/parlipapers/docview/t70.d75.1847-024981?accountid=13042>; county classifications from E. A. Wrigley, "English County Populations in the Later Eighteenth Century," *Economic History Review* 60, no. 1 (2007): 35-69.

Even if all of this was accounted for, a cautious use of the primary sources would still be necessary to avoid biased signatures data. English parish registers can be in various states of neglect, not all of which can be attributed to random measurement error. Particularly, weary parsons in rapidly growing urban parishes are suspected

191. Stephens, *Education, Literacy and Society, 1830-70: The Geography of Diversity in Provincial England*, p. 27.

of having under-recorded important life events.¹⁹² Historians must also be careful to distinguish between registers of marriage certificates, which could be bought for a fee to avoid the public announcement of marriage banns, introducing probable sample selection bias, and simple parish marriage registers.¹⁹³ Marriage certificates, not registers, are used in several landmark studies because they frequently also record occupation.¹⁹⁴

Within a single sample, signature rates could be quite volatile from year to year. For instance, even with a remarkably large sample of 38,705 signatures taken from Lancashire, which should tend to reduce sampling variability by the law of large numbers, Sanderson's chart of literacy is highly volatile, falling approximately 25 per cent in its most dramatic dip in 1827-8.¹⁹⁵ As the registrar general reported, this could be because marriage followed its own kind of macroeconomic cycle:

... the marriage returns in England point out periods of prosperity little less distinctly than the funds measure the hopes and fears of the money market. If the one is the barometer of credit, the other is the barometer of prosperity, present in part, but future, expected, anticipated, in still greater part.¹⁹⁶

Such correlations invite caution about how sample years are selected to ensure that historical claims are not based on anomalous evidence. The supposed industrial nadir of literacy statistics, for instance, corresponds uncomfortably with the start of a bloody war that surely disrupted many well-laid plans.¹⁹⁷

192. R. S. Schofield, "Representativeness and Family Reconstitution," *Annales de démographie historique*, no. 1 (1972): 121-125, <https://www.jstor.org/stable/44385865>, p. 123.

193. Cressy, "Literacy in Seventeenth-Century England: More Evidence," pp. 148-9.

194. Stone, "Literacy and Education in England 1640-1900," p. 105; Sanderson, "Literacy and Social Mobility in the Industrial Revolution in England"; Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*.

195. Sanderson, "Literacy and Social Mobility in the Industrial Revolution in England," p. 86-7.

196. *Parliamentary Papers*, technical report 967, Registrar General of Births, Deaths and Marriages in England Eighth Annual Report (London, 1845), <https://ezproxy-prd.bodleian.ox.ac.uk:4200/parlipapers/docview/t70.d75.1847-024981?accountid=13042>, pp. x-xxiii.

197. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, pp. 46-7.

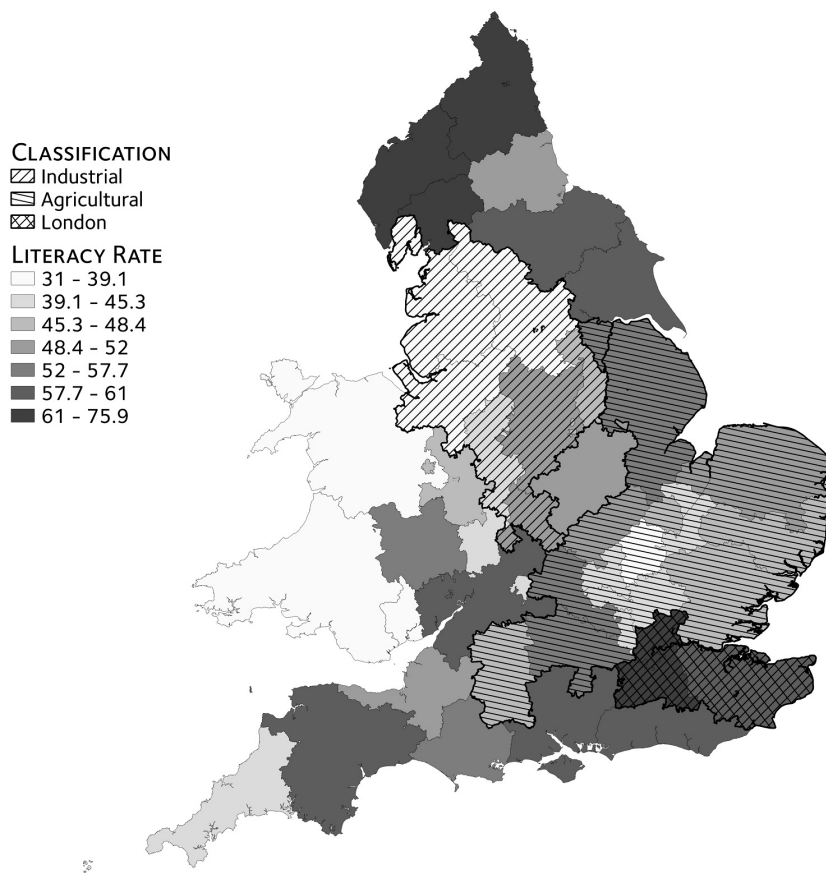


Figure 1.5: Female literacy rates, 1839-1845.

Source: *Parliamentary Papers*, technical report 967, Registrar General of Births, Deaths and Marriages in England Eighth Annual Report (London, 1845), <https://ezproxy-prd.bodleian.ox.ac.uk:4200/parlipapers/docview/t70.d75.1847-024981?accountid=13042>; county classifications from E. A. Wrigley, "English County Populations in the Later Eighteenth Century," *Economic History Review* 60, no. 1 (2007): 35-69.

To be clear, in the above studies, most authors are aware of these problems and make attempts to address them. The problem, however, is that it is difficult to systematically control for them at the macroeconomic level. It is therefore possible that the confounding factors catalogued here, and others unanticipated, may influence the story suggested by signature rates.

For instance, in 1839-1845, when national signature rates at marriage were first systematically reported by the registrar general, the pattern does not look quite so

clear cut (figures 1.4 and 1.5). At a glance, the industrial counties look to have approximately average male literacy rates, although this is arguably too late to pick up the 1790s dip identified by earlier writers. In contrast, they look to be outliers in terms of gender inequality. Indeed, a recent paper that tries to control for confounding variables using an instrumental variable approach finds that the relationship between the number of steam engines in 1800 and literacy of children born between 1806 and 1816 is slightly negative but insignificant. In contrast, the paper finds a significant positive effect of steam engines on literacy inequality by gender.¹⁹⁸ It is hard to reconcile this with the story of rising opportunity costs of child labour, as factory owners were not known to discriminate wages between boys and girls.¹⁹⁹

The largest problem with signature-rate evidence, however, is how much it seems to underestimate the proportion of children who attended schools. A critical analysis of recent work by Alexandra de Pleijt demonstrates how much a strict focus on literacy can understate direct measures of various kinds of enrollment. For primary schooling, de Pleijt considers those who sign their names as having gone through at least a “relatively sustained and prolonged effort” in school.²⁰⁰ Using her procedure to estimate the number of primary school enrollments in 1835 on the basis of literacy data yields 243,656 new scholars in that year.²⁰¹

However, when the House of Commons requested that parish overseers enumerate

198. Pleijt, Nuvolari, and Weisdorf, “Human Capital Formation During the First Industrial Revolution: Evidence from the Use of Steam Engines,” pp. 30-1.

199. Sara Horrell and Jane Humphries, “The Exploitation of Little Children”: Child Labor and the Family Economy in the Industrial Revolution,” *Explorations in Economic History* 32 (1995): 485–516.

200. Alexandra de Pleijt and Jacob Weisdorf, “Human Capital Formation from Occupations: The ‘Deskilling Hypothesis’ Revisited,” *Cliometrica* 11, no. 1 (2016): 1–30, <https://doi.org/10.1007/s11698-016-0140-y>, pp. 104.

201. De Pleijt estimates enrollment in year t with the following equation

$$Enrollment_t = Literacy_{t+15} * \frac{\gamma_t}{10} * n_t,$$

where the literacy rate is lagged by 15 years to account for age of marriage, γ_t is the share of the population aged 5-14 in year t , and n_t is the population in year t . Estimates of these values are attained from Wrigley et al. (1997) and the author’s own calculated literacy rates weighted by sex.

schools in the "Kerry Returns" of 1833 — already admitted by historians and the report's authors to be an underestimate of the true number attending school—they found that there were 1,276,947 scholars and an additional 1,548,800 Sunday scholars in England and Wales.²⁰² These scholars did not all enroll in the year in which they were counted, and much depends on estimates of average years of schooling. Again, however, it is possible to follow de Pleijt's own estimates and weightings to account for the number of literate people who would go on to attend secondary and tertiary education and the expected duration of their school careers. This correction implies that primary scholars with no plans to go on to grammar school still spent 4.7 years in primary school if the numbers are to add up.²⁰³ This is before accounting for the remedial role Sunday schools played for many students over their early working lives, average attendance at which lasted for about three years by the 1840s.²⁰⁴ For comparison, Jane Humphries's study of male working class autobiographers finds an average of 2.37 years of day school attendance in 1831-40, the lowest in her sample, and

202. *Parliamentary Papers*, p. 1345.

203. The total number of students in school in one year should be roughly equal to the number of new students enrolled in a year times the average length of attendance in years.

Because secondary and tertiary education provision was more stable, occurring largely at endowed grammar schools and one of England's three universities, it is easier to directly account for enrollment here. According to de Pleijt, there were 786 secondary schools in 1860, with an average enrollment of 47 boys. She assumes that these students attended three years of primary school and 6 years of secondary school.

For tertiary education, Stone (1974) counts 272 B.A.s, 179 M.A.s, and 111 dropouts, weighted with an additional four, seven, and two years respectively. This gives

$$1,276,947 = (\textit{PrimaryEnrollment} * \textit{AveragePrimaryAttendance}) \\ + (36,942 * 8) + (272 * 13) + (179 * 16) + (111 * 11),$$

and

$$973,790 = \textit{PrimaryEnrollment} * \textit{AveragePrimaryAttendance}.$$

Taking primary enrollment as the remainder after subtracting all those whose school careers would continue from total primary enrollment calculated above and solving algebraically for average primary attendance gives

$$\frac{973,790}{206,152} = \textit{AveragePrimaryAttendance} = 4.72.$$

204. West, *Education and Industrial Revolution*, pp. 14-8; Snell, "The Sunday-School Movement in England and Wales: Child Labour, Denominational Control and Working-Class Culture," pp. 101, 125.

de Pleijt’s own procedure would assign two years of attendance to these scholars.²⁰⁵ More likely, literacy rates underestimate the number of primary students enrolled by more than half. Indeed, observing the relatively short period of attendance on average and the relatively large number of students enrolled at any one time, the Newcastle commissioners of 1857 deduced that “almost all the children in the country capable of going to school receive some instruction.”²⁰⁶ As David Mitch notes, however, the more pressing question was how long—and, I would add, when and what school—to attend?²⁰⁷

Overall, the review of the evidence above has identified limitations in the use of signatures to make inferences about the role of human capital in Britain’s industrialisation. Studies to date have identified a dip in literacy around the turn of the nineteenth century, connected to the industrial revolution through geography and occupations, and the bulk of the evidence has tended to lean in this direction. However, when it comes to untangling the various competing causes and their magnitudes, there is reason enough to step back and consider context beyond the parish book.

1.3 Skill

The workplace itself was a site of human capital development. Apprenticeships, either formal or informal, could impart valuable skills to children in exchange for a period of unpaid or discounted work under a skilled tradesperson.²⁰⁸ The extent to which new technologies required such skilled occupations, however, is debated. Many

205. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 314; Pleijt and Weisdorf, “Human Capital Formation from Occupations: The ‘Deskilling Hypothesis’ Revisited,” p. 112.

206. Newcastle Report, vol. 1, summary, qtd. in Smith, *A History of English Elementary Education 1760-1902*, p. 238.

207. Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, p. 207.

208. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, pp. 304-5; Kelly, Mokyr, and O’ Gráda, “Precocious Albion: A New Interpretation of the British Industrial Revolution.”

have agreed with the Hammonds, who characterized technological change as undermining traditional skills through the employment of women and children and saw in the often explosive early industrial action a doomed defense of a disappearing way of life.²⁰⁹ Kevin O'Rourke et al.'s model of endogenous technical change in early industrial Britain suggests that if the initial endowment of unskilled labour is greater than that of skilled labour, technological change will be initially directed to use more unskilled labour because of a market-size effect. Technological change will endogenously become skill-demanding on average in response to rising incomes and an expanding pool of public-good knowledge.²¹⁰ This implies a two-step process in which unskilled-biased growth initially predominates but is eventually replaced by later skill-biased growth.²¹¹ In contrast, historian Joel Mokyr has consistently emphasized the importance of complementarity between empirical know-how embodied in skilled labour and formal knowledge in the production of innovations and public-good knowledge in explaining even the first wave of industrialisation.²¹² Early industrialisation thus presents a puzzle when it comes to explaining where these technological spillovers came from if the economic incentives to produce skill were apparently in retreat.

Evidence on the value of skill comes from variation between and within occupations. Gregory Clark has calculated a long-run skill premium series, the ratio of skilled builders wages to unskilled wages, covering the past eight centuries (1200-2000) whose most salient feature is stasis between 1400 and 1900.²¹³ This finding is remarkable; the skill premium did not respond to dramatic increases in the literacy rate in

209. Hammond and Hammond, *The Skilled Labourer, 1760-1832*, pp. 1-11.

210. Their model also assumes that the quality of innovations in the high-skilled sector and the unskilled sector were initially equal. O'Rourke, Rahman, and Taylor, "Luddites, the Industrial Revolution, and the Demographic Transition," pp. 384-5.

211. *Ibid.*, pp. 394-5.

212. E.g., Joel Mokyr, *The Gifts of Athena* (Princeton, NJ: Princeton UP, 2002), pp. 28-77; Mokyr, *A Culture of Growth*, p. 139.

213. Gregory Clark, "The Condition of the Working Class in England, 1209-2004," *Journal of Political Economy* 113, no. 6 (2005): p. 1309; The same was true of Western Europe as a whole Jan Luiten van Zanden, "The Skill Premium and the 'Great Divergence'," *European Review of Economic History* 13, no. 1 (2009): pp. 129-30.

the early modern period or to changes in the organization of work in the industrial revolution. Interpreting this evidence, however, is somewhat ambiguous, not least because wage-determination is a complex process.²¹⁴ The rationale for using builders' wages for studying the value of skill, apart from their prevalence in surviving written sources, is that this industry, particularly masonry, experienced very little technological change that would affect the productivity of skill within the industry.²¹⁵ Thus, adopting the neoclassical assumption that wages reflect marginal productivity, wage differentials in masonry should only change as a result of the movement of skilled labour between industries. As hypothetical apprentices pursued higher skill premia in more dynamic sectors, for example, the wages of skilled builders who remained might increase due to their diminished supply. This might not be true if labour markets were not competitive. Clark anticipates this point, but points only to the relative weakness of guilds in England to dismiss it.²¹⁶ However, other kinds of labour market failure are possible, an argument historians have made in various forms.²¹⁷ On the other hand, if the supply of skill responded elastically to earnings in the medium- and long-term, the skill premium also may not change, and the market may clear on quantity and not price, as Zeev, Mokyr and van der Beek argue.²¹⁸ Finally, there is also a body of literature that remains skeptical of long-run builders' wage series in general. These authors point out that the primary sources for wage data reflect total wage bills paid to contractors before subtracting their premium for organizing work

214. In contrast to Goldin and Katz, who make a similar argument using data on the rising U.S. skill premium, for instance, Clark does not use data on the supply of skill. See Goldin and Katz, *The Race Between Education and Technology*, p. 97.

215. Arthur L. Bowley, *Wages in the United Kingdom in the Nineteenth Century* (Cambridge: CUP, 1900), p. 59, <https://archive.org/details/wagesinunitedkin00bowl/page/n5/mode/2up>.

216. Clark, "The Condition of the Working Class in England, 1209-2004," p. 1316.

217. Judy Stephenson, Patrick Wallis, and Meredith Paker, "Nominal Wage Patterns, Monopsony, and Labour Market Power in Early Modern England," in *LSE Economic History Working Papers 356* (London: London School of Economics, 2023); Jeffrey G. Williamson, "Did English Factor Markets Fail During the Industrial Revolution?," *Oxford Economic Papers* 39 (1987): 641-678; David R. Green, *From Artisans to Paupers: Economic Change and Poverty in London, 1790-1870* (Aldershot: Scolar Press, 1995), pp. 72-3.

218. Ben Zeev, Mokyr, and Beek, "Flexible Supply of Apprenticeship in the British Industrial Revolution."

and bearing risk, which was unlikely to be constant over so many centuries, and that the types of projects for which records survive were unordinarily complicated and skill-demanding.²¹⁹

At the national level, Alexandra de Pleijt and Jacob Weisdorf observe a substantial decrease in the proportion of male manual labourers following “skilled” occupations between 1550 and 1870. Their decline, however, begins much before the classical industrial revolution, and the effect was largest in parishes with agricultural and mixed economies, moderately felt in commercial and handicraft economies and barely registered in industrial parishes. Their evidence could be consistent with a growing geographical concentration of industry (none of their sampled parishes are in Lancashire, for instance) or the effects of enclosure.²²⁰ Indeed, the same authors estimate a positive effect of more steam engines on the prevalence of highly-skilled mechanics and a negative effect on the prevalence of unskilled labourers in a county circa 1800, using instrumental variables regression.²²¹ Moreover, Feldman and van der Beek identify a robust positive relationship between the number of apprentices, particularly those in highly-skilled and machine trades, and the number of high-quality inventions in time series data covering the eighteenth century.²²² On the other hand, the overall rate of apprenticeship seems to have been declining over the eighteenth and nineteenth centuries.²²³ It is thus plausible that industrialisation demanded skill of a certain kind but was not universally skill-biased.

219. John Hatcher and Judy Z. Stephenson, eds., *Seven Centuries of Unreal Wages: The Unreliable Data, Sources and Methods That Have Been Used for Measuring Standards of Living in the Past* (Palgrave Macmillan, 2018), chs. 2 and 5 in particular.

220. Pleijt, “Human Capital Formation in the Long Run: Evidence for Average Years of Schooling in England, 1300-1900”; for the view that geographic concentration occurred very early, see Keith Sugden, “An Occupational Study to Track the Rise of Adult Male Mule Spinning in Lancashire and Cheshire, 1777-1813,” *Textile History* 48, no. 2 (2017): 160–175.

221. Pleijt, Nuvolari, and Weisdorf, “Human Capital Formation During the First Industrial Revolution: Evidence from the Use of Steam Engines.”

222. Feldman and Beek, “Skill Choice and Skill Complementarity in Eighteenth Century England.”

223. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, pp. 234-9; K. D. M. Snell, *Annals of the Labouring Poor: Social Change and Agrarian England, 1660-1900* (Cambridge: Cambridge University Press, 1985), pp. 228-69.

Variation within an occupation offers additional evidence for the employment of human capital within the work process. David Mitch cites evidence from shoploom weavers in the 1830s showing no wage premium to those who were literate, and a similar pattern held in a dataset of agricultural labourers in the 1860s.²²⁴ In surprising contrast, Clark Nardinelli finds a wage premium to literacy among child labourers in a wide variety of occupations in the 1830s of about 13% after controlling for age and work experience.²²⁵ As Sidney Pollard and others have pointed out, factory discipline was valuable to the early industrialists and scarce among artisans used to controlling their labour input, and it was perhaps this ‘skill’ that schools inculcated more than any other.²²⁶ Additionally, industrial age-wage profiles show significant increases among males even beyond the ages of peak physical strength, and H. M. Boot interprets this as evidence of human capital acquisition through “learning-by-doing.”²²⁷ In contrast, wage increases leveled off among women after about age 14, which Paul Minoletti explains as the result of women’s exclusion from occupations within the factories in which they might exercise authority over male subordinates.²²⁸

One influential effort to reconcile the ambiguous value of skill in general and its strategic importance in developing and implementing innovations holds that it was ‘upper tail’ human capital that mattered.²²⁹ In other words, despite possibly declining

224. Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, p. 21.

225. The coefficient for experience is also positive and significant. Clark Nardinelli, “Corporal Punishment and Children’s Wages in Nineteenth Century Britain,” *Explorations in Economic History* 19, no. 3 (1982): 283–295.

226. Sidney Pollard, *The Genesis of Modern Management: A Study of the Industrial Revolution in Great Britain* (Harmondsworth, 1965); E. P. Thompson, “Time, Work-Discipline, and Industrial Capitalism,” *Past & Present* 38 (1967): 56–97; Stephen A. Marglin, “What Do Bosses Do?: The Origins and Functions of Hierarchy in Capitalist Production,” *Review of Radical Political Economics* 6, no. 2 (1974): pp. 60–112.

227. Boot, “How Skilled Were Lancashire Cotton Factory Workers in 1833.”

228. Paul Minoletti, “The Importance of Gender Ideology and Identity: The Shift to Factory Production and Its Effect on Work and Wages in the English Textile Industries, 1760-1850” (D.Phil Thesis, University of Oxford, 2011), https://ora.ox.ac.uk/objects/uuid:7697b548-d389-4d20-9150-1891ec65c95f/download_file?file_format=pdf&safe_filename=Minoletti_thesis.pdf&type_of_work=Thesis.

229. Joel Mokyr, “Bottom-up or Top-Down? The Origins of the Industrial Revolution,” *Journal of Institutional Economics* 14, no. 6 (2018): 1003–1024, <https://doi.org/10.1017/S174413741700042X>.

demand for skill in most industries, the incentives facing a relatively small group of elite artisans and entrepreneurs—quintessential among whom were perhaps Boulton and Watt—could supply the sufficient conditions for the first industrial revolution.²³⁰ Mokyr, in a recent article published with Kelly and O’Grada, has since qualified this claim somewhat, arguing that differences in the average endowment of skill in fact do matter, if only because this implies a denser distribution of ‘upper tail’ human capital.²³¹ Nonetheless, this abstract discussion begs a very concrete question: what, if anything, set innovators apart? In a recent prosopographical study, Meisenzahl and Mokyr describe the background and human capital attainments of 759 ‘tinkerers’—people responsible for a minor innovation—who all seem remarkably ordinary. Indeed, of those born before 1800, only 16 percent of ‘tinkerers’ in textiles served an apprenticeship, 4 per cent reported attending school, and 1 per cent attended university.²³² It is unlikely that these tinkerers were so much less likely to attend school than the general population; rather, their biographers did not think their schooling worth mentioning or it was never recorded. Additionally, the entire sample is no more likely to have completed an apprenticeship than the boys in Jane Humphries’s sample of working-class autobiographers in the same period.²³³

Allowing that mechanical skills imparted through apprenticeship were important, as they undoubtedly were, from a life-course perspective this form of human capital accumulation seems incomplete. Most apprenticeship contracts began around age 14 or 16, which in the life-course model of human capital accumulation would be a very inefficient allocation if complementary skills were not also developed in earlier

230. Jacob, *The First Knowledge Economy: Human Capital and the European Economy, 1750-1850*, pp. 25-32; Mokyr, *A Culture of Growth*, p. 282; Sean Bottomley, “The Returns to Invention During the British Industrial Revolution,” *Economic History Review* 72, no. 2 (2019): 510–530.

231. Morgan Kelly, Joel Mokyr, and Cormac O’ Grada, “The Mechanics of the Industrial Revolution,” *Journal of Political Economy* 131, no. 1 (2023): p. 84.

232. Ralf Meisenzahl and Joel Mokyr, “The Rate and Direction of Invention in the British Industrial Revolution: Incentives and Institutions,” in *NBER Working Paper No. 16993* (Cambridge, Mass.: National Bureau of Economic Research, 2011), p. 458, <http://www.nber.org/papers/w16993>.

233. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, pp. 234-9.

life.²³⁴ More concretely, apprenticeship involved remarkably little active instruction and instead relied on careful observation, imitation, and initiative on the apprentice's part; as Patrick Wallis pithily puts it, 'Apprenticeship was more of a chance to learn, rather than to be taught.'²³⁵ Whether that learning would be successful or not surely depended on the set of skills and capabilities the apprentice had developed earlier in the life-course.

1.4 Conclusion

Of all these forms of human capital accumulation, paradoxically, that which has received the least attention in the reviewed literature is early childhood education, at the very beginning of the life-course. This is out of proportion to the amount of attention given to this period in contemporary human capital theory, in which early childhood is understood as a sensitive period for the accumulation of foundational skills that feed into later learning.²³⁶ Hence this thesis advances an argument that is squarely focused on human capital accumulation during early childhood, particularly in response to the changing incentives and constraints imposed by industrialisation. In particular, I argue that the early expansion in Britain of secondary industries employing women and children altered the setting of childcare for young children in working families. The offer of industrial work to married women and elder siblings who would have otherwise provided care at home raised the demand for extra-familial childcare, which the dame schools provided jointly with elementary education. I demonstrate that this shift inadvertently aligned schooling with a biological 'sensitive period' for learning and human capital accumulation at a time when the customary school enrolment age was late and irregular.

234. Cunha and Heckman, "The Technology of Skill Formation."

235. Wallis also makes use of a life-course perspective but does not consider early childhood Patrick Wallis, "Between Apprenticeship and Skill: Acquiring Knowledge Outside the Academy in Early Modern England," *Science in Context* 32, no. 2 (2019): p. 161 and passim.

236. Almond and Currie, "Human Capital Development Before Age Five."

In chapter two, I explore theoretical conditions under which an earlier school-entry age would lead to higher levels of human capital. This would be the case if children formerly attended school relatively late and households underestimated the complementarity of human capital investment across the life-cycle. I also demonstrate why higher earnings for women and children would be associated with an earlier demand for child care.

Chapter three develops an intellectual history of the idea of complementarity in education, in line with the conditions established by the model developed in the earlier chapter. In particular, I argue that prevailing theories of learning did not emphasize any strict relation between educational sequence and biological age until around the turn of the nineteenth century. Then, I show that these ideas were slow to diffuse more widely. Additionally, I present evidence that the customary school-entry age was poorly defined (high variance), perhaps indicating a lack of consensus, but generally fell sometime around nine years old.

In chapter four, I present a detailed study of education in London from the late eighteenth century using archival and published primary sources. Over this period, poor children in London were becoming literate at progressively younger ages. Using quantitative data from registers of children taken into the care of London parishes, I show that between roughly 1760 and 1830 the average age at which children in this group learned to read declined by almost two years. Drawing on the a theoretical model developed in chapter two, I argue that this trend was related to a declining gender-wage gap in London over this period. In effect, schools substituted for working women's care. Next, using a parish that had not yet constructed a workhouse and therefore sent all children to be cared for privately, I show that (1) children in this setting learned to read and (2) those who began learning to read between the ages of four and six learned 1.7 years faster than those who began aged seven to nine. This evidence agrees with contemporary findings of developmental 'sensitive periods'

for learning and demonstrates that a favourable redistribution of learning over the life-course could compensate for shorter educational duration.

Chapter five is an analysis of the quality of early childhood education in this period and contains an estimate of the growth of early-childhood enrollment circa 1835. I present evidence that private schools supplied the majority of school places for children of this age-group and argue this was because they responded flexibly to demand for care and their instructional methods provided a more reliable signal of care quality than other schools.

Chapter six adopts a more conventional quantitative analysis of census data from 1851 to argue two things. First, using geographical endowments as instrumental variables, I demonstrate that the presence of industries known to employ large numbers of married women and children (i.e., elder siblings) led to an increase in the proportion of five-year-old children at school, consistent with schools substituting for household care during early childhood. Second, I demonstrate that early education was strongly associated at the regional level with skilled industrial work, Sunday schools, and indicators of social cohesion, such as lower and declining rates of illegitimacy. While researchers usually argue that Britain's human capital accumulation stalled during the first wave of industrialisation, I argue instead that the input mix changed in favour of early education, which should be considered as part of a complementary set of institutions that supported learning over the life-course throughout the industrial revolution.

Chapter seven concludes with the 1876 Elementary Education Act, which effectively ended the system of early childhood education provided by the dame schools by making education compulsory at 'certified efficient' schools. I also use this occasion to make international comparisons, as Britain's chosen compulsory school-entry age of five was below any comparable state and reflected the experience of early education in the previous century.

Chapter 2

Block play: a model of human capital in early childhood

The foregoing discussion of literacy, school, and skill has left the theory of human capital investment somewhat aside. Implicitly, the discussion assumes that increases in these observable inputs will produce greater outputs. For instance, school or apprenticeship is expected to improve individuals' efficiency at performing tasks or the complexity of tasks they are capable of, which is subsequently valued on the labour market. Yet for such a theory to be consistent with the process of human learning, I have argued that it is also important to consider the sequence in which those inputs occur.

This line of reasoning follows a model developed by Flavio Cunha and James Heckman to describe two key features of human capital development: (1) 'self-productivity' and (2) 'dynamic complementarity' between different life-course stages of human capital accumulation. These features are closely related, attempting to formalise their observation that 'on average, the later remediation is given to a disadvantaged child, the less effective it is.'¹ In this context, 'self-productivity' reflects the notion that human capital acquired in an earlier stage raises human capital in later stages of development directly; i.e., early investments persist and skills are 'cross fertilizing.'² If a

1. Cunha and Heckman, "The Technology of Skill Formation," pp. 33-4.

2. Ibid., p. 35.

particular skill or capacity is especially sensitive to improvement in an earlier period, this skill may nonetheless contribute to entirely different skills that are more readily acquired in later periods. To illustrate, Cunha and Heckman cite research finding that ‘emotional security’ encourages children to explore their environments, presumably because they are better able to cope with anxieties arising from the unknown, and this feeds into ‘more vigorous learning of cognitive skills’ later on.³ Secondly, ‘dynamic complementary’ reflects the notion that earlier investments increase the subsequent efficacy of later investments. For example, those enjoying relatively enriched early environments will reap greater returns from follow-up investments than those who did not enjoy the same high-quality early childhood environment. On the other hand, this same principle of complementarity implies that high early childhood investment must be followed-up with complementarily high investment at a later stage in order to be reap the full benefit.⁴ Cunha and Heckman operationalize these features by proposing a two-period constant elasticity of substitution (CES) function model of human capital investment.

The Cunha-Heckman model is flexible enough to accommodate a wide range of

3. Cunha and Heckman, “The Technology of Skill Formation,” p. 35.

4. The difference between these two principles can be understood in terms of stocks and flows. With “self-productivity,” the stock of human capital in earlier periods has a direct effect on the stock of human capital in later periods. With “dynamic complementarity,” the stock of human capital in earlier periods also has a multiplier effect on the flow of investment in later periods.

Mathematically, that is, they describe the stock of human capital in each period (θ_{t+1}) as a function of fixed parental characteristics (h), stocks of human capital in the previous period (θ_t), and investment flows in the previous period (I_t),

$$\theta_{t+1} = f_t(h, \theta_t, I_t).$$

The concept of “self-productivity” therefore implies that the partial derivative of human capital with respect to past stocks of human capital is positive,

$$\frac{\partial f_t(h, \theta_t, I_t)}{\partial \theta_t} > 0,$$

while the concept of “dynamic complementarity” implies that the cross-derivative is also positive,

$$\frac{\partial^2 f_t(h, \theta_t, I_t)}{\partial \theta_t \partial I_t'} > 0.$$

See *ibid.*, p. 36

investments, from formal schooling to informal socialization in the household, and this should be borne in mind. However, since my attention is primarily on early childhood education in schools, I discuss the model in terms of schooling. I propose a simple version of their model in which human capital is produced according to

$$f(s_0, s_1) = [\alpha s_0^\sigma + (1 - \alpha) s_1^\sigma]^{\frac{1}{\sigma}}, \quad (2.1)$$

where α is a parameter capturing the weight of early childhood education in producing final outcomes, $0 \leq \alpha \leq 1$, s_0 is early childhood education, s_1 is later education, and $\frac{1}{1-\sigma}$ is the elasticity of substitution between early and late education, with $\sigma \leq 1$. Lower values of σ produce greater complementarity in the model. To illustrate the importance of complementarity, figure 2.1 depicts a level curve for equation (2.1) at three different values of σ , with $\alpha = 0.25$. The relatively low productivity of early childhood education in this example (low α) causes the curve to bend towards the y-axis when σ is relatively high (i.e., low complementarity), but as σ decreases, the curve becomes increasingly parallel about the $x = y$ line, and the low weight given to early education becomes increasingly irrelevant. Moreover, as σ decreases, the curve increasingly approximates a right angle. When early and late education are strong complements (low σ) therefore, they must increase in equal stride to increase overall human capital, and the lesser factor will increasingly limit the efficacy of the greater. This implies that with greater complementarity, it will be increasingly optimal to invest in early and late periods in equal proportion.

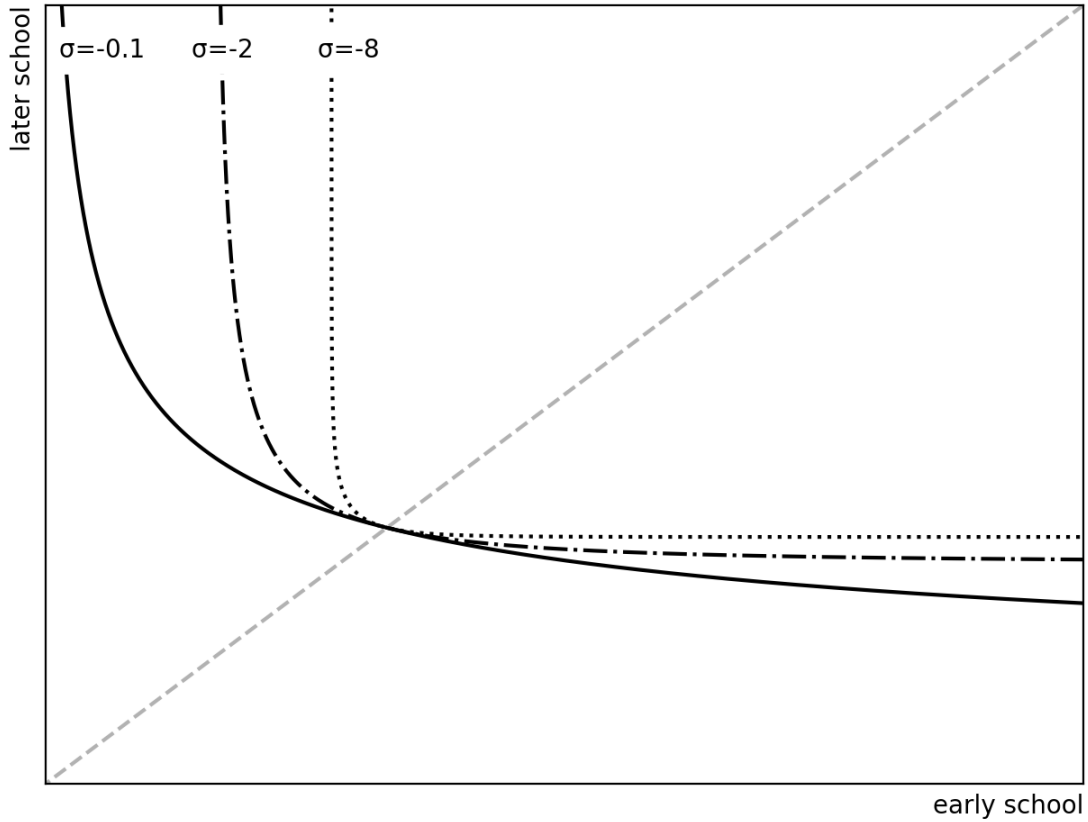
This is demonstrated more formally by maximizing (2.1) subject to a budget constraint

$$x = p_0 s_0 + p_1 s_1, \quad (2.2)$$

where x is expenditure, p_0 is the price of early education, and p_1 is the price of later education. From the first-order conditions,

$$-\frac{p_0}{p_1} = -\frac{\alpha}{1 - \alpha} \left(\frac{x_0}{x_1} \right)^{\sigma-1},$$

Figure 2.1: Visualizing complementarity in human capital investment



which gives the optimal ratio of early to late school when rearranged,

$$\frac{x_0^*}{x_1^*} = \left(\frac{p_0(1-\alpha)}{p_1\alpha} \right)^{\frac{1}{\sigma-1}}. \quad (2.3)$$

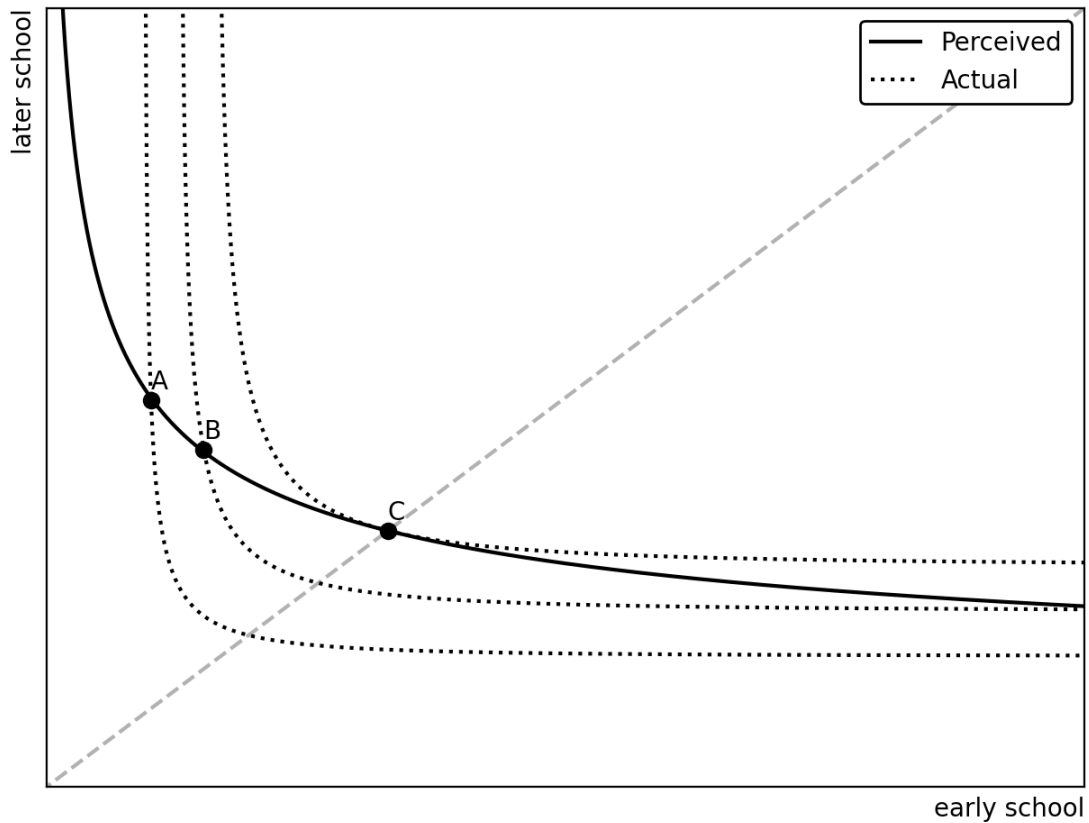
As σ approaches $-\infty$ in (2.3), this ratio is equal to one in the limit. Therefore, in the model, greater complementarity produces an optimal strategy that increasingly favours investment in early and late education in equal measure.⁵

2.1 The mistaken complementarity effect

I extend the Cunha-Heckman model to predict the effect of households underestimating the amount of complementarity between early and late school, which I call

⁵ Cunha and Heckman develop a similar model incorporating credit and an overlapping generations framework and reach a similar conclusion. See Cunha et al., “Interpreting the Evidence on Life Cycle Skill Formation,” and the online appendix.

Figure 2.2: The “mistaken complementarity” effect



the “mistaken complementarity” effect. Historians have advanced the argument, in various forms, that prior to the eighteenth century, childhood was not given special consideration as a phase of the life-course requiring any different or separate treatment across a range of social domains, including school.⁶ I do not take so extreme a position, which in terms of the model would suggest that early and late education were viewed as perfect substitutes. I make the less stringent argument that parents merely underestimated the degree of complementarity between early and late education.⁷

6. Lloyd deMause, “The Evolution of Childhood,” in *The History of Childhood*, ed. Lloyd deMause (London: Souvenir Press, 1980), pp. 51-3; Lawrence Stone, *The Family, Sex and Marriage in England 1500-1800* (London: Weidenfeld / Nicolson, 1977), pp. 6-7, 105-14, 174-8; Tilly and Scott, *Women, Work, and Family*, p. 58.

7. There is contemporary evidence suggesting parents still do this. See John A. List, Julie Pernaudet, and Dana Suskind, “It All Starts with Beliefs: Addressing the Roots of Educational Inequities by Shifting Parental Beliefs,” in *University of Chicago Working Papers*, vol. 2021-127 (Chicago, IL: University of Chicago, 2021).

The “mistaken complementarity” effect is depicted visually in figure 2.2. Consider first the “perceived” curve on its own. Assume parents impart a fixed level of human capital to their children, and households face a “perceived” trade-off between early and late school and a set of costs in so doing. The notion of a fixed level of human capital is analytically useful to isolate the effect of substituting early school for later school or vice versa, but it is also plausible to imagine a family wanting their child to learn some fixed ability, say reading, and forming judgements about the relative productivity of early and late school in doing so (the “perceived” trade-off). Indeed, this is how Madoc-Jones has characterised parental schooling decisions in this period, observing, ‘when a child had reached the minimum level of accomplishment in the three Rs thought desirable by the parents, then the time had arrived for the termination of schooling, regardless of the child’s age.’⁸ Cost-minimizing parents would buy the least-costly combination of early and late school, given prevailing prices, which may include various opportunity costs, that led to their desired outcome. For instance, if later school were relatively cheap, households would choose a combination like point A, which combines more later school with less early school to produce the fixed educational outcome. If early school were to become less costly, households would move to combinations represented by points B or C instead.

However, in the model, the “perceived” trade-off is not the same as the “actual” trade-off because households underestimated the degree of complementarity between early and late school. Thus a household at point A, believing its chosen combination of early and late school will produce their desired outcome, will in fact be facing the “actual” trade-off represented by the dotted curve intersecting point A. They may find that the combination of early and late school they have chosen on the “perceived” curve represents a lower level of human capital on the “actual” curve; i.e., they may find that their child performs worse than expected, or struggles to

8. Madoc-Jones, “Patterns of Attendance and Their Social Significance: Mitcham National School, 1830-39,” p. 51.

learn. Suppose now that early school becomes relatively less costly. The household will target the same fixed outcome but will shift from a combination of early and late school represented by point A to one more like point B. Although they have not left the “perceived” curve, still thinking they have selected a combination giving the same set amount of human capital, they will now be on a new, higher “actual” curve (the curve shifts outward), and the same is true of a move from B to C. However, increases in early school along the “perceived” curve beyond point C (where early school is equal to later school) will again decrease the level of “actual” human capital. In general, the “mistaken complementarity” effect predicts that substituting early for late school along a “perceived” human capital curve will increase human capital as long as households underestimate the amount of complementarity and are initially combining more late school and less early school before the substitution.

To demonstrate formally, consider that the “actual” production function of human capital, as in (2.1), takes a CES functional form

$$f(s'_0, s'_1) = [\alpha s'^{\sigma}_0 + (1 - \alpha) s'^{\sigma}_1]^{\frac{1}{\sigma}}, \quad (2.4)$$

while the “perceived” production function is

$$g(s_0, s_1) = [\alpha s_0^{\phi} + (1 - \alpha) s_1^{\phi}]^{\frac{1}{\phi}}, \quad (2.5)$$

and $\sigma \neq \phi$. In other words, households do not accurately perceive the degree of complementarity between early and late school. The “actual” value of human capital will then be a function of the variables chosen in the “perceived” human capital curve

$$f(s_0, s_1). \quad (2.6)$$

Take the total derivative of (2.6) with respect to s_0 ,

$$\frac{df}{ds_0} = f_1(s_0, s_1) \frac{\partial s_0}{\partial s_0} + f_2(s_0, s_1) \frac{\partial s_1}{\partial s_0}, \quad (2.7)$$

where $\partial s_1/\partial s_0$ is the trade-off between late and early school along the “perceived” human capital curve. Effectively this breaks down the change in “actual” human capital into that part contributed by early education and that part contributed by the substitution of later school for early school according to the “perceived” human capital function. Substituting values from (2.4) and (2.5) into (2.7) yields

$$\frac{df}{ds_0} = \zeta s_0^{\sigma-1} - \zeta s_1^{\sigma-1} \left(\frac{s_0}{s_1}\right)^{\phi-1}, \quad (2.8)$$

where

$$\zeta = \alpha \left[\alpha s_0^\sigma + (1 - \alpha) s_1^\sigma \right]^{\frac{1}{\sigma}-1}.$$

Because $\zeta \geq 0$ by construction, as long as $\zeta \neq 0$, (2.8) will be positive if

$$s_0^{\sigma-1} > s_1^{\sigma-1} \left(\frac{s_0}{s_1}\right)^{\phi-1},$$

which can be simplified to

$$s_0^{\sigma-\phi} > s_1^{\sigma-\phi}.$$

Taking the log yields the following condition under which the “mistaken complementarity” effect will be positive

$$(\sigma - \phi) \ln(s_0) > (\sigma - \phi) \ln(s_1). \quad (2.9)$$

Now consider the case where households underestimate the complementarity of early and late school (i.e., $\sigma < \phi$). In that case, $\sigma - \phi < 0$, and because of the multiplication property of inequalities, (2.9) will be true if $s_0 < s_1$. This case agrees with the intuition presented in figure 2.2. To reiterate, then, the “mistaken complementarity” effect on human capital will be positive so long as: (1) households underestimate the degree of complementarity ($\sigma < \phi$) and (2) are initially using more late school than early school ($s_0 < s_1$).

Under these two assumptions, therefore, increases in early school relative to later school will, according to the model, lead to more human capital accumulation. As

noted, the first assumption is derived from the historical thesis that childhood was undifferentiated as a phase of human development in early modern Europe.⁹ An assessment of this claim and its intellectual history is taken up in the next chapter. While I do not go as far as Ariès to claim the ‘idea of childhood did not exist’, I do argue that people did not generally believe that age had a significant bearing on the educational process until relatively late in the nineteenth century.¹⁰

The second assumption, i.e., that delayed school enrolment was relatively common in the past, I argue, essentially follows from the first. Without a strong belief in how the educational sequence should follow biological age, rather more idiosyncratic beliefs or motivations determined when children entered school. Honora Edgeworth assessed that prevailing educational theories ‘were as contradictory and capricious as the diversity of Tastes and the wildness of imagination could invent’.¹¹ Particularly for upper-class families, children may have been withheld from school to maintain stricter control over their socialization at home, and certainly, eighteenth-century diarists expressed a variety of ideological reasons for maintaining young children at home to be cared for by their mothers.¹² Parents may have taken pleasure or found purpose in caring for their children, delaying the painful moment of separation.¹³ Less careful parents may have simply lost track of their children’s age.¹⁴ One explanation that I consider in more detail below is that there were economies of scale in caring for children at home so that siblings of different ages tended to be maintained at home or sent away to school in groups. The overall impression from the documentary

9. Aries, *Centuries of Childhood: A Social History of Family Life*, p. 190.

10. *Ibid.*, pp. 39, 128.

11. M.S. draft of letter from R.L. Edgeworth to the *Gentleman’s Magazine*, n.d., qtd. in Sophia Woodley, “‘Oh Miserable and Most Ruinous Measure’: The Debate Between Private and Public Education in Britain, 1760-1800,” in *Educating the Child in Enlightenment Britain: Beliefs, Cultures, Practices*, ed. Mary Hilton and Jill Shefrin (Farnham, Surrey: Ashgate, 2009), p. 31-5.

12. Michèle Cohen, “The Pedagogy of Conversation in the Home: ”familiar Conversation” as a Pedagogical Tool in Eighteenth and Nineteenth-Century England,” *Oxford Review of Education* 41, no. 4 (2015): 447–463; Stone, *The Family, Sex and Marriage in England 1500-1800*, p. 408.

13. Stone, *The Family, Sex and Marriage in England 1500-1800*, pp. 449-50.

14. Brian A’Hearn, Dorothee Crayen, and Jörg Baten, “Quantifying Quantitative Literacy: Age Heaping and the History of Human Capital,” *Journal of Economic History* 69, no. 3 (2009): p. 766.

evidence is of tremendous variation in age of enrolment. On the other hand, where material constraints were binding, I argue more uniform behaviour tended to follow. It was commonly alleged that very young children were at school because working families used these institutions as a form of child care.¹⁵ Where these needs pressed, they trumped notions about the ‘proper’ age to enrol. To put it formally, children’s enrolment age was

$$\min(a_i, a_c), \tag{2.10}$$

or the lesser of the ‘idiosyncratic’ enrolment age, a_i , and the age at which the demand for child care first arose, a_c . What follows is an account of how the relative costs of school changed in favour of early enrolment for working families, corresponding to an increase of s_0 in the model.

2.2 The logic of early enrolment

I argue that the cost of child care rose and fell throughout a typical household’s life-cycle, and women’s labour (and sometimes children’s) was engaged and withdrawn as a short-run response to balance the household’s desire for both income and child care. These conflicting aims were particularly acute when children were young, as they could not be left on their own without risking serious harm.¹⁶ I focus on the short run to accord with historians’ understanding of married women’s labour force participation as ‘irregular,’ ‘complex,’ ‘opportunistic,’ and ‘fragmented,’ in response to short-term fluctuations in costs related to child rearing, to which historians have also attributed children’s erratic school attendance.¹⁷ When members of the household

15. Jonathan Rose, *The Intellectual Life of the British Working Classes* (New Haven: Yale UP, 2002), p. 151; Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, p. 142.

16. Barbara Hanawalt, “Childrearing Among the Lower Classes of Late Medieval England,” *The Journal of Interdisciplinary History* 8, no. 1 (1977): pp. 17-8.

17. Tilly and Scott, *Women, Work, and Family*, p. 50-1; Sara Horrell and Jane Humphries, “Women’s Labour Force Participation and the Transition to the Male-Breadwinner Family, 1790-1865,” *Economic History Review* 48, no. 1 (1995): p. 97; Katrina Honeyman and Jordan Goodman, “Women’s Work, Gender Conflict, and Labour Markets in Europe, 1500-1900,” *Economic History*

responsible for caring for young children went to work, those children were placed in care outside the home, usually at school, although education may not have been the primary objective. Throughout, I describe the model using mathematical language accompanied by a more intuitive explanation of its key behavioural assumptions and predictions, and I aim for simplicity and parsimony.¹⁸

First consider a household’s decision-making at a given moment in time. I assume that households derive benefit from market income directly and the care their children receive

$$U = g(y, c), \tag{2.11}$$

where U represents the utility of the entire household, shared as a public good among members, g is concave, y is market income, and c is best conceived of as a subjective judgment about the worth of child care.

In each household, there is a carer whose time endowment is 1, which is split between caring for children at home, t_c , and waged labour, t_w ,

$$1 = t_c + t_w.$$

For any time a carer spends working, fees for private care must be paid, f , which subtract from the household’s market income

$$y = wt_w - ft_w + Y_{hh}. \tag{2.12}$$

In general, fees will increase with the number of children in the household, who must each pay fees for private care. At any given moment, however, the number of children is fixed, so the fees will likewise be considered fixed for now. Y_{hh} represents the market income of other members of the household.

Review 48, no. 1 (1991): p. 616; Madoc-Jones, “Patterns of Attendance and Their Social Significance: Mitcham National School, 1830-39,” pp. 52-3.

18. For more general models yielding very similar conclusions, see David M. Blau and Philip K. Robins, “Child-care Costs and Family Labor Supply,” *The Review of Economics and Statistics* 70, no. 3 (1988): 374–381, <https://doi.org/10.2307/1926774>; Jeremy Greenwood, Nezih Guner, and Guillaume Vandenbroucke, “Family Economics Writ Large,” *Journal of Economic Literature* 55, no. 4 (2017): pp. 1347-53.

Finally, relying on private care introduces principal-agent risks. Hired carers may care for or neglect children, and monitoring their behaviour is costly.¹⁹ Parents were alive to these risks. For instance, when a young Francis Place was sent out to be nursed after recovering from a fever to Wimbledon, where the air was presumably more sanitary, his father would make the long walk from London to check in on him, unannounced ‘that he might not be deceived by false appearances’.²⁰ Thus

$$c = q_c t_c + q_w t_w, \tag{2.13}$$

where q_c represents the probability that children will not be neglected at home and q_w represents the probability that children will not be neglected outside the home. Although principal-agent risks may arise in home-provided care as well, I generally assume that these risks are greater in market-provided care, $q_w < q_c$. In practice, such market-provided care was commonly provided in small schools, which perhaps met in the garret of a working-class home under the watch of a ‘dame’.²¹ This model assumes that demand for this kind of education arose primarily as a substitute for child-care provided at home, a view that was commonly advanced by contemporaries²². Indeed, Joseph Gutteridge described his school-dame as ‘motherly’.²³ However, as I discuss in more detail in chapter five, I propose that principal-agent risks also explain why child-care demand was satisfied by ‘dame schools’, an institution that provided both care and elementary education jointly, if reading ability served as a signal that children were not being neglected under the dame’s care.

19. For a general discussion of principal-agent risks, see Jean Ensminger, “Reputations, Trust, and the Principal Agent Problem,” in *Trust in Society*, ed. Karen S. Cook (New York: Russell Sage Foundation, 2001), pp. . 185–201.

20. Francis Place, *The Autobiography of Francis Place*, ed. Mary Thale (Cambridge: Cambridge University Press, 1972), p. 28.

21. Gardner, *The Lost Elementary Schools of Victorian England*, p. 107.

22. Joyce Burnette, *Gender, Work and Wages in Industrial Revolution Britain* (Cambridge: Cambridge University Press, 2008), p. 178.

23. Adams Anthony, ed., *Master & Artisan in Victorian England* (London: Evelyn, Adams & Mackay, 1969), p. 84.

I refer to ‘carers.’ Although in many cases, these were mothers, other household members may have played a similar role. I assume, however, that only one person looked after the younger children at any one time. By analogy to the theory of comparative advantage in international trade, Gary Becker argues that members of a household will specialize in the activity in which they are relatively more productive, and I adopt a similar assumption.²⁴ Household member i will become the ‘carer’ if their comparative advantage in care is greater than member j , and j will then specialize in market work. In terms of the marginal utility of each household member’s time, denoted with a subscript, member i will have a comparative advantage in care if

$$\frac{(\partial g/\partial c)(\partial c/\partial t_{ci})}{(\partial g/\partial c)(\partial c/\partial t_{cj})} > \frac{(\partial g/\partial y)(\partial y/\partial t_{wi})}{(\partial g/\partial y)(\partial y/\partial t_{wj})}, \quad (2.14)$$

where the chain rule has been applied to (2.11). Because utility is shared within the household, the marginal utility of care $\partial g/\partial c$ and market income $\partial g/\partial y$ are equal for all household members and therefore cancel out. In terms of (2.13) and (2.12), with appropriate subscripts, this condition then becomes

$$\frac{q_{ci}}{q_{cj}} > \frac{w_i - f}{w_j - f}. \quad (2.15)$$

To refer to a plausible scenario, perhaps an elder sibling looked after his younger siblings while their mother went to work. Assuming this sibling provided less reliable care than his mother would, (2.15) says that his net wage (after paying fees)—his opportunity cost of care—would have to be proportionally lower for him to nonetheless maintain a comparative advantage. This may have occurred where the mother’s work was particularly skilled or in the early part of the family life-cycle when children’s potential earnings were limited, as Horrell and Humphries find in their studies of household budgets.²⁵

24. Gary S. Becker, *A Treatise on the Family* (Cambridge, Massachusetts: Harvard University Press, 1993), p. 33.

25. Sara Horrell and Jane Humphries, “The Origins and Expansion of the Male Breadwinner

The assumption that only one carer is needed to care for all children at home implies the existence of economies of scale. The cost of home-provided care in the model is the opportunity cost of the carer’s wages, which she may give up to look after all of the children in the household at once. In contrast, market-provided care was generally purchased in exchange for fees paid per child, implying costs that rise in the number of children. This leads to an ‘all-or-nothing’ kind of behaviour in the model, where all children are cared for at home until the benefit of the carer’s market wage exceeds the costs of the children’s care fees. This may seem like an unrealistic assumption, particularly if children need more or less individualised attention depending on their maturity.²⁶ However, all models are simplifications. This assumption provides a rationale for the observation that siblings of varying ages tended to be enrolled in school—and, for that matter, withdrawn—all at once, as Madoc-Jones observed in her study of early nineteenth-century attendance registers and Matthew Arnold reported of his school inspections in the 1850s.²⁷

To evaluate the model further, I adopt a log utility function. The household will then face the following decision

$$\begin{aligned} \max_{t_w, t_c} \quad & U = \alpha \ln(wt_w - ft_w + Y_{hh}) + (1 - \alpha) \ln(q_c t_c + q_w t_w) \\ \text{s.t.} \quad & 1 = t_w + t_c. \end{aligned} \tag{2.16}$$

I further assume that all variables included in (2.16) are non-negative and that net income is also non-negative; i.e., $wt_w - ft_w + Y_{hh} \geq 0$. This problem is solved using the Lagrange multiplier method in the chapter appendix, which yields the following

Family: The Case of Nineteenth-Century Britain,” *International Review of Social History* 42 (1997): pp. 49-50; Horrell and Humphries, “Women’s Labour Force Participation and the Transition to the Male-Breadwinner Family, 1790-1865,” p. 112.

26. Martin Browning, “Children and Household Economic Behaviour,” *Journal of Economic Literature* 30, no. 3 (1992): p. 1456-9, <https://www.jstor.org/stable/2728065>; for an historical example, see Alexandra Shepard, “‘Working Mothers’ in Eighteenth-Century London,” *History Workshop Journal* 96 (2023): p. 12.

27. Madoc-Jones, “Patterns of Attendance and Their Social Significance: Mitcham National School, 1830-39,” p. 52; Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, p. 24.

(interior) solution for the carer's time spent working, which for children means more time in paid care:

$$t_w^* = \frac{\alpha(fq_c - q_cw - q_cY_{hh} + q_wY_{hh}) + Y_{hh}(q_c - q_w)}{(f - w)(q_c - q_w)}. \quad (2.17)$$

Rather intuitively, this suggests that carers will spend more time working if their wages are higher and child-care fees are lower. In general, carers will also spend less time caring where other household income is higher. This agrees with the findings of Horrell and Humphries, who report that women and girls, probably carers, were less likely to participate in market work where the earnings of the male household head were higher.²⁸

However, there are also conditions in which carers will either spend all or none of their time in work (corner solutions). The carer will spend all of her time caring and none of it working, $t_w = 0$, when

$$\alpha q_c(w - f) < Y_{hh}(1 - \alpha)(q_c - q_w). \quad (2.18)$$

This may occur if care fees are higher than the carer's earnings, if the quality of care outside the home is better than what is available inside the home, or if other household earnings are very high. If $w - f \leq 0$, this condition will always hold unless $q_c - q_w \leq 0$ too. In words, this implies that if child care fees are higher than the carer's wage, she will not work unless the quality of care outside of the home (in terms of principal-agent risks) is higher than the care provided in the home, in which case she may work to pursue high-quality care outside the home. This no-work solution may also hold when household income, Y_{hh} , is very high. Conversely, the carer will spend all of her time working and none caring, $t_c = 0$, when

$$\frac{\alpha q_w}{(1 - \alpha)(q_c - q_w)} > 1 + \frac{Y_{hh}}{n}. \quad (2.19)$$

28. Horrell and Humphries, "Women's Labour Force Participation and the Transition to the Male-Breadwinner Family, 1790-1865," pp. 110-2; Horrell and Humphries, "The Exploitation of Little Children": Child Labor and the Family Economy in the Industrial Revolution," pp. 508-9.

This may occur when the carer's wages are high relative to the household income, or when the household's preference for market income and the quality of care available outside the home are relatively high.

The model is only meant to describe how a household would respond to three basic factors in the short run: the carer's own wages, the household head's wages, and the cost of child care. Two of these affect participation intuitively. The carer's participation in waged work will increase if her potential wages are higher and if the fees charged for child care are lower. Less intuitively, lower household income will increase the carer's participation and consequently increase the demand for early childhood care. It does not capture or explain every facet of a family's decision-making. For example, decisions affecting fertility and marriage are left out. Unemployment, the carer's human capital investment, occupational choice or mobility in pursuit of higher wages are not considered, nor is there a market-clearing mechanism for care work. Many of these factors would be relatively fixed in the short run, and their omission is justified by the model's concern with short-term fluctuations associated with child care.

Nonetheless, at this stage, it is possible to grasp what the model implies about the timing of child-care demand. As discussed, the cost of market-provided childcare is assumed to rise in the number of children. Thus the fees facing households should be relatively low early in the life-cycle when few children have been born, rise through the middle of the life-cycle, and decline as children grow older and no longer need care. Assuming carer's potential earnings, w , do not change over that period, this implies a 'U-shaped' path of net carer's earnings.²⁹ As long as households have preferences, earnings, and costs such that (2.18) does not hold across the whole life-cycle, i.e., households purchase some market care, this suggests that households will rely on

29. For evidence of relatively flat age-earnings profiles for women, see Boot, "How Skilled Were Lancashire Cotton Factory Workers in 1833"; Joyce Burnette, "How Skilled Were English Agricultural Labourers in the Early Nineteenth Century?," *Economic History Review* 59, no. 4 (2006): pp. 688-716.

market care for a longer period of the life-cycle where carer’s earnings are higher, all else equal.

To illustrate, figure 2.3 depicts a hypothetical U-shaped path of net earnings ($w - f$) across the life-cycle, with the horizontal dashed-line representing

$$w - f = \frac{Y_{hh}(1 - \alpha)(q_c - q_w)}{\alpha q_w}, \quad (2.20)$$

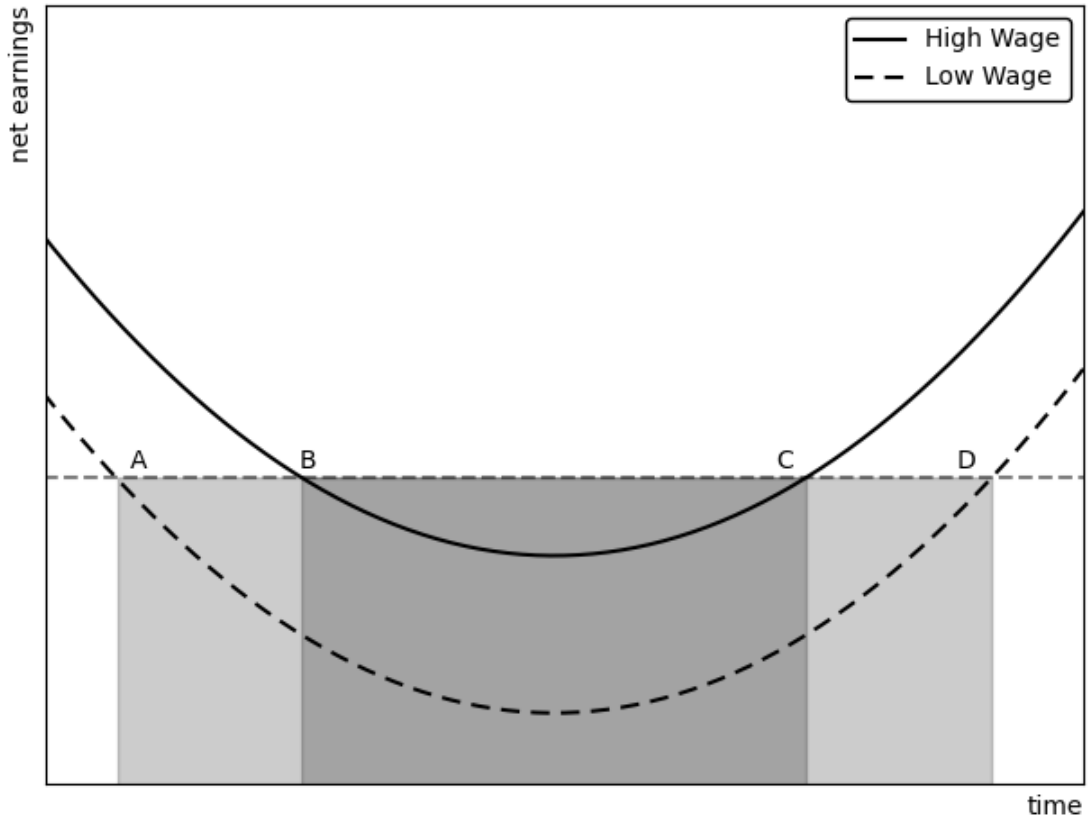
the level of net earnings below which the carer will do not work, derived from (2.18). The figure also depicts a high-wage scenario, where the carer’s potential earnings are high, and a low-wage scenario; these scenarios differ only in the position of the curve on the y-axis because fees are assumed to change across the life-cycle while earnings are fixed. Where the curve drops below the level of net earnings defined in (2.20), the carer will not work and will provide all child care herself. The interval A–D represents the period of the life-cycle in which young children are cared for entirely at home in the low earnings scenario, while in the high-earnings scenario this is represented by the shorter interval B–C. This illustrates the basic logic of the argument—children are placed in child care for a greater part of the life-cycle where carer’s earnings are higher—using the no-work corner solution defined above. Above this threshold, there exist solutions in which carers may work more or less intensively, but for simplicity these are not shown.

In reality, the cost of child care was not the same for every child, it varied with age, and thus total child-care costs did not vary smoothly across the life-cycle. Figure 2.3 should in reality be a lot noisier. For example, young children need more individual attention and care, and this was reflected in the market cost of their care.³⁰ Wet nursing was also valued as a separate service and incurred a higher fee.³¹ For example,

30. Martin Browning argues there are economies of scale in caring for older children, while infants need more individual attention, see Browning, “Children and Household Economic Behaviour,” p. 1456-9.

31. For example, see Pamela Sharpe, *Population and Society in an East Devon Parish: Reproducing Colyton 1540-1840* (Exeter: University of Exeter Press, 2002), pp. 254-6.

Figure 2.3: The path of child care use over the life-cycle



a female “over-looker” in a paper factory in the 1840s paid 3 d. per week to have her three middle children attend school, while her infant was cared for at home at a cost of 1s. 6d. per week.³² In St. Clement Danes, Westminster, Ann Scott noted in her settlement examination of 1791 that she had paid Ann Davis, a 59-year-old widow, 3 s. per week to ‘nurse’ her child aged one year and eight months.³³ In this setting, ‘nurse’ referred to a variety of tasks, including breast-feeding and child-minding, and Alex Shepard reports wages ranging from 2 s. to 4 s. per week for nurses.³⁴ The founding hospital paid its nurses a similar weekly rate.³⁵ Parish nurses in London

32. Burnette, *Gender, Work and Wages in Industrial Revolution Britain*, [p. 179.

33. St. Clement Danes, Pauper Settlement, Vagrancy and Bastardy Exams, *London Lives, 1690-1800*, WCCDEP358020308 (www.londonlives.org, version 2.0, March 2018), Westminster Archives Centre, STC/B/1/3.

34. Shepard, “‘Working Mothers’ in Eighteenth-Century London,” pp. 4, 17.

35. Valerie Fildes, *Wet Nursing: A History from Antiquity to the Present* (Oxford: Wiley-Blackwell, 1988), pp. 176-80.

were statutorily entitled to at least 2s. per week and received an additional 6d. per week for nursing children younger than six years old. They were paid a bonus of 10s. for nursing infants aged less than 9 months, while the parish of St. James in Westminster offered an additional 6d. per week to wet-nurses.³⁶ Children of about three years old and up, however, could usually find a place in a dame school for 3 d. to 4 d. per week, or as much as 6 d. in Westminster.³⁷ After a while, children grew old enough to be left without parental supervision during the day or to go into work. Autobiographers commonly juxtaposed ‘street’ children with ‘school’ children, recalling a perennial image of dislocation from family life for older children.³⁸ At this point, their care was no longer part of the opportunity cost of the carer’s time spent in work. Total fees charged therefore depended on both the number of children and their age at any given moment. As suggested above, the presence of an infant in the household could significantly increase the market cost of child care. Households therefore likely faced fairly sharp short-run fluctuations in the costs of child-care over the life-cycle on top of the more general U-shaped pattern.

I argue it was households’ varied responses to these short-term challenges of child-rearing that affected whether some children entered school in early childhood. For an individual child, their entry into school will have depended on where they fell in this flux. To attempt to illustrate how these different effects may have combined in practice to affect an average child’s experience, I perform a rough accounting exercise to consider how the model behaves when applied to different demographic types and labour markets.

36. Dorothy George, *London Life in the Eighteenth Century* (London: London School of Economics, 1951), p. 47.

37. *First Report of a Committee of the Statistical Society of London on the State of Education in Westminster* (London: Charles Knight, 1837), pp. 13, 57; Education Committee, “Report of the Education Committee of the Statistical Society of London on the Borough of Finsbury,” *Journal of the Statistical Society of London* 6, no. 1 (1843): p. 37, <https://www.jstor.org/stable/2338010>.

38. Thomas Cooper, *The Life of Thomas Cooper*, ed. John Saville (Leicester: Leicester UP, 1971), p. 73; Will Thorne, *My Life’s Battles* (London: George Newnes, 1925), p. 19; Thomas Carter, *Memoirs of a Working Man* (London: Charles Knight, 1845), p. 22; see also discussion in Karen Wells, *Childhood in a Global Perspective*, 3rd (London: Polity, 2021), pp. 60-2.

2.3 Patterns of child-care demand

To capture different demographic experiences, I adopt two of the ‘model’ families described by Eric Schneider in a similar simulation exercise.³⁹ Schneider’s first family is large, with nine surviving children and a birth interval of 30 months.⁴⁰ The second family consists of six children, three of whom die in infancy. The first-born child survives to age two, while the fourth and sixth children perish before their first birthdays.⁴¹ After an infant death, Schneider shortens the birth interval to 24 months, and I do the same.⁴² Although these are not real families and are in fact somewhat extreme examples for illustrative purposes, I refer to the first family as ‘rural,’ and the second family as ‘urban’ in reference to the contrasting demographic experience of city and country in the eighteenth century.⁴³

I then consider these two demographic types under different labour market conditions. I call the large ‘rural’ family ‘agrarian’ if the carer’s wages are relatively low and ‘craft’ if they are relatively high. This is to reflect married women’s shrinking wages and opportunities in the agrarian southeast at the turn of the century and women’s comparably high contribution to family budgets in rural handicrafts.⁴⁴ To choose an appropriate wage for married women is complicated by the fact that their

39. These are families ‘A’ and ‘B’, see Eric B. Schneider, “Real Wages and the Family: Adjusting Real Wages to Changing Demography in Pre-Modern England,” *Explorations in Economic History* 50, no. 1 (2013): 99–115.

40. In fact, he assumes that birth intervals follow a log-normal distribution with a mean of 30.8 months and pulls from the distribution as a random draw. I simply assume a deterministic birth interval of 30 months.

41. Schneider, “Real Wages and the Family: Adjusting Real Wages to Changing Demography in Pre-Modern England,” p. 105.

42. *Ibid.*, p. 103.

43. E. A. Wrigley et al., *English Population History from Family Reconstitution 1580-1837* (Cambridge: CUP, 1997), p. 428; Barry Reay, *Microhistories: Demography, Society, and Culture in Rural England, 1800-1930* (Cambridge: Cambridge University Press, 1996), p. 62.

44. Horrell and Humphries, “Women’s Labour Force Participation and the Transition to the Male-Breadwinner Family, 1790-1865,” p. 101, 107; Maxine Berg, “What Difference Did Women’s Work Make to the Industrial Revolution?,” *History Workshop* 35 (1993): pp. 31-3; Nigel Goose, ed., “The Straw Plait and Hat Trades in Nineteenth-Century Hertfordshire,” in *Women’s Work in Industrial England: Regional and Local Perspectives* (Hatfield: Local Population Studies, 2007), p. 117; Snell, *Annals of the Labouring Poor: Social Change and Agrarian England, 1660-1900*, pp. 15-66.

number of days worked for a wage varied, and married women who worked few days may have done so to perform, for instance, care work. The yearly income estimates that historians have generally used to assess family welfare will therefore not reflect the opportunity cost of caring for children at home, having already accounted for it through the number of days worked.⁴⁵ However, married women's participation and wages may also have suffered a 'marriage penalty' due to structural unemployment and various market frictions, or discrimination, which would have held whenever married women sought work outside the home and would therefore be part of the opportunity cost of care.⁴⁶ I adopt the imperfect solution of quoting day rates paid to married women (or weekly rates divided by 6). I adopt the 1830s as a benchmark, representing a period after the Napoleonic demobilization and 1825 banking crisis and before the 'hungry forties' for which I have been able to find reasonable figures of married women's wages in a variety of settings.⁴⁷

For women's 'agrarian' wages, I use Humphries and Weisdorf's estimates of casual day rates paid to women in the 1830s.⁴⁸ The straw-plait industry, which grew up throughout Bedfordshire and Hertfordshire at the end of the eighteenth century, is my representative of rural handicrafts. Nigel Goose estimates wages in this industry to have been, remarkably, between eight and ten shillings per week in the 1830s.⁴⁹ Good accounts of women's urban wages come from Henry Mayhew's reporting on the London poor in the 1840s, from which I take the sewing wages of a saw-seller's wife

45. See, for instance, the discussion in Sara Horrell, Jane Humphries, and Jacob Weisdorf, "Family Standards of Living Over the Long Run, England 1280-1850," *Past & Present* 250 (2021): pp. 120-8, <https://doi.org/10.1093/pasj/gtaa005>.

46. Deborah Valenze argues married women were held to 'a nonproductive domestic identity ... especially in the area of child rearing. Working class women ... would find this model irrelevant, if not an obstruction to their efforts to provide for themselves and their families'; see Deborah Valenze, *The First Industrial Woman* (Oxford: Oxford University Press, 1995), p. 185; Tilly and Scott, *Women, Work, and Family*, p. 124-5.

47. Nicholas Dimsdale and Ryland Thomas, *UK Business and Financial Cycles Since 1660*, vol. 1 (Palgrave Macmillan, 2019), ch. 6.

48. Jane Humphries and Jacob Weisdorf, "The Wages of Women in England, 1260-1850," *Journal of Economic History* 75, no. 2 (2015): p. 432.

49. Goose, "The Straw Plait and Hat Trades in Nineteenth-Century Hertfordshire," p. 112.

who recalled earning between 11s. and 12s. per week doing embroidery in the past. As the trade was depressed, she could more recently only find work braiding dresses earning $7\frac{1}{2}$ d. per day, ‘if she had not her baby to attend to’.⁵⁰ Such low wages likely reflect a general economic depression in the 1840s, and I expect her retrospective wage to be more representative of skilled tailoring wages in the 1830s. I nonetheless retain both wages and report an ‘optimistic’ and ‘pessimistic’ version of married women’s urban wage. Male wages are taken from Robert Allen’s long-run wage data-set for the year 1835.⁵¹

Finally, I abstract from the reports of care costs by age given above. For the purposes of the accounting exercise, I define a step-wise function for childcare fees: children aged 0-2 years could be cared for at 2s. per week, those aged 2 to 3 for 10d., and children aged 3 to 8 for 4d. I assume children older than eight could be left alone throughout the day and, therefore, that their fees were zero to capture the idea that older children’s care was no longer part of the opportunity cost of the carer’s waged work.⁵² In the accounting exercise, then, fees enter (2.12) as

$$y = wt_w - \sum_{i=0}^N \pi(a_i)t_w + Y_{hh} \quad (2.21)$$

where $\pi(a_i)$ represents the step-wise function of age described above, and $N + 1$ is the size of the household.

50. Sally Alexander, *Women’s Work in Nineteenth-Century London: A Study of the Years 1820-50* (London: The Journeyman Press, 1983), pp. 39-40.

51. Robert C. Allen, *The Great Divergence in European Wages and Prices from the Middle Ages to the First World War*, 2010, <https://doi.org/10.7910/DVN/TMZGSF>.

52. Interesting evidence for the age at which children were left on their own comes from the sessions papers and coroner’s reports of accidental death. Children in early modern Portsmouth were possibly left on their own around age 7 or 8, while in the medieval period the coroner’s evidence suggests that even toddlers were left alone, while older children simply accompanied their parents throughout the day without necessarily being kept out of harm’s way. Further, under the old poor law, children under the age of seven were entitled to parental care and could not be separated from them. Jessica Warner and Robin Griller, “‘My Pappa Is Out, and My Mamma Is Asleep.’ Minors, Their Routine Activities, and Interpersonal Violence in an Early Modern Town, 1653-1781,” *Journal of Social History* 36, no. 3 (2003): p. 568-9; Hanawalt, “Childrearing Among the Lower Classes of Late Medieval England,” pp. 17-8; Alys Levene, *The Childhood of the Poor: Welfare in Eighteenth-Century London* (Basingstoke, Hamps.: Palgrave Macmillan, 2012), p. 9.

Table 2.1: Extra-familial child care in model demographic families

	(1) Siblings	(2) Surviving	(3) Male Wage	(4) Carer's Wage	(5) Outside Care	(6) Age in Care
Rural Agrarian	9	9	19	8.4	0.90	0.33
Rural Crafts	9	9	19	16	1	0
<i>Pessimistic</i>						
Urban Craftsman	6	3	60	7.5	0.14	7.83
Urban Labourer	6	3	36	7.5	0.29	2
<i>Optimistic</i>						
Urban Craftsman	6	3	60	22	1	0
Urban Labourer	6	3	36	22	1	0

Note: Wages in pence; $\alpha = 0.7$, $q_c = 1$, and $q_w = 0.75$

Source: See text.

The results of this exercise are presented in table 2.1. Column (5) gives the model's prediction for the mean share of early childhood (aged seven or less) a child in each family type spent in the care of someone outside the family. Column (6) gives the mean age when each child was predicted to first enter care or, in the case of older children who receive no care in the exercise, their age when the carer first re-entered the workforce. Again, this accounting exercise is not meant to reflect actual experiences but to provide a rough idea of how the complex and countervailing demands of child-rearing over the life cycle may have played out. It is clear that the carer's wage relative to household income was very important; where this measure is high, the demand for care seems to arise earlier. The exception is in the optimistic 'urban craftsman' scenario, where despite the carer's income share being lower than in the 'rural agrarian' scenario, the relatively small 'urban' household perhaps tipped the scales towards earlier care. Nonetheless, as the 'rural agrarian' scenario demonstrates, large families did not rule out early care. This is because only the number of children below age eight are considered as part of rising care costs, and this is affected primarily by the interval between surviving children and not the total number of children born.

For example, if the fourth child of the ‘Urban Labourer’ had survived instead of the fifth, shrinking the average interval between surviving children, the average child in the pessimistic scenario would have entered care at 2.4 years and spent 20 % of its early childhood there (calculation not shown). Finally, I note how higher male wages generally decreased the carer’s participation rate, despite large movements in the cost of child-care, as a comparison of the pessimistic urban craftsman and labourer households illustrates, where in the formal model this effect was somewhat ambiguous.

To return to the question of ‘why’ the demand for care in early childhood arose, the model and accounting exercise suggest demand will be highest where women’s wages are high, where men’s wages are low, where fertility is low, and where the spacing between surviving siblings is wide, although demographic factors emerged as relatively less important in the accounting exercise. Low adult male wages relative to the rest of the household may suggest certain kinds of urban-industrial places and therefore ‘where’ early childhood care arose.⁵³ However, it is not clear that the model would predict a secular increase in early childhood care towards the turn of the nineteenth century. Male wages were rising in the early part of the eighteenth century, although they stagnated thereafter, and the modal experience for married women may well have been declining wages in agriculture and ‘de-industrialization’ through the loss of spinning employment and other handicrafts.⁵⁴ Male wages did fall, however, among agricultural labourers.⁵⁵ Moreover, population grew rapidly towards the second half of the eighteenth century as fertility rose and infant mortality fell, increasing family size and decreasing the age gap between surviving children.⁵⁶ Given

53. Berg, “What Difference Did Women’s Work Make to the Industrial Revolution?”

54. Robert C. Allen, “The Great Divergence in European Wages and Prices from the Middle Ages to the First World War,” *Explorations in Economic History* 38 (2001): pp. 428-9; Humphries and Weisdorf, “The Wages of Women in England, 1260-1850,” pp. 427-430.

55. Schneider, “Real Wages and the Family: Adjusting Real Wages to Changing Demography in Pre-Modern England,” pp. 108-9.

56. Wrigley et al., *English Population History from Family Reconstitution 1580-1837*, pp. 218-9, 532.

all this, it is not impossible that the high-water mark of early childhood care lay earlier in time.

Nonetheless, several historical developments plausibly suggest a secular increase in the demand for care over the eighteenth century. The first is that the kind of work done by married women changed, as Alice Clark and Bridget Hill argue, to become less integrated with the lives of other members of the household. According to their account, married women lost control over the rhythm of their own productive work so that interruptions for child care were more difficult to manage, and they increasingly worked in settings outside of the home apart from their children.⁵⁷ Although some aspects of this narrative are overdrawn, historians like Joyce Burnette have maintained that cottage industry allowed women to combine paid labour with childcare.⁵⁸ In other words, there was less of a trade-off between work and care in these tasks that married women commonly performed so that despite high participation rates, women employed in cottage industry did not require as much market care. As important cottage industries like spinning and hand-loom weaving declined and these industries adopted more factory production, therefore, this may have led to rising demand for extra-familial childcare clustered in industrial districts. I discuss this hypothesis in chapter 6, where I present evidence that although both handicraft and industrial production led to an increase in early child-care demand, the effect was weaker in cottage industry.

This argument is in some ways complementary to the ‘industrious revolution’ thesis. According to Jan de Vries, the expansion of available consumer goods that could only be purchased in the market—tea, sugar, etc.—raised the utility of money

57. Bridget Hill, *Women, Work and Sexual Politics in Eighteenth-Century England* (Oxford: Basil Blackwell, 1989), pp. 44-9; Alice Clark, *Working Life of Women in the Seventeenth Century* (London: Routledge, 1982).

58. Peter Earle, “The Female Labour Market in London in the Late Seventeenth and Early Eighteenth Centuries,” *Economic History Review* 42, no. 3 (1989): 328-353; Burnette, *Gender, Work and Wages in Industrial Revolution Britain*, p. 183.

income and lead to an increase in the number of days worked.⁵⁹ In the model, this would be reflected in a secular rise in α over time. As more women sought paid work outside the home and worked more intensively within the home, perhaps they sought more care for their dependants. It may also have been the case that urbanization encouraged an eighteenth-century ‘consumer revolution’ and also contributed to a secular increase in α .⁶⁰

Finally, a process of institutional development may have contributed to solving the principal-agent problem in early child care gradually over time. This would correspond in the model to an increase in q_w , and it may be conceived as the accumulation of a kind of social capital.⁶¹ El-Attar identifies interpersonal trust as an important determinant of families’ use of extra-familial child care in the present and finds that mothers whose own mothers worked are more likely to rely on extra-familial child care.⁶² She attributes this to women forming expectations from their own experiences.⁶³ Applied to the eighteenth century, possibly as more women passed through schools, they developed expectations about both the kind and quality of services these institutions provided. As I discuss in more detail in a later chapter, these expectations may have facilitated the adoption of reading ability as a signal of care quality. Parents-principals came to understand through experience that teaching children to read would be costly for carers-agents who neglected children, and as literacy spread it became less costly both for school dames to produce and for parents to verify this signal.⁶⁴ The index of this process is women’s steadily rising literacy rate over the

59. Jan De Vries, *The Industrious Revolution: Consumer Behaviour and the Household Economy, 1650 to the Present* (Cambridge: Cambridge University Press, 2008), passim.

60. Maxine Berg, *Luxury and Pleasure in Eighteenth-Century Britain* (Oxford: Oxford University Press, 2005), p. 217-8.

61. James S. Coleman, “Social Capital in the Creation of Human Capital,” *American Journal of Sociology* 94, no. supplement (1988): p. s113.

62. Mayssun El-Attar, “Trust, Child Care Technology Choice and Female Labor Force Participation,” *Review of Economics of the Household* 11 (2013): 507-44.

63. *Ibid.*, p. 513.

64. See discussion in Michael Bacharach and Diego Gambetta, “Trust in Signs,” in *Trust in Society*, ed. Karen S. Cook (New York: Russell Sage Foundation, 2001), pp. 158-62, 166-72.

eighteenth and nineteenth centuries.⁶⁵

The theory developed in this chapter suggests the demand for child-care resulting from any or all of these secular trends would emerge where women's and children's earnings were relatively high. As dame schools provided education and child-care jointly and were commonly relied upon to meet this demand, this would lead to a shift towards earlier education in these settings. Such a shift would promote the accumulation of greater human capital if households generally enrolled their children late, ($s_0 < s_1$), and underestimated the degree of complementarity between stages of human-capital accumulation across the life-course, ($\sigma < \phi$). The remaining chapters argue that this is a good description of the empirical process of human capital accumulation in the early stages of industrialisation in England and Wales.

65. Schofield, "Dimensions of Illiteracy, 1750-1850."

Appendix: model solution

I assume the household faces the following problem

$$\begin{aligned} \max_{t_w, t_c} \quad & U = \alpha \ln(wt_w - ft_w + Y_{hh}) + (1 - \alpha) \ln(q_c t_c + q_w t_w) \\ \text{s.t.} \quad & 1 = t_w + t_c, \end{aligned} \quad (2.22)$$

that all variables included in (2.22) are non-negative, and that net income is also non-negative; i.e., $wt_w - ft_w + Y_{hh} \geq 0$. Using the Lagrange multiplier method, the first-order Kuhn-Tucker conditions for a solution to (2.22) are

$$\mathcal{L}(t_w, t_c, \lambda) = \alpha \ln(wt_w - ft_w + Y_{hh}) + (1 - \alpha) \ln(q_c t_c + q_w t_w) - \lambda(t_w + t_c - 1)$$

$$\frac{\partial \mathcal{L}}{\partial t_w} = \frac{\alpha(w - f)}{wt_w - ft_w + Y_{hh}} + \frac{(1 - \alpha)q_w}{q_c t_c + q_w t_w} - \lambda \leq 0 \quad (2.23)$$

$$\frac{\partial \mathcal{L}}{\partial t_c} = \frac{(1 - \alpha)q_c}{q_c t_c + q_w t_w} - \lambda \leq 0 \quad (2.24)$$

$$\frac{\partial \mathcal{L}}{\partial \lambda} = -t_w - t_c + 1 = 0. \quad (2.25)$$

The time constraint (2.25) holds with equality as I assume the carer spends all of her time either working or caring; I assume no leisure. For a solution in which the carer divides her time between work and care (an interior solution), (2.24) and (2.23) hold with equality. Substituting (2.24) into (2.23) and re-arranging yields

$$\frac{\alpha(f - w)}{wt_w - ft_w + Y_{hh}} = \frac{(1 - \alpha)(q_w - q_c)}{q_c t_c + q_w t_w}. \quad (2.26)$$

Further re-arranging and substituting in (2.25) gives

$$\alpha(f - w)(q_c - q_c t_w + q_w t_w) = (1 - \alpha)(q_w - q_c)(wt_w - ft_w + Y_{hh}), \quad (2.27)$$

which is further simplified to give the interior-solution share of the carer's time spent working

$$t_w^* = \frac{\alpha(fq_c - q_c w - q_c Y_{hh} + q_w Y_{hh}) + Y_{hh}(q_c - q_w)}{(f - w)(q_c - q_w)}. \quad (2.28)$$

The partial derivatives of this solution suggest how the optimal division of the carer's time between work and care will respond to changes in wages and fees. Note also that an increase in the share of the carer's time spent in work implies more time the children are cared for outside the home. This will be increasing in the carer's wages,

$$\frac{\partial t_w^*}{\partial w} = \frac{Y_{hh}(1 - \alpha)}{(w - f)^2} > 0, \quad (2.29)$$

and decreasing in the fees charged for private care,

$$\frac{\partial t_w^*}{\partial f} = -\frac{Y_{hh}(1 - \alpha)}{(f - w)^2} < 0. \quad (2.30)$$

Intuitively, carers will respond to higher wages by participating in the labour market and will respond to higher fees for child care by withdrawing.

The effect of higher household income, Y_{hh} , will generally be to decrease the carer's labour force participation. If the carer's wages contribute positively to the household's market income after paying child-care fees (carer's net income is positive), the partial derivative

$$\frac{\partial t_w^*}{\partial Y_{hh}} = -\frac{1 - \alpha}{(w - f)}, \quad (2.31)$$

will be negative, and her participation rate will decrease as other household members' income is higher. There is a theoretical case where this is not true. If child-care fees are greater than the carer's potential wage, (2.31) will perversely be positive, and the carer's labour force participation will increase with household income. However, this will generally lead to a corner solution in which the carer does no work. The carer will spend all of her time caring and none of it working, $t_w = 0$, when (2.23) holds with inequality. Then the left-hand side of (2.27) will be greater than the right-hand side, yielding the following condition

$$\alpha q_c(w - f) < Y_{hh}(1 - \alpha)(q_c - q_w). \quad (2.32)$$

If $w - f \leq 0$, this condition will always hold unless $q_c - q_w \leq 0$ too. In words, this implies that if child care fees are higher than the carer's wage, she will not work unless

the quality of care outside of the home (in terms of principal-agent risks) is higher than the care provided in the home, in which case she may work to pursue high-quality care outside the home. This no-work solution may also hold when household income, Y_{hh} , is very high.

Conversely, the carer will spend all of her time working and none caring, $t_c = 0$, when (2.24) holds with inequality. In this case, the left-hand side of (2.26) is less than the right-hand side, yielding the following condition

$$\alpha q_w(w - f) > (1 - \alpha)(q_c - q_w)(w - f + Y_{hh}) \quad (2.33)$$

This condition will generally arise when the carer's wages are high relative to the household income, or when the household's preference for market income and the quality of care available outside the home are relatively high. This point is perhaps made clearer by defining net carer's earnings, $n = w - f$, and rearranging:

$$\frac{\alpha q_w}{(1 - \alpha)(q_c - q_w)} > 1 + \frac{Y_{hh}}{n}. \quad (2.34)$$

The right-hand side is a familiar rational function decreasing in n to a limit at 1. Thus if the left-hand side is less than one, indicating a weak preference for market earnings or very risky market care, this condition will never arise. Conversely, a strong preference for market income or the availability of high-quality market care would make this condition hold at lower values of net carer's earnings.

Chapter 3

Head, hand, and heart: intellectual foundations of late enrolment

Walter Powell, gentry farmer and rent-collector from Monmouthshire, remarked dryly in his diary entry for April 2, 1627, ‘I put my sonnes John, Wm, & tho: at Monmouth free schoole.’¹ In October, his son-in-law joined them, ‘to learne to write’.² The next year, on August 18, he again wrote, ‘sent my 5 sonnes altogether to Monmoth free scoole, viz. John, Wm, tho:, Rich: & Charles.’³ His sons were 19, 15, 12, 10, and 8 years old when they were first enrolled in school.⁴ His son-in-law was 18.⁵ Walter Powell provides no additional comment or explanation for this striking enrolment pattern. In fact, it was probably not particularly abnormal for the time and did not call for further comment. The theoretical model developed in the previous chapter relied on two assumptions, which Walter Powell’s actions illustrate well. Households in the past underestimated the complementarity between early and late education and enrolled their children relatively late. This chapter discusses the origins of these assumptions and provides a brief intellectual history of the idea of complementarity in education across stages of childhood.

1. Walter Powell, *The Diary of Walter Powell of Llantilio Crossenny in the County of Monmouth, Gentleman, 1603-1654*, ed. Joseph Alfred Bradney (Bristol: John Wright, 1907), p. 18.

2. Ibid.

3. Ibid., p. 19.

4. Ibid., pp. 3-4.

5. Ibid., p. v.

3.1 An intellectual history of educational complementarity

For those who subscribed to the notion that children developed at all—i.e., did not believe, as some did, that a fully-formed personality appeared in miniature at the moment of insemination—the ideas of John Locke (1632-1704) were particularly influential.⁶ Locke conceived of the mind as a “*tabula rasa*” to be inscribed by “experience” of one of two kinds. Cleverley and Phillips provide the following helpful gloss:

Sensation, or experience obtained via the sense organs, gives rise to such simple ideas as yellowness, whiteness, hotness, coldness, hardness, and sweetness. Reflection (or introspection, or ‘internal sensation’) is the source of experience in which we perceive the operations of our own mind; it is by reflecting upon our own mental processes that we obtain such simple ideas as thinking, doubting, reasoning, and willing.⁷

According to Locke, once such simple ideas were developed, they could subsequently be combined and recombined “to an almost infinite variety” into synthetic complex ideas.⁸ Such a model, of course, suggests a certain sequence in which learning occurs, beginning with the simple exercise of the senses and proceeding through reflection to the synthesis of complex from simple ideas. This kind of sequentialism appears also in James Mill’s discussion of the “law of association” and in Maria Edgeworth’s advice that educators avoid abstract terms when speaking to young children because “General terms are, as it were, but the indorsements upon the bundles of our ideas; they are useful to those who have collected a number of ideas, but utterly useless

6. Stone, *The Family, Sex and Marriage in England 1500-1800*, p. 406.

7. John F Cleverley and D. C. Phillips, *Visions of Childhood: Influential Models from Locke to Spock*, 2nd (New York: Teachers College Press, 1986), pp. 16-7.

8. *Ibid.*, p. 17.

to those who have no collections ready for classification.”⁹ Locke’s model of learning thus implied a sequence but not a necessary relationship to temporal age.

Nonetheless, it was clear that an earlier start allowed more time for learning, as earlier schoolmasters had independently concluded long before Locke published his theories.¹⁰ Early pedagogues advocated a variety of school-entry ages, some of which fell within the range of early childhood, but as Cressy argues, this was a self-promotion literature meant to convey the results of newly devised teaching methods in exaggerated proportions; these principles were likely not followed in practice.¹¹ Other priorities could be taken into account. For instance, John Mulcaster, the first—and apparently very sympathetic—schoolmaster at Merchant Taylor’s school, advocated judging children’s school-readiness on an individual basis and warned that ‘hurrying’ children would have harmful effects on their health.¹²

Locke, in letters written to an aristocratic friend to advise him of how to raise his son, also proposed that an early start to education was best.¹³ But he was largely concerned with inculcating discipline and manners, writing, ‘Those therefore that intend ever to govern their children, should begin it whilst they are very little, and look that they perfectly comply with the will of their parents.’¹⁴ The logic was to curtail the accumulation of bad habits through parental indulgence, which would only make the task of correcting manners or ‘breeding’ more difficult later on, as these earlier indulgences would necessarily need to be undone.¹⁵ For formal education, however,

9. James Mill, “Analysis of the Phenomena of the Human Mind,” in *Readings in the History of Psychology*, ed. Wayne Dennis (New York: Appleton-Century-Crofts, 1948), 140–154; Maria Edgeworth and Richard Lovell Edgeworth, *Practical Education*, vol. 1 (London: J. Johnson, 1798), pp. 71–2.

10. David Cressy, *Education in Tudor and Stuart England* (London: Edward Arnold, 1975), pp. 70–1; W. J. Frank Davies, *Teaching Reading in Early England* (London: Pitman Publishing, 1973), p. 64.

11. Cressy, *Literacy & the Social Order: Reading & Writing in Tudor & Stuart England*, pp. 27–8.

12. Davies, *Teaching Reading in Early England*, pp. 62–3.

13. John Locke, *Some Thoughts Concerning Education*, ed. R. H. Quick (Cambridge: Cambridge University Press, 1934), pp. 21–2, <https://hdl.handle.net/2027/inu.32000000333239>.

14. *Ibid.*, p. 27.

15. *Ibid.*, pp. 21–2.

Locke advocated a less structured approach, imploring his friend to hire a tutor who would ‘secure his [son’s] innocence, cherish and nurse up the good, and gently correct and weed out any bad inclinations, and settle in him good habits’ before turning to ‘bookish’ lessons.¹⁶ Then he only specified that children should learn to read after they have learned to speak, which ‘might be made a play and recreation to children’, and they should learn to write after they have learned to read.¹⁷ This is entirely consistent with Locke’s emphasis on learning as the accumulation of sequentially more complex experiences. In a separate document, *An essay on the poor laws*, Locke advocated a different approach for pauper children. These he advised should ‘from infancy be inured to work’ and taken into workhouse ‘schools’ aged three to spin wool, with no mention of reading lessons or play.¹⁸ Early exposure made the bitter pill of truncated opportunity easier to swallow.

Absent from this model and the educational sequence it implied, however, was any strict relation between biological age and educational sequence. If the mind was simply filled in by the accumulation of experience, it did not perforce restrict one’s learning if that process was delayed. Parents and children whose demand for education was not unlimited could delay school careers of limited duration according to the schedules imposed by competing priorities. Later experience could make up for early inexperience without any loss of efficiency.¹⁹ An ideal education therefore followed a gradient from simple to complex ideas, but in terms of biological age, early and late learning were roughly substitutes.

Thus although notions of immaturity and precocity were in fact fairly common, these simply reflected a child’s progress along the gradient of experience. For instance, John Evelyn, whose self-writing covers the period 1640-1706, thought his five-year-

16. Locke, *Some Thoughts Concerning Education*, pp. 128-9.

17. *Ibid.*, p. 129-36.

18. Locke, “An Essay on the Poor Law.”

19. See, for example, John Locke, *An Essay Concerning Human Understanding*, Everyman’s Library, vol. 1 (London: J. M. Dent & Sons Ltd., 1961), pp. 16-7.

old son's interest in Greek and proficiency in scripture went beyond 'his age and experience,' while nonetheless some books he thought exceeded even his precocious son's abilities.²⁰ Similarly, the character Kate Stanley in Hannah More's moralizing novel, *Coelebs in Search of a Wife* (1809), declares, "I am eight years old today. I gave up all my gilt books, with pictures ... and I am now going to read such books as men and women read."²¹ Kate's father then explains how he makes 'the renouncing their baby books a kind of epocha.... We have in our domestic plan several of these artificial divisions of life.'²² However divided her "domestic plan," these periods did not correspond to Kate's biological or neurological capacity but rather to her acquired experience, and it is clear that her father would prefer her to be done with simple books sooner rather than later. "We have," says Mr. Stanley, "too many elementary books. They are read too much and too long.... Much, however, will depend on capacity and disposition. A child of slower parts may be indulged till nine years old with books which a lively genius will look down upon at seven."²³ Hannah More's benign or even favourable depiction of precocity, however, fell out of favour by the middle of the century, when, according to Anna Davin, precocity took on connotations of unnaturalness.²⁴ Compare Charlotte Mason, advocate of home-schooling and founder of the Parents Educational Union in 1887, who expressed her anxieties about precocity in children remaining home-schooled beyond age nine in explicitly neurological terms, advising that "the actual conformation of the child's brain depends upon the habits which the parents permit or encourage" and "the discipline of the school is so valuable that the boy or girl who grows up without it is at a disadvantage through life."²⁵ The slight difference of perspective between these

20. Pollock, *Forgotten Children: Parent-Child Relations from 1500 to 1900*, p. 100.

21. Hannah More, *Coelebs in Search of a Wife* (London: T. Cadell / W. Daviers, 1809), p. 378.

22. *Ibid.*, pp. 378-9.

23. *Ibid.*, p. 378-9.

24. Anna Davin, "What is a Child?," in *Childhood in Question: Children, Parents and the State*, ed. Anthony Fletcher and Stephen Hussey (Manchester: Manchester University Press, 1999), p. 21.

25. Charlotte Mason, *Home Education*, p. 84, and *Parents Review*, III, p. 279, qtd. in Christina de Bellaigue, "Charlotte Mason, Home Education and the Parents' National Educational Union in

two writers—one in which age is simply correlated with experience and the other in which experience and the development of the brain are naturally connected—are illustrative of a wider intellectual shift.

It is, of course, possible to identify writers whose ideas prefigure developmentally sensitive education. John Amos Comenius (1592-1670), a pedagogue and member of the Moravian Church, devised a plan for universal education open to boys and girls, rich and poor, in which he described what amounts to a ‘sensitive period’ for education:

His [man’s] brain, which we have already compared to wax, because it receives the images of external objects that present themselves to its organs of sense, is, in the years of childhood, quite wet and soft, and fit for receiving all images that come to it. Later on, as we find by experience, it grows hard and dry by degrees, so that things are less readily impressed or engraved upon it.²⁶

Comenius’s ideal school system was divided into four ‘grades’ of six years’ duration, infancy, childhood, boyhood, and youth, each with its own method of instruction. His guiding maxim was ‘to follow the lead of nature in all things, to observe how the faculties develop one after the other, and to base our method on this principle of succession’.²⁷ Comenius was invited to visit England in 1641 by Samuel Hartlib, who had published and translated some of Comenius’s writings.²⁸ John Drury, Hartlib’s close collaborator, likely influenced by Comenius, published a proposal for a universal and developmentally informed system of education, which was part of Hartlib’s

the Late Nineteenth Century,” *Oxford Review of Education* 41, no. 4 (2015): pp. 503, 512.

26. M. W. Keatinge, *The Great Didactic of John Amos Comenius, Now for the First Time Englished* (London: Adam / Charles Black, 1896), p. 211, 218-9, <https://hdl.handle.net/2027/hvd.32044012587341>.

27. *Ibid.*, p. 409.

28. Charles Webster, “Introduction,” in *Samuel Hartlib and the Advancement of Learning*, ed. Charles Webster (Cambridge: Cambridge University Press, 1970), pp. 25, 28-9; John Amos Comenius, *A Reformation of Schooles*, trans. Samuel Hartlib, Original date: 1642 Original publisher: Blew Bible Original publisher place: London (Menston: Scolar Press, 1969).

wider campaign for educational reform during the revolutionary seventeenth century.²⁹ While Comenius's ideas on education contain many seeds of future intellectual developments, his writings were largely forgotten after his death and were only 're-discovered' in the late nineteenth century.³⁰ This was the dog that did not bark, a sign of intellectual disinterest, and Samuel Hartlib's writings met a similar fate.³¹ Although the pedagogical principles could be separated from the more radical political and social implications of universal education, their association with social reform possibly limited their appeal.³² Hartlib's proposals for school reform only ever received a lukewarm reception in the Long Parliament, and his ideas were perhaps considered too Puritan and radical to be accepted by the more socially conservative generation of schoolmasters of the restoration.³³ Although some of Hartlib's ideas, particularly on reform of the grammar school and university curricula, were taken up by the non-conformist academies, these schools taught more advanced subjects to older children.³⁴ Comenius's intellectual efforts did little to create a lasting consensus on when elementary education should begin.

According to Stephen Lassonde, it was not until the end of the nineteenth century that "Heightened sensitivity to the significance of age, the creation of behavioral norms surrounding each age, and the increased tendency of individuals (children especially) to internalize the importance of minute discontinuities between social, biological, and chronological age," took on cultural significance.³⁵ This change Lassonde largely attributes to the introduction of compulsory schooling and graded

29. John Dury, "The Reformed School," in *Samuel Hartlib and the Advancement of Learning*, ed. Charles Webster (Cambridge: Cambridge University Press, 1970), pp. 139–64.

30. Paul Monroe, *A Text-Book in the History of Education* (New York: Macmillan, 1905), p. 481.

31. Webster, "Introduction," p. 71; Cressy, *Literacy & the Social Order: Reading & Writing in Tudor & Stuart England*, p. 172.

32. Webster, "Introduction," p. 68–9.

33. Lawson and Silver, *A Social History of Education in England*, pp. 161, 164–8, 180.

34. Webster, "Introduction," p. 71; Lawson and Silver, *A Social History of Education in England*, p. 173.

35. Stephen Lassonde, "Age, Schooling, and Development," in *The Routledge History of Childhood in the Western World*, ed. Paula S. Fass (Abingdon: Routledge, 2013), p. 212.

curricula, which for the first time standardized age of enrolment, and therefore, “as each cohort moved through graded schools, their ages became, de facto, more uniform over time.”³⁶ A normative age-experience gradient was therefore established, disseminating outward from the school to affect wider social understandings of age and inform scientific theorizing about child development, illustrated by, for instance, Jean Piaget’s notion of biological-cognitive stages of development in the early 20th century.³⁷ Such an argument is compelling, but other intellectual winds blew in the same direction.

To argue for complementarity is effectively to argue that biology, particularly the unfolding development of the brain in childhood, interacts with experience in learning.³⁸ Nurture follows nature’s script. Thus certain strands of naturalistic thought, particularly those interrogating the relationship of humanity to nature, were apt to influence thinking about human development.³⁹ For instance, Jean-Jacques Rousseau’s (1712-1778) intellectual project asserted society’s fundamentally corrupting influence upon things as they are in nature.⁴⁰ Applied to education, this suggested “that what is good in it should be adapted to the nature of things,” but to follow the nature of things, one must have some notion of how nature proceeds.⁴¹ Rousseau makes this point clearly:

...education comes to us from nature, from men, or from things. The *inner growth of our organs and faculties* is the education of nature [my emphasis], the use we learn to make of this growth is the education of men, what we gain by our experience of our surroundings is the education

36. Lassonde, “Age, Schooling, and Development,” p. 217.

37. Ibid., pp. 216-223.

38. Tomer makes this point forcefully, see Tomer, *Integrating Human Capital with Human Development: The Path to a More Productive and Humane Economy*, p. 71.

39. Stewart and McCann, *The Educational Innovators, 1750-1880*, p. 34.

40. Cleverley and Phillips, *Visions of Childhood: Influential Models from Locke to Spock*, pp. 34-5.

41. Jean Jacques Rousseau, *Émile*, ed. Barbara Foxley, Everyman’s Library 518 (London: J. M. Dent & Sons Ltd., 1943), p. 2, <https://archive.org/details/in.ernet.dli.2015.226569/>.

of things.⁴²

All three must accord, and from this idea Rousseau derives different stages of development, in line with biological age, at which certain lessons and experiences are more appropriate than others.⁴³ Rousseau's influence was widespread, particularly among late-eighteenth- and early-nineteenth-century pedagogues in Europe, such as Johann Heinrich Pestalozzi (1746-1827), Albertine Necker de Saussure (1766-1841), and Maria Edgeworth (1768-1849).⁴⁴

Curiosity about nature and humanity's place within it further motivated a number of empirical efforts.⁴⁵ This process was also coincident with the professionalization of psychiatry and the growth of psychology as a scientific discipline toward the end of the eighteenth century.⁴⁶ The earliest detailed description of infant growth and development was carried out by Dietrich Tiedemann in 1787, and such studies were published with increasing frequency over the nineteenth century.⁴⁷ One of the clearest statements of "complementarity" in learning in this early period, however, came from a mistaken diagnosis. In 1799, a twelve-year-old boy was found in the woods of Aveyron, France, and his discoverers believed the "wild boy" had been abandoned by his parents at least five years prior, left alone to survive on chestnuts and pilfered vegetables. He was brought to Paris in 1800, where, 'Vulgar, as well as philosophical curiosity, was much attracted toward the young savage,' as a reporting London periodical put it, but 'His apparent qualities were ... such as to disappoint some of the

42. Rousseau, *Émile*, p. 6.

43. For example, Rousseau, *Émile*, pp. 6-7, 29-31, 49-50; Willem Koops, "Imagining Childhood," in *Beyond the Century of the Child: Cultural History and Developmental Psychology*, ed. Willem Koops and Michael Zuckerman (Philadelphia: University of Pennsylvania Press, 2003), p. 6.

44. Koops, "Imagining Childhood," pp. 6-7; Albertine Necker de Saussure, *L'éducation Progressive, Ou Étude Du Cours De La Vie*, vol. 1 (Brussels: Louis Hauman, 1836), pp. 97, 160, 252; Edgeworth and Edgeworth, *Practical Education*, p. 177.

45. Stewart and McCann, *The Educational Innovators, 1750-1880*, pp. 51,

46. Dora B. Weiner, "The Madman in the Light of Reason: Enlightenment Psychiatry," in *History of Psychiatry and Medical Psychology: With an Epilogue on Psychiatry and the Mind-Body Relation*, ed. Edwin R. Wallace and John Gach (New York: Springer, 2008), pp. 255-77.

47. Wayne Dennis, "Historical Beginnings of Child Psychology," *Psychological Bulletin* 46, no. 3 (1949): 224-235.

fanciful expectations with which people thronged to see him.⁴⁸ Dr. Pinel, into whose care the boy was initially placed, believed those qualities were best explained by an “incurable” mental handicap, while Dr. Itard demurred, believing that his behaviour was more like what one would expect of someone lacking socialization, having grown up in nature.⁴⁹ Over the next several years, Dr. Itard painstakingly attempted to educate Victor, as he was called, but he was ultimately left discouraged.⁵⁰ Yet, all along, Dr. Itard was reluctant to abandon his thesis that Victor’s condition was the effect of absent socialization, ultimately concluding:

...by reason of their long inaction the intellectual faculties are developing slowly and painfully, and ... this development, which in children growing up in civilized surroundings is the natural fruit of time and circumstances, is here the slow and laborious result of a very active education in which the most powerful methods are used to obtain most insignificant results.⁵¹

If one believed, with Dr. Itard, therefore, that Victor’s abandonment at a young age was the sole cause of his impaired speech, executive functioning, memory, etc., then this was strong evidence that early learning was critical and that addressing early deficits was costly if not impossible. However, one could always adopt Dr. Pinel’s

48. “Account of the Discovery and Education of the Savage of Aveyron,” *Universal Magazine of Knowledge and Pleasure* 110 (1802): 247–251, <https://www.proquest.com/historical-periodicals/account-discovery-education-savage-aveyron/docview/6143096/se-2?accountid=13042>.

49. Wayne Dennis, *Historical Readings in Developmental Psychology* (New York: Appleton-Century-Crofts, 1972), p. 35, <https://archive.org/details/historicalreadin0000denn/page/n6/mode/1up>.

50. *Ibid.*, p. 37-9.

51. Dr. Itard’s notion of critical periods of development comes out clearly in his discussion of Victor’s inability to speak. He writes, ‘Of all the phenomena observable during the first developments of a child perhaps the most astonishing is the facility with which he learns to speak. When one thinks that speech, which is without question the most marvelous act of imitation, is also its first result, admiration is doubled for that Supreme Intelligence whose masterpiece is man, and Who, wishing to make speech the principal promoter of education, could not let imitation, like the other faculties, develop progressively, and therefore necessarily made it fruitful as well as active from its beginning. But this imitative faculty ... varies in its application according to age. It is used in learning to speak only during the earliest childhood. Later other functions come under its influence and it abandons, so to speak, the vocal instrument, so that a young child, even an adolescent, after leaving his native country, promptly loses its manners, etiquette and language, but never loses those intonations of voice which constitute what is called accent.’ *ibid.*, pp. 45-46, 49.

diagnosis—that Victor had a mental handicap prior to his abandonment—as Charles Knight did in his review of the case for the Society for the Diffusion of Useful Knowledge’s *Penny Magazine*, which led him to conclude that the little improvement in Victor’s condition “must have seemed incredible” in the circumstances and that “education did something for the mitigation of their calamity.”⁵² For Pinel and Knight, there was simply no need to think about the interlocking sequence of biology and experience, while for those who followed Dr. Itard—notably, Maria Montessori was influenced by the Itard’s writings—this was of utmost significance.⁵³

The other major intellectual movement in this century bearing upon the relationship of human development to nature was the formulation of a theory of evolution. Although Charles Darwin’s work on this subject was important—and Darwin even wrote an early study of emotions in his own children—it was the looser notion of the evolutionary course of species through different forms applied, by analogy, to human development that was more influential.⁵⁴ The idea of recapitulation held that traces of the evolutionary past of the human organism, its “phylogeny,” could reflect or, in stronger versions of the theory, determine an individual’s growth path, its “ontogeny.”⁵⁵ An infant’s flapping arms simply refigured the “fish stage” of humanity’s primordial history.⁵⁶ Examples in this genre include Herbert Spencer’s *Essays on Education* (1861), which argues that teaching should “carry each child’s mind through

52. Charles Knight, “Peter the Wild Boy; And the Savage of Aveyron,” *Penny Magazine of the Society for the Diffusion of Useful Knowledge* 2, no. 70 (1833): 170–171, <https://www.proquest.com/historical-periodicals/peter-wild-boy-savage-aveyron/docview/2764261/se-2?accountid=13042>.

53. Catherine L’Ecuyer, Bernacer Javier, and Güell Francisco, “Four Pillars of the Montessori Method and Their Support by Current Neuroscience,” *Mind, Brain, and Education* 14, no. 4 (2020): pp. 317–428.

54. Dennis Thompson, John D. Hogan, and Phillip M. Clark, *Developmental Psychology in Historical Perspective* (Chichester: Wiley-Blackwell, 2012), pp. 11–13; Robert B. Cairns and Beverley D. Cairns, “The Making of Developmental Psychology,” in *Handbook of Child Psychology: Theoretical Models of Human Development*, ed. William Damon and Richard M. Lerner, vol. 1 (Hoboken, N.J.: John Wiley & Sons, 2006), pp. 92–4.

55. John R. Morss, *The Biologising of Childhood: Developmental Psychology and the Darwinian Myth*, 2nd (London: Routledge, 2018), p. 4; Cleverley and Phillips, *Visions of Childhood: Influential Models from Locke to Spock*, pp. 43–4.

56. Cleverley and Phillips, *Visions of Childhood: Influential Models from Locke to Spock*, p. 52.

a process like that which the mind of humanity at large has gone through,” and G. Stanley Hall’s (1846-1924) inverse assertion that “infancy, childhood and youth are three bunches of keys to unlock the past history of the race,” carried the correspondence between ontogeny and phylogeny to a point where one could draw conclusions about the latter from the former.⁵⁷ These ideas influenced decisions about which instructional methods and even which books were most appropriate at which age.⁵⁸ One of the most explicit statements of how this thinking recast Locke’s *tabula rasa*, however, was given by William Preyer (1841-1897) in the preface to *The Mind of the Child* (1882), a study of his own child’s development:

The development of mind, like the development of body, must be regarded as dating back far beyond the origin of the individual being....

What is acquired by experience is only a part.... Everything goes to show a continuity in the capacity of sensation. This capacity does not spring afresh each time in the human being out of material incapable of sensation, but, as a hereditary property of the parts of the egg, is differentiated in these, and by stimulus from without is brought into action.... The mind of the new-born child, then, does not resemble a *tabula rasa*, upon which the senses write their impressions, so that out of these the sum-total of our mental life arises through manifold reciprocal action, but the tablet is already written upon before birth, with many illegible, nay, unrecognizable and invisible, marks, the traces of the imprint of countless sensuous impressions of the long-gone generations.⁵⁹

57. Cleverley and Phillips, *Visions of Childhood: Influential Models from Locke to Spock*, pp. 46-7; G. Stanley Hall, “Evolution and Psychology,” qtd. in Cleverley and Phillips, *Visions of Childhood: Influential Models from Locke to Spock*, p. 50.

58. Cleverley and Phillips, *Visions of Childhood: Influential Models from Locke to Spock*, p. 48.

59. Wilhelm Preyer, “The Mind of the Child,” in *Readings in the History of Psychology*, ed. Wayne Dennis (New York: Appleton-Century-Crofts, 1948), pp. 251-4.

Such were developments in high theory that over the course of the nineteenth century, an incipient notion and theoretical justification for complementarity in human learning thus became increasingly well-defined. Whether and to what extent these notions entered everyday thought or affected policy, however, is another question.

There are a number of reasons to expect ideas around educational complementarity to have first shifted in relation to the infant schools. They were the earliest schools to cater to infants as a defined age group. The relative uniformity of this cohort may have brought considerations about age distinctions and educational sequence front of mind, in a process analogous to that described by Stephen Lasonde, before similar uniformity was introduced to the wider education system through compulsion.⁶⁰ Second, if it seemed like common sense that children could attend school at more or less whatever age, the infant schools had to rationalize and justify their departure from this norm. Finally, many of the pedagogues who analysed and advocated for infant education, e.g., Owen, Pestalozzi, Edgeworth, were influenced by Rousseau, whose thinking about natural development had introduced an embryonic notion of developmental pedagogy.⁶¹ Others, such as Samuel Wilderspin, paid no explicit intellectual debt to Rousseau but developed ideas that bore striking resemblance to formal theories developed on this basis through regular engagement with a community of pedagogues in Britain.⁶² Prominent figures like Kay-Shuttleworth, eventual secretary of the Committee of Council on education, actively read and promoted new pedagogical theory, and figures like Wilberforce and Hannah More wrote about the importance of childhood as a sensitive period for learning circa 1800.⁶³

60. Lasonde, "Age, Schooling, and Development."

61. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 18, 19; Stewart and McCann, *The Educational Innovators, 1750-1880*, pp. 60-3.

62. Stewart and McCann, *The Educational Innovators, 1750-1880*, pp. 258, 269.

63. Stewart and McCann, *The Educational Innovators, 1750-1880*, pp. 179-97; Anne Stott, "Evangelicalism and Enlightenment: The Educational Agenda of Hannah More," in *Educating the Child in Enlightenment Britain: Beliefs, Cultures, Practices*, ed. Mary Hilton and Jill Shefrin (Farnham, Surrey: Ashgate, 2009), pp. 46-8.

Thus a number of statements from inspectors, trustees, and bureaucrats working in education indicate that this question was on their minds, particularly in relation to infant schools. At a town meeting in Lewes held Wednesday, November 30, 1825, at which the subject of establishing an infant school was under consideration, Dr. King, a director of the Brighton Infant School, told the gathered audience that “The simplest and most engaging methods are taken to lay a foundation of useful knowledge—to regulate the temper, and train them, according to their capacity, in the most important branches of moral duty.”⁶⁴ Mr. Wood, in his report (1840) for the Birmingham Statistical Society for the Improvement of Education, speculated that

It is very commonly alleged, in extenuation of the neglect of teachers of dame schools, that the scholars are too young to be susceptible of much instruction, whereas in reality they are more open to judicious cultivation at this period than at any other, habits being then formed, tastes acquired, associations and impressions received, and principles inculcated, which lie at the basis of the future character, and oftentimes determine the happiness or misery of the individual.⁶⁵

Readers of the *Penny Magazine* were introduced to Wilderspin’s justification for infant schools, “to mould the dispositions at that very tender age, when alone they can be moulded,” and the Bishop of London’s opinion that these schools’ benefit lay “in giving [children], not so much actual knowledge as that which, at their age, is more important, the habit and facility of acquiring it.”⁶⁶ The 1861 Newcastle Report on the state of popular education put the same concept a little differently: “We shall show hereafter that if two children enter an elementary school at the age of 7 ... one

64. “Untitled,” vol. 18, 897, *Sussex Advertiser* (Lewes), December 1825, <https://link.gale.com/apps/doc/R3213511842/BNCN?u=oxford&sid=bookmark-BNCN&xid=2d7b6ed4>.

65. “Report of the State of Education in Birmingham,” *Journal of the Statistical Society of London* 3, no. 1 (1840): p. 30, <https://www.jstor.org/stable/2337963>.

66. Charles Knight, “Infant Schools,” *Penny Magazine of the Society for the Diffusion of Useful Knowledge* 1, no. 25 (1832): 210–1, <https://www.proquest.com/historical-periodicals/infant-schools/docview/2754999/se-2?accountid=13042>.

coming from a good infant school, the other uneducated ... the child from the infant school will make as much progress by the age of 10 as the other will by the age of 12'.⁶⁷ Finally, T. H. Huxley expressed a similar opinion on behalf of the School Board for London:

We cannot too strongly insist upon the importance of schools for children under 7 years of age. In a properly conducted Infant School, children are not only withdrawn from evil and corrupting influences, and disciplined in habits of order, attention and cleanliness but they receive such an amount of positive instruction as greatly facilitates their progress in the more advanced schools.⁶⁸

The beliefs thus sampled appear tentative, somewhat speculative, and perhaps overly preoccupied with moral character. They express a general belief that infant schools improved school readiness but offer no explicit theory, not least one that appealed to biological development, for why that should be the case. Still, it is clear that some of the organizers of education over the nineteenth century thought of early and late education as complements in some form or another.

The development of middle-class kindergartens provides a final illustration of how slowly such ideas were adopted and put into practice. Although middle class readers may have been more familiar with the cultural changes discussed above, notably the Romantic association of childhood with innocence and nature, the incorporation of such ideas into middle-class schooling came much later.⁶⁹ Indeed, early pamphlets proposing educational reform in this area took the working-class infant school as their

67. *Report of the Commissioners Appointed to Inquire Into the State of Popular Education in England*, 1861, p. 28.

68. School Board for London, *Minutes*, vol. 1, London, 1870-1 qtd. in Jane Read, "Free Play with Froebel: Use and Abuse of Progressive Pedagogy in London's Infant Schools, 1870-C. 1904," *Paedagogica Historica* 42, no. 03 (2006): pp. 309-10.

69. Cunningham, *Children and Childhood in Western Society Since 1500*, pp. 54-9.

model.⁷⁰ In part, as discussed above, this reflected a lack of consensus on when children should begin school and the absence of a clear theory to guide the decision.⁷¹ Early kindergarten promoters Johannes and Berta Ronges, for example, understood that to meet their objective they would have to offer a conceptual justification for early childhood education, as ‘Mothers have been left without the assistance of science in their nurseries’.⁷² Such a justification was imported from Europe through the work of Friedrich Froebbel, himself a student of Pestalozzi, and was greatly encouraged by Liberal German emigrés who arrived following the revolution of 1848.⁷³ Growth of kindergarten was halting through the 1850s and 60s, but after the Home and Colonial Infant School society hired Heinrich Hoffmann in 1857 to introduce Froebbelian methods in the training schools, and the opening of several other kindergarten training schools in years following, by the late nineteenth century, kindergarten offered a viable model of education for middle-class children.⁷⁴

As a further consequence of this reform, infant school teachers in the 1870s were likely to have received training in child-centred, Froebbelian pedagogy, and school boards made some effort to introduce these methods to working-class infant schools.⁷⁵ However, given the very high pupil-teacher ratios in such schools, infant school teachers could do little more than encourage repetitious and rote exercises that only superficially resembled Froebbel’s pedagogy.⁷⁶ Tailoring lessons to individual children’s

70. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, p. 29.

71. Tessa Blackstone, *A Fair Start: The Provision of Pre-School Education* (London: Allen Lane, 1971), p. 14, 22.

72. Johannes Ronge and Berta Ronge, *A Practical Guide to the English Kinder Garten* (London, 1855), p. iii qtd. in *ibid.*, p. 26.

73. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 31-6.

74. Blackstone, *A Fair Start: The Provision of Pre-School Education*, p. 25; Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 36-9.

75. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 45-7.

76. *Ibid.*, pp. 47-50.

needs would be virtually impossible where class sizes approached 100 infants.⁷⁷

Though developments in psychology and pedagogy were converging upon a concept of complementarity in education over the course of the nineteenth century, several barriers worked against the widespread adoption of such ideas. On the one hand, attitudes towards early childcare seem to have resisted change. On the other, a lack of resources hindered the adoption of well-laid plans. As a consequence, early childhood education in practice lagged considerably behind theory.

3.2 School enrolment age in practice

When Henry Brougham, M.P. and educational reformer, stood to support the new infant schools in 1824, he recounted a critic's accusation, 'not satisfied with dispensing education to children who have attained what in former times was thought a proper age, we are now anxious to educate mere infants incapable of receiving benefit from such instruction.'⁷⁸ Brougham was alleging that many of his contemporaries held normative beliefs about the 'proper age' for children to attend school, although he did not specify an age. Perhaps the clearest moment to observe norms like these is when they are converted from vaguely shared beliefs into explicit, universal standards. William Petty's proposal in 1647 for universal schooling, for instance, applied to 'all children of above seven yeares old', and seven was a common statutory lower-bound for admission to the day schools.⁷⁹ The parochial school in St. Mary, Islington, in the early nineteenth century had ruled 'That no child shall be admitted till turned

77. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 47-50; Blackstone, *A Fair Start: The Provision of Pre-School Education*, pp. 28-9; Read, "Free Play with Froebel: Use and Abuse of Progressive Pedagogy in London's Infant Schools, 1870-C. 1904," p. 314-6.

78. "Infant Schools," *The Morning Chronicle* (London), June 1824, p. 3, accessed 24 February 2023, British Library Newspapers.

79. William Petty, *The Advice of W.P. to Mr. Samuel Hartlib. for the Advancement of Some Particular Parts of Learning*, GALE Making of the Modern World (London, 1647), p. 4, <https://link.gale.com/apps/doc/U0104922550/MOME?u=oxford&sid=bookmark-MOME&xid=5ecf6b89&pg=5>; Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, p. 6.

Table 3.1: Statutory admission ages in charity school charters

School	Date	Age of admission
Halsham Free School, Yorkshire ^a	1579	6-14
Great Marlow Free School, Buckinghamshire ^a	1624	10-14
Latimer's School, Hammersmith ^b	1627	7-12
Yarmouth Charity School, Norfolk ^c	1713	8-14
Catherine Bayley's School, Coventry ^d	1751, 1768	9-10
Birmingham Bluecoat School ^e	1756	7+
Hendon Free School, Suffolk ^f	1852	7-12

a: W. K. Jordan, *The Charities of Rural England, 1480-1660: The Aspirations and Achievements of the Rural Society* (London: George Allen / Unwin, 1961), pp. 56, 319 b: W. K. Jordan, *The Charities of London, 1480-1660: The Aspirations and the Achievements of the Urban Society* (London: George Allen / Unwin, 1960), pp. 240 c: NRO Y/ED/269 d: CHC 368/1/1 e: WC MS 1622 1/1/1/2 f: SABSE FL590/11/3

of seven years of age'.⁸⁰ According to the charter of the Bunbury grammar school, established in 1595, girls could be admitted to learn to read in English but 'might not continue past the age of nine or such earlier time as they had learned to read'.⁸¹ This suggests an expectation that girls would learn to read by age nine, a process that was believed to take about two or three years. Allowing for differences of opinion, therefore, the closest thing to a consensus seems to be that the 'proper' school-entry age was seven. Several more explicit statements of school-age are given in table 3.1, taken from the minute books and charters of schools providing elementary education. As a whole, it seems that a wide range of school-entry ages were acceptable, although most were relatively late. It is also difficult to discern a trend, with the free school in Hendon admitting the same range of children in 1852 as Latimer's school had done more than two centuries earlier. At least among the school trustees and donors affiliated with endowed schools, school-entry norms appear to have been relatively unchanging and did not reserve time for infant education.

Households making decisions about school-entry age may therefore have been influenced by a growing theoretical appreciation for the importance of infant education,

80. LMA P83/MRY1/0265

81. W. K. Jordan, *The Charities of London, 1480-1660: The Aspirations and the Achievements of the Urban Society* (London: George Allen / Unwin, 1960), p. 232.

or they may have held to more customary school-entry norms. I first consider the relatively affluent middle- and upper-class households who enrolled their children in Merchant Taylor's, a London grammar school teaching day scholars.⁸² Where material constraints on the household were unlikely to press in the direction of early education as a form of necessary childcare, as in working households, I expect the age of enrollment to more closely reflect customary notions. Thus the ages of admission to Merchant Taylor's school, whose pupils were relatively elite and became increasingly so over the eighteenth century, can perhaps provide a clue about what ideas prevailed when there was no pressing material reason to behave otherwise.⁸³ Merchant Taylor's was a grammar school in London that also accepted children into its petty classes, where they were taught to read and write in English as preparation for the grammar school.⁸⁴ At the beginning of the eighteenth century, sons of artisans and even a small number of labourer's sons were admitted, but this practice was gradually abandoned and gentry families simultaneously became more likely to enrol their sons, giving 'a clear impression of a social "elevation"', according to Tompson, by about 1740.⁸⁵ Figure 3.1 presents the admission age of all boys admitted to Merchant Taylor's between 1700 and 1874, which is extracted from a digitized copy of the school's registration books.⁸⁶ Overall, this sample describes the enrolment of 10,888 pupils at the school.

First impressions suggest there was very little agreement about when to enrol a child. For the whole eighteenth century, there was an approximately six-year difference between the youngest decile and the eldest decile of admitted boys. Although boys entering the grammar school were likely older than boys entering the petty

82. Curtis and Boulton, *An Introductory History of English Education Since 1800*, p. 16.

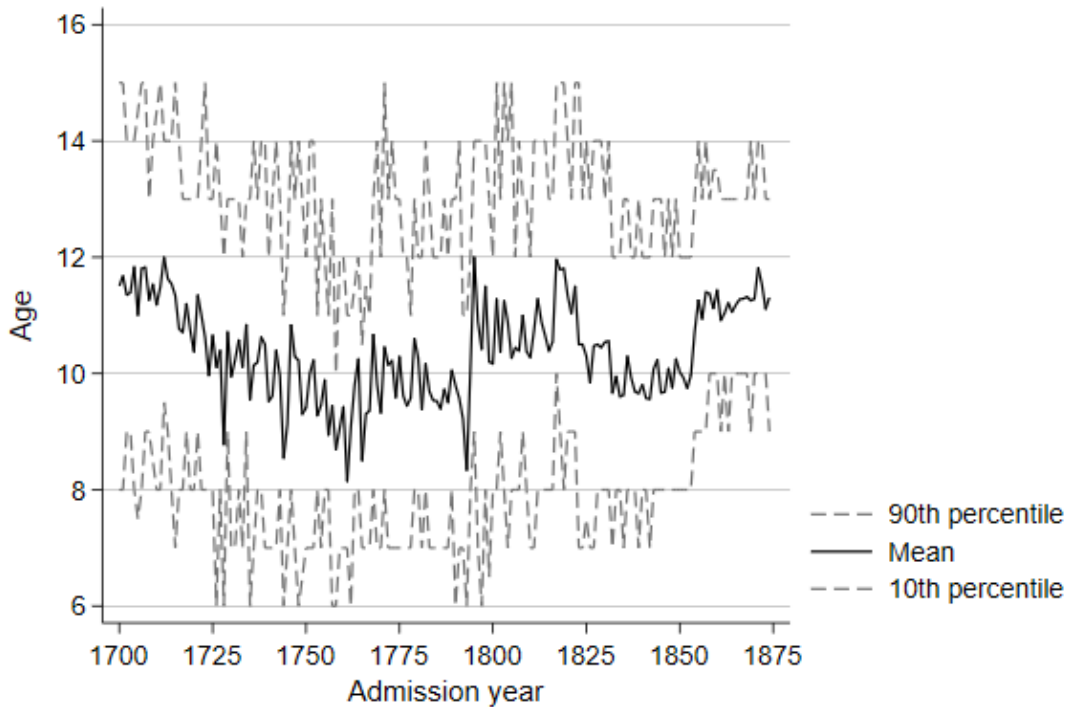
83. Richard S. Tompson, *Classics or Charity? the Dilemma of the 18th-Century Grammar School* (Manchester: Manchester University Press, 1971), pp. 96-8.

84. DeMolen, "Ages of Admission to Educational Institutions in Tudor and Stuart England," p. 214.

85. Tompson, *Classics or Charity? the Dilemma of the 18th-Century Grammar School*, pp. 96-8.

86. Charles J. Robinson, *A Register of the Scholars Admitted Into Merchant Taylor's School, from A.D. 1562 to 1874*, vol. 2, HathiTrust (Lewes: Farncombe & Co, 1883), <https://hdl.handle.net/2027/njp.32101068146164>.

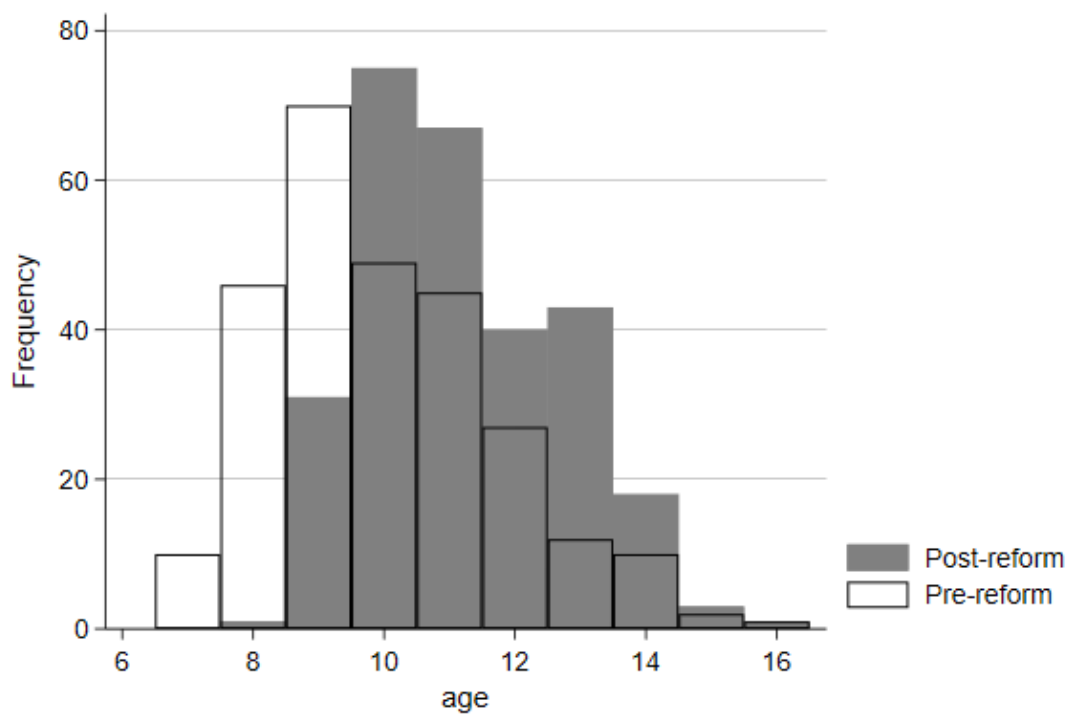
Figure 3.1: Age of enrolment of children at Merchant Taylor’s school, London



school, which would account for some of the variation, the extent of variation is nonetheless remarkable. Wide variation in the age of enrolment is also replicated at Eton and Bury St. Edmunds, schools which did not admit petties.⁸⁷ To some extent variation at the secondary level represented by the grammar school must also have reflected variation at the more elementary levels of education, as children completed their earlier schooling and advanced to the grammar school at very different ages. Within this wide range of variation, however, the mean school-entry age was relatively late, ranging from about nine to twelve years old. The youngest decile entered the school, likely admitted to the petty classes, around age seven. Moreover, while there was more change over time at the top of the age distribution, the bottom decile changed very little before about 1850 (see figure 3.1). In sum, the enrolment registers

87. DeMolen reports age distributions for these schools which imply mean admission age in the seventeenth century was 12.7 years with a standard deviation of 1.7 years in Bury St. Edmunds and 12.3 years with a standard deviation of 1.6 years at Eton; see DeMolen, “Ages of Admission to Educational Institutions in Tudor and Stuart England,” pp.213-4.

Figure 3.2: Age distribution before and after closure of petty classes, Merchant Taylor's



of Merchant Taylor's suggest little consensus existed among these middle- and upper-class households about when to enrol a child. As a general tendency, their children were sent to school late, and this situation, particularly for younger children, was largely unchanging from about 1700 to 1850.

Within this wide range of school-entrance ages, it is possible to get a rough idea of the age of the petties by examining the effects of school reform. In 1854, the new schoolmaster closed the petty school and changed the admission criteria to only admit those above nine years old who could read and write in English and understood basic Latin grammar.⁸⁸ This change of policy appears in figure 3.1 as a sharp jump in enrolment age in 1854. By comparing the age distribution before this reform, which included both petty- and grammar-school admissions, to the distribution after

⁸⁸ F. W. M. Draper, *Four Centuries of Merchant Taylors' School: 1561-1961* (London: Oxford University Press, 1962), p. 152.

the reform, which only included grammar-school admissions, I extract the empirical distribution of petty-school admissions, subject to some assumptions.

Figure 3.2 depicts the histogram of enrolment ages for the five-year period before the reform, from 1849 to 1853 inclusive, overlaid on the histogram for the five-year period after the reform, from 1855 to 1859 inclusive. The year of the reform itself, 1854, I exclude as I expect admissions in that year to have been a mix of admissions practices from both regimes. As a slight methodological point, I make no effort to correct for the exclusion of potential grammar-school boys aged younger than nine in the post-reform period. It is possible that eight-year-old boys would have liked to be admitted to the grammar school in the post-reform period but could not. I discuss the possible effect of this truncation in the discussion below.

I conceive of the probability density function (PDF) for admission age in the pre-reform years as a combination of two PDFs, one for the admission age of petties and another for the admission age of grammar-school boys. These PDFs are each weighted by the share of petties and grammar-school boys in the school, or more specifically in admissions. That is,

$$p(x) = wp_a(x) + (1 - w)p_b(x), \quad (3.1)$$

where $p(x)$ is the PDF of admission age in the pre-reform (combined) years, $p_a(x)$ is the PDF of petties' admission age, w is the weight or share of petties in the admitted group, and $p_b(x)$ is the PDF of grammar-school admission age. If I assume that the post-reform PDF is equivalent to $p_b(x)$, the grammar-school distribution in the pre-reform years, it is possible to back out the distribution of petty-school admissions by assigning a weight, w , representing the share of petties in school admissions, according to the following equation

$$p_a(x) = \frac{1}{w}p(x) - \frac{1 - w}{w}p_b(x). \quad (3.2)$$

This is simply (3.1) rearranged, with $p(x)$ being the empirical PDF in the pre-reform period and $p_b(x)$ being the empirical PDF in the post-reform period, standing in for the distribution of grammar-school boys.

It remains to assign a weight to petty-school admissions. The admissions books do not state the class into which boys were admitted so this must be worked out another way. I begin by observing that 272 boys were admitted in the five pre-reform years and 279 boys were admitted in the five post-reform years. Thus it seems the overall scale of admissions did not change. Rather, admissions into the grammar school grew at the expense of petty-school admissions. As a first pass, I assume that boys aged 13 and above when admitted were exclusively admitted into the grammar school and maintain the assumption that the post-reform PDF was the same as the pre-reform PDF for grammar-school admissions. The growth in the number of boys aged 13 and above post-reform, under these assumptions, gives the growth of grammar-school admissions as a result of the reform. There were 65 boys aged 13 and above post-reform and 25 pre-reform, suggesting growth by a factor of 2.6. This implies that roughly 38 per cent of pre-reform admissions entered the grammar school and $w = 0.62$. It seems that, in fact, the majority of boys admitted to Merchant Taylor's school before 1854 were admitted to the petty school to be taught how to read and write in English. Corroborating evidence for this view comes from the appendix of the Clarendon commission, which inspected the students of Merchant Taylor's in December 1861. By this time, only nine boys were still enrolled at the school who had been admitted in the pre-reform period. Of these, seven had been admitted into the petty school, or roughly 77 percent.⁸⁹ At least circa 1850, therefore, it seems correct to conclude that the majority of boys admitted to Merchant Taylor's entered as petties.

⁸⁹. *Report of Her Majesty's Commissioners Appointed to Inquire Into Revenues and Management of Certain Colleges and Schools: Appendix*, vol. ii (London: Her Majesty's Stationery Office, 1864), p. 355.

Table 3.2: Approximate age of petties at Merchant Taylor’s

Admission age	PMF (1849-1853)	PMF (1855-1859)	Petties $w = 0.5$	Petties $w = 0.62$
7	0.037	0.000	0.074	0.059
8	0.169	0.004	0.334	0.271
9	0.257	0.111	0.403	0.347
10	0.180	0.269	0.091	0.126
11	0.165	0.240	0.09	0.120
12	0.099	0.143	0.055	0.072
13	0.044	0.154	-0.066	-0.023
14	0.037	0.065	0.009	0.020
15	0.007	0.011	0.003	0.005
16	0.004	0.004	0.004	0.004
Mean	9.998	11.20	8.791	9.26

Table 3.2 works out the empirical probability distribution of enrolment age in the petty school using equation (3.2). As the data are discrete, these are technically probability mass functions (PMF). Using $w = 0.62$ to work out the empirical PMF for petty enrolment suggests a mean enrolment age of 9.26 in this group. The effect of possible truncation at age nine is therefore somewhat ambiguous. ‘Uncounted’ grammar-school boys aged seven or eight would translate into relatively fewer petties at these ages, which are below the mean. However, because the PMF must sum to one, correcting for these potentially ‘uncounted’ early grammar-school admissions would flatten out the remainder of the post-reform PMF, implying relatively more petties admitted after age nine, which is older than the mean. The net effect, I expect, would be to leave the estimated mean largely unaffected and increase the variance. On the other hand, policy may follow as much as direct practice, and it is possible that the 1854 policy change simply formalized the fact that few children entered the grammar school below age nine. The estimated distribution itself fairly closely matches the statutorily defined age of petties supported by Latymer’s will (1624), i.e., between age seven and 12, one of the few charters DeMolen was able to identify that explicitly

mentioned petties' ages.⁹⁰ Using $w = 0.5$ as a more conservative value still yields a mean enrolment age of 8.791 for petties. In theory, PMFs should not be negative; however, given these are random variables, an unlikely draw may turn out an empirical result that does not align with theoretical expectations. This is the likely explanation for the estimated PMF at age 13. Nonetheless, assuming the more conservative lower weighting yields what seems like a very large negative probability for petty admissions at age 13, which seems unlikely, although this may also be due to a failure of the assumptions underlying the exercise. Examining the seven petties included in the Clarendon report yields a mean age of 9.05 at admission, providing direct evidence for a relatively late admission age into elementary education among these middle- and upper-class households.⁹¹ At least insofar as the children at Merchant Taylor's and in the schools cited above are representative, this evidence suggests that relatively elite families conservatively followed late school-entry norms throughout the eighteenth and nineteenth centuries.

For working-class households, in contrast, very practical—but from the point of view of children's development, contingent—considerations about budgets, clothing, travel, and child care emerge as primary justifications for school entry and exit. This is not because working-class people were categorically incapable of understanding Locke or Rousseau. Indeed, several working class writers mention having read Locke.⁹² 'Read part of Locke's "Essay on Human Understanding,"' wrote Thomas Turner (1756), a shopkeeper, and not unfairly added, 'which I find to be a very abstruse book.'⁹³ Rousseau was apparently read by a smaller group, among whom Thomas Poole, au-

90. DeMolen, "Ages of Admission to Educational Institutions in Tudor and Stuart England," p. 211.

91. *Report of Her Majesty's Commissioners Appointed to Inquire Into Revenues and Management of Certain Colleges and Schools: Appendix*, p. 355.

92. Place, *The Autobiography of Francis Place*, p.119; Pollock, *Forgotten Children: Parent-Child Relations from 1500 to 1900*, p. 122; Rose, *The Intellectual Life of the British Working Classes*, p. 21.

93. Thomas Turner, *The Diary of Thomas Turner* (Oxford: Oxford University Press, 1984), p. 74.

dodidact farmer from Somerset, but his ideas did have a wider effect.⁹⁴ Indeed, the radical soldier John Pearman wrote, ‘My firm belief is man was sent into the world to be happy & joyful as all other animated nature are it is the artificial Law that cause so much misery’, an opinion with which Rousseau would have wholeheartedly agreed.⁹⁵ Such cases may well have been exceptional, but they reveal a certain interest in thinking about the development of the mind. Rather, correspondence in the education of working-class children with any ‘natural’ process was interrupted by considerations of family economy, which overwhelmingly ruled decisions about school enrolment.⁹⁶ For children thus affected, according to historian David Vincent, ‘the forces affecting school attendance were such as to prevent the identification of the period of institutional education with a particular period of childhood.’⁹⁷

The moment of future transition into work dangled over working-class school children’s time at school like Damocles’s sword.⁹⁸ As a result, parents often expressed a dispassionate attitude towards school. For instance, despite his mother’s insistence that he learn to read and write, James Mullin wrote, ‘my mother kept continually impressing me with the unanswerable argument that I was bound to work for my living all through my life and the sooner I started the better. By “work” was meant manual labour, for mental labour was considered no work at all.’⁹⁹ Parents expressed hope that their children might acquire some basic intellectual ability like reading or numeracy, but there were limits to what they would do to achieve this. When asked about irregularity of school attendance in Pendleton, a dyer’s wife and mother to

94. Stewart and McCann, *The Educational Innovators, 1750-1880*, pp. 23-4.

95. John Pearman, *The Radical Soldier’s Tale: John Pearman, 1819-1908*, ed. Carolyn Steedman (London: Routledge, 1988), pp. 162-3.

96. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 310; Smelser, *Social Paralysis and Social Change: British Working-Class Education in the Nineteenth Century*, p.

97. Vincent, *Bread, Knowledge and Freedom: A Study of Nineteenth-Century Working Class Autobiography*, p. 97.

98. Madoc-Jones, “Patterns of Attendance and Their Social Significance: Mitcham National School, 1830-39.”

99. James Mullin, *The Story of a Toiler’s Life*, ed., Patrick Maume, (Dublin: University College Dublin Press, 2000) p. 23, qtd. in Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 330.

seven children responded, ‘We senden them to school a bit, when we can afford it,’ and stressed her reluctance to send her children to school without proper clothing, ‘poor folk canna live, let alone clothing and larning. I canna, for shame, to let children go out, let alone going to school. But it’s a weary thing when people canna read. It’s a blessed fine thing to be a good scholar.’¹⁰⁰ Another woman explained, ‘she never sent her children to schoo’ but when she could find *nout* better for ‘em to do.’¹⁰¹

This attitude applied equally to the content of school instruction. One teacher, Thomas Cooper was an intellectually ambitious autodidact who briefly found work as a schoolmaster because of his reputation for wandering the fields with stacks of books.¹⁰² At first, in addition to reading and writing, he taught a small group of interested boys Latin and Euclid. ‘There was no desire on the part of the parents of any other pupils in my school, that they should learn Latin’, Cooper admitted, but he nonetheless ‘wished to teach it to all’. He soon began lessons in Latin for all children at no additional fee, and urged the class to memorize the parts of speech. The response from parents was unhappy—‘I want our Jack to larn to write a good hand. What’s the use of his larning Latin? It will nivver be no use to him’—and Cooper’s students left his classroom for another.¹⁰³ Another boy, George Herbert, explained, ‘I had been set a sum of how many barley corns would reach around the world. My father thought I had learned enough for my purpose in my capacity of life. I was therefore put to work’.¹⁰⁴ Although attitudes such as these do not directly reflect the idea of ‘complementarity’, they do give a sense that working-class attitudes towards pedagogical theory were rather conservative.

Actual evidence on working-class parents’ rationale for school-entry age is very dif-

100. “State of Education in the County of Rutland,” pp. 68-9.

101. *Ibid.*

102. Incidentally, Cooper began his education before the age of three. Cooper, *The Life of Thomas Cooper*, pp. 5, 73.

103. *Ibid.*, pp. 75-6, 99.

104. George Herbert, *Shoemaker’s Window*, ed. Christina S. Cheney, (Oxford: Blackwell, 1948) p. 7 qtd. in Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 331.

difficult to come by. Adults reflecting on their own childhoods may not have remembered or ever known their parents' full motivations, and working-class autobiographers provided little information about their families.¹⁰⁵ In the few examples I have been able to find, however, parents seem to have been motivated by non-pedagogical concerns. For instance, Alexander Somerville only began attending school aged eight because there was no one to make the two-mile journey with him and, as he thought, due to 'the want of clothes, such as the affectionate feelings of my father and mother wished me to go in—simply something else than rags; and these were not to be had until 1818, when markets fell, and food being cheaper, it became possible to get clothes.'¹⁰⁶ Thomas Cooper, under the care of his recently widowed mother working as a dyer at home, was sent to a dame's school 'As soon as I was strong enough.'¹⁰⁷ The death of David Winstanley's mother, he wrote, 'left my Father with four of us to provide for.' Both parents were hand-loom weavers, and the shock loss of a carer apparently prompted Winstanley's father to find a school place for the five-year-old.¹⁰⁸ Another boy, James Campkin, was prone to wander off until, at eight years old, he went missing for an entire day. 'No sooner had I arrived at home,' he wrote, 'than a consultation was held, and the result was that the next week I was to be sent to school.'¹⁰⁹ For these working households, the decision about when to enroll a child in school took into account children's physical growth, health, safety, clothing, and the need for child care but did not consider pedagogical theory.

A clearer perspective on how much working-class households believed age affected education may be gained by flipping the question on its head. One implication of the

105. Vincent, *Bread, Knowledge and Freedom: A Study of Nineteenth-Century Working Class Autobiography*, pp. 43-4.

106. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 310; **qtd. in** Vincent, *Bread, Knowledge and Freedom: A Study of Nineteenth-Century Working Class Autobiography*, p. 96.

107. Cooper, *The Life of Thomas Cooper*, p. 7.

108. David Winstanley, *A Schoolmaster's Notebook: Being an Account of a Nineteenth-Century Experiment in Social Welfare, by David Winstanley of Manchester, Schoolmaster*, ed. Thomas Kelly and Edith Kelly, vol. 8, 3 (Manchester: Chetham Society, 1957), p. 22.

109. James Campkin, *The Struggles of A Village Lad* (London: William Tweedie, 1859), p. 4.

theory of ‘dynamic complementarity’ in education is that remedial learning requires more time and effort than if education had followed a more efficient schedule in early childhood. Rather than looking for parents to rationalise their school-entry decisions, therefore, expressions of a particular kind of regret from individuals who only learned to read and write in later life may also indicate a belief in ‘complementarity’. I look for this kind of evidence in the set of working-class autobiographers Jane Humphries identifies as having learned to read and/or write as adults, supplemented by a few autobiographies identified through the Burnett, Vincent, and Mayall bibliography.¹¹⁰ Individuals would likely have clearer memories of their time spent acquiring literacy when older, and the process of acquiring literacy forms an important part of the narrative in autobiographies, as these accounts depend on their authors being literate, so education is therefore a common topic.¹¹¹ A general expression of regret at having not learned to read in childhood will not be sufficient evidence of a belief in educational complementarity. Rather, I interpret late learners to be expressing an implicit belief in educational complementarity if they express regret over having their capacity to learn diminished by having begun their education late, relative to children who began at younger ages. I have been unable to identify working-class autobiographers who expressed such an attitude.

The first group of late-learners and autobiographers were those born in the eighteenth century. John Savage, a miller, was born in 1723 in Essex. Although his mother taught him to learn to read at home at a very young age, he describes his first entry to the classroom aged ten:

It being quite a Country place where we was born, there was no Schools
nearer than Maldon to send us to. As soon as my elder Bror. & Self

110. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 309; John Burnett, David Vincent, and David Mayall, *The Autobiography of the Working Class: An Annotated, Critical Bibliography* (Brighton: Harvester, 1984).

111. Vincent, *Bread, Knowledge and Freedom: A Study of Nineteenth-Century Working Class Autobiography*, p. 94.

were ten or twelve years old we were sent thither to learn Writing and Arithmetick, and we work'd rather hard to get that little learning ; it was full five miles to ye Schoool, and we used to walk thithter in the Morning and home at Night, Summer & Winter, and two Sons of a Neighbour came a mile further to call us. Now if a Farmer or Tradesman's sons have two or three miles to go to a School they must have a Hobby or a Donkey to ride it, poor Rogues!¹¹²

It is clear that by 'hard work' Savage means the long journey between home and the schoolroom, and there is no other indication that Savage felt at a disadvantage for beginning school at this age. The next autobiographer, Joseph Mayett was born in 1783 in Buckinghamshire, and his childhood was spent in lace-making for wages to supplement his father's poor pay as an agricultural day labourer.¹¹³ Again, although he did not attend a formal school, his mother made an effort to teach him the basics of reading from the family Bible and a primer.¹¹⁴ At age eleven, Mayett describes his experience at the Sunday School:

in the year 1794 there was a Sunday School Set up in the town to which I was Sent and the master being a tolerable good scholar for that age I made some progress the first twelv months in Learning hard names and I sone became the first boy in the School but my master being taken ill was obliged to give up the School and I was turned over to another School master but I made but little progress for I never Learned the points and stops the accents nor emphatical words only I Could Read without Spelling neither did I learn any of these untill I was 23 years of age.¹¹⁵

112. John Savage, *Memoirs, Containing Some Particulars of the Life, Family, and Ancestors of John Savage* (Ipswich: S. / W. J. King), p. 1.

113. Joseph Mayett, *The Autobiography of Joseph Mayett of Quainton (1783-1839)*, ed. Ann Kussmaul (Aylesbury: Buckinghamshire Record Society, 1986), p. 1.

114. *Ibid.*

115. *Ibid.*, p. 2.

Mayett does describe having difficulties in school, but he seems to attribute these to the quality of his teacher and not his age. Indeed, under his earlier teacher, he boasts of being top boy.¹¹⁶ In 1803, he enlisted in the army and by chance acquired additional education from another soldier quartered in the same barracks in 1806:

here I was stationed in a half Room that is half the men of our Company and half of another Company and there was a man whose name was Samuel winright a man of the other Company in the Room with me and he was a good Scholar and he undertook to learn me to Read in a better tone of voice than I had attained too and to keep my points and stops for I had never learned them before.¹¹⁷

There is again nothing here to indicate Mayett felt he was at a disadvantage by his late education.

The second group of late-learning autobiographers were men born in the early nineteenth century. Emanuel Lovekin, a mining butty born in Staffordshire in 1820, described how he came to learn to read aged 13:

But when I was about 13teen, I had my thigh broken and had to lei in bed thirteen weeks. And began to feel very Strongley the deseries to learn to read. The young men I know came and read to me and I begain to learn a little, and when I was able I went to a nights School. And the little I learnt made me feel I was getting on very nicely.... I went to the Wrockmerdine Wood Primitive Methodist Sunday School a good while learned a little knowlidge and truth, For which I had great cause to thank God, Still by perseverance I got to read fairly well and write a little and

116. Mayett, *The Autobiography of Joseph Mayett of Quainton (1783-1839)*, p. 2.

117. *Ibid.*, p. 37.

Somehow I was looked up to as Something alien to the Common Class of young men.¹¹⁸

Lovekin's description is spare, but there is nothing here to indicate he believed his education was at a disadvantage. Next, James Murdoch was born in 1806 the illegitimate child of a butcher and a servant in Elgin, Scotland. As a consequence of his illegitimacy, Murdoch's father, 'took little notice of me', which perhaps explains his late educational start. 'At ten years of age I was put to school, where I was taught to read the Bible, and got a few lessons in writing', Murdoch writes, which he supplemented as a teenager:

In the fifteenth year of my age I managed to put myself a few months to school, which were spent in writing, studying Gray's Arithmetic, and Lennie's Grammar, and in poring over the pages of an English, and a Latin and English Dictionary, both of which came accidentally into my hands.¹¹⁹

Rather than express regret over his late start, however, Murdoch portrays himself as attentive and intelligent, writing, 'From the earliest period I can remember my mind was naturally thoughtful'.¹²⁰

Autobiographers in the third group were born in the second half of the nineteenth century and became involved with an active and expanding labour movement. Will Thorne (b. 1857), a trade unionist and eventual M.P., learned to read in his twenties after moving to London and becoming politically active. He states only that 'Eleanore Marx-Aveling, Karl Marx's third daughter, used to assist me to improve my reading and handwriting, which was very bad at the time', and later, 'It was Eleanor that helped me more than any one else to improve my very bad handwriting, my reading

118. John Burnett, ed., *Useful Toil: Autobiographies of Working People from the 1820s to the 1920s* (London: Routledge, 1974), pp. 296-7.

119. James Murdoch, *The Autobiography and Poems of "Cutler Jamie"* (Elgin: n.p., 1863), pp. 1-3.

120. *Ibid.*, pp. 2.

and general knowledge'.¹²¹ Walter Freer was born in 1846, worked as an engine-loom operator, and eventually became active in Glasgow municipal politics. He provides the following account of his earliest education:

For me education consisted of three months' tuition at a penny school. Every Monday morning the school-master collected our pennies, then left us to do whatever we wanted, while he went out to get tipsy. I left school, unable to write, and able to read only the simplest words.

At nine years of age I was working at a factory where copy-books were ruled. I remember so well a boy called Young who taught me to make strokes and curves. One night he produced a writing-book so that I might have a copy to work from. I looked at it. There was something familiar about it. I asked him whose name was printed on it.

When he told me, I laughed and said: "That's yin o' the buiks we're ruling in the work." I had been working making books to teach other boys how to write and I couldn't write myself.

Reading I had to learn by hanging round the door of a cellar where boys were learning their lessons, and for the loan of a penny reader would gladly run the messages for a boy's mother.

The first continuous bit of reading of my life was the fingering out of a text on a card given me at the Sabbath night school. When I had learned six texts I received a big card, and for six big cards obtained a book. What a glorious possession, a real book to work at with the help of other boys and men in the work!¹²²

121. Thorne, *My Life's Battles*, pp. 47, 117.

122. Walter Freer, *My Life and Memories* (Glasgow: Civic Press, 1929), pp. 128-9.

Freer's description of his sporadic attainment of literacy evokes little pathos, and he depicts himself as a keen and enterprising reader who overcame difficult circumstances. Incidentally, Freer also describes how Glaswegians received the theory of evolution:

The world of thought has seen as much change as the world of science. Years ago Glasgow Green was the great Forum of the people—as indeed it is to-day. I remember well the days when the chief objects of ridicule were the 'monkey-men' who made speeches about Darwin and Evolution. To me, and most of my like, bred in Calvinistic doctrine, the mention of evolution was an outrage. We wouldn't have it.¹²³

This kind of hostility towards evolutionary theory possibly ruled out acceptance of developmental psychology grounded on its principles. George Edwards, born in 1850 in Norfolk, was a brick-maker and agricultural labourer, and later, a trade unionist and M.P. He did not learn to read until after he was married, aged 32, when his wife taught him to read and prepare sermons for the Methodist circuit. He writes:

Up to this time I could not read, I merely knew my letters, but I set myself to work. My dear wife came to my rescue and undertook to teach me to read. For the purposes of this first service she helped me to commit three hymns to memory and also the first chapter of the Gospel according to St. John. It was a big task, but she accomplished it, and this is how it was done. When I returned home from work after tea she would get the hymn-book, read the lines out, and I would repeat them after her. This was repeated until I had committed the whole hymn to memory.¹²⁴

His first sermon was delivered largely from memory, but he was able to read the next one:

123. Freer, *My Life and Memories*, p. 131.

124. George Edwards, *From Crow-Scaring to Westminster: An Autobiography* (London: Labour Publishing Company, 1922), p. 32.

I made rapid progress with my education under the tutorship of my wife, who would sit up very late at night to teach me. She would sit on one side of the fireplace and I on the other. I would spell out the words and she would tell me their pronunciation.

By the time the next plan came out I could just manage to read my lesson and hymns, but not until I had gone through them many times with my wife and had mistakes rectified.¹²⁵

Despite his late start, Edwards does not express any hesitation or regret. Rather, he comes across as extremely competent and dedicated. He describes himself as 'eager for knowledge' and explains how he gave up his habit of smoking tobacco so that he could finance the purchase of more books.¹²⁶

The final group of late learners I consider are women born in the second half of the nineteenth century who, through their involvement with the cooperative movement, contributed autobiographies to a collected volume.¹²⁷ Both of these women learned to read as domestic servants. Mrs. Wrigley was born in 1858 in Cefn-Mawr, in the Welsh Marches. She describes her earliest education:

My third situation was in Oldham in 1872, at a Temperance Hotel. I was then fourteen years old. Seeing as I could not read or write, my master and mistress took an interest in me and paid for my education at the night school for two years. He also helped me at night with my lessons.¹²⁸

Her description contains little detail, but she does not indicate that her late start posed any particular problems. Mrs. Layton, born in 1855 in Bethnal Green, provides more detail. She picked up various lessons through her different employers as a young domestic servant. At age eight, she describes attending a ragged school:

125. Edwards, *From Crow-Scaring to Westminster: An Autobiography*, pp. 33-4.

126. *Ibid.*, p. 34.

127. Margaret Llewelyn Davies and Virginia Woolf, eds., *Life as We Have Known It, by Co-Operative Working Women* (London: L. / Virginia Woolf, 1931).

128. *Ibid.*, p. 59.

I got to work at eight in the morning and left at eight at night, with the exception of two nights a week when I left at seven o'clock to attend a night school, one of a number started by Lord Shaftesbury, called Ragged School. I was very happy in my place and was very fond of the baby, who grew so fond of me that by the time he was twelve months old he would cry after me when I went home to my dinner and when I went away to school before he was in bed. I felt very proud of my influence over my baby, and got into the habit of taking him home with me rather than let him cry. But I could not take him to school with me. As it was summer time and his mother could not keep him quiet, she offered me 3d. more a week to give up going to school and stay with the baby. This was a great trial to me. I did not like to feel the baby was crying and being neglected while I was at school. At the same time the teacher was so pleased with my progress and I was so anxious to learn, that I decided to stay at school. This upset my mistress and she made up her mind I should not go to that silly school. The conflict ended by my refusing to work for her, and so we parted.¹²⁹

Mrs. Layton refused higher wages to continue her schooling, where she believed she was making good progress. The next mention of literacy comes when she is fifteen years old and employed in a new situation: 'My mistress used to teach her children instead of sending them to school. I had often to mind the youngest child while the mother in the same room taught the two elder children to read. In this way I learnt how to spell and pronounce a good many words'.¹³⁰ Unfortunately, however, her mistress died in childbirth, and her mistress' sisters did not continue the practice. 'After the baby came, the children went to school, and as I had the principal care

129. Davies and Woolf, *Life as We Have Known It, by Co-Operative Working Women*, pp. 20-1.

130. *Ibid.*, p. 26.

of the child, I had very little time to myself. If by chance I was seen reading, I was told that I ought to be able to find something better to do, and generally speaking a job was found for me'.¹³¹ Mrs. Layton continued to read 'trashy' serial magazines when her employers were not paying attention, and she does express a sense of regret here: 'I have often thought how different my life at that time might have been if I had had a good book lent me to read and that I could have read it openly'.¹³² She is not expressing regret over a lost opportunity to read in general, however, but rather at the quality of the reading material available to her. In her next position, aged sixteen or seventeen, this situation was rectified:

In this household, reading was not considered a waste of time, and books were supplied to me to read which were suitable to a young impressionable girl, far different to the trash I had read in secret before. Then too, I was encouraged to improve my education. I used to write and my mistress would correct the mistakes in spelling and grammar. I also used to write to my brother who was a schoolmaster, and he would answer and return my letter corrected.¹³³

Mrs. Layton, although she does express a sense of missed opportunity, does not leave readers with any sense that she felt her learning was hindered or presented special challenges. It is a picture of steady, if interrupted, improvement.

Very few of these working-class autobiographers express anything like regret at having started their education so late. Some of them say very little, stating only the bare facts of when and where they learned to read and write. Others, however, describe a kind of self-confident autodidacticism.¹³⁴ Insofar as beliefs about the efficacy

131. Davies and Woolf, *Life as We Have Known It, by Co-Operative Working Women*, p. 26.

132. *Ibid.*, p. 27.

133. *Ibid.*, p. 29.

134. David Vincent identifies this attitude other autobiographies as well, see Vincent, *Bread, Knowledge and Freedom: A Study of Nineteenth-Century Working Class Autobiography*, pp. 171-93.

of remedial education are the counterpart of attitudes about the efficacy of early education, these autobiographers' lack of attention to the possible drawbacks of delayed learning suggests they did not think about education in sharply developmental terms.

To return, then, to the two conditions under which the 'mistaken complementarity effect' would be positive, it appears that households likely underestimated the degree of complementarity across stages of the educational sequence. For one, at the theoretical level, this idea was only slowly emerging over the nineteenth century and often in contexts far removed from everyday decisions about school enrolment. Among educationalists associated with infant schools, some expressed notions of complementarity, however tentative, but their lectures and pamphlets do not seem to have moved those households who made enrolment decisions. In particular, I found no evidence that upper- and middle-class households of Merchant Taylor's school were adapting their children's school-entry ages to align with the developing theory. Working-class attitudes are more difficult to judge, as schooling decisions in these households were more subject to fluctuating material constraints. However, an analysis of attitudes towards remedial education among working-class autobiographers uncovered no evidence for a belief in complementarity. Thus it seems tenable to conclude that households underestimated the degree of complementarity ($\sigma < \phi$).

Given this, for an increase in early education to have a positive effect on human capital, the other condition that must be met, according to the model, is that households initially used more late school than early school ($s_0 < s_1$). A theoretical framework for this condition was given in the previous chapter; in the absence of child-care demand, households enroll their children according to school-entry age norms. This chapter thus also provides evidence that these norms encouraged relatively late enrollment. The next chapter explores a case where child-care demand was growing and families responded by abandoning these norms in favour of earlier school-entry.

Chapter 4

Roll call: the enrolment age of London's poor, 1767-1830

On June 7, 1824, the Infant School Society was formed at the Freemason's Tavern on Great Queen Street, about a mile north of the Houses of Parliament.¹ At least five M.P.s were present, among whom Henry Brougham and William Wilberforce, and one lord, while ladies and Quakers filled out the hall.² To open the meeting, the Marquess of Lansdown celebrated the achievements of the experimental school for infants opened six years prior in Westminster, which 'succeeded, not only in ... keeping the children out of vice and mischief,' but in 'engrafting' infant's minds with 'principles of virtue, which capacitated them for receiving a further stage of instruction'.³ The Marquess admitted his former doubts, since relieved, that 'with regard to young children the most beneficial education they could receive was a domestic one under the superintendence of kind & prudent parents.' But what the poor children of London faced, he continued, was in fact a choice between 'some sort of education,' provided by the infant school in early childhood, and 'no education at all,' being left to the care of their siblings or the influence of criminals in the 'streets of the crowded

1. "Infant Schools," *The Morning Chronicle* (London), June 1824, p. 3, accessed 24 February 2023, British Library Newspapers.

2. The ideological base of support for infant schools was diverse; see McCann, "Samuel Wilderspin and the Early Infant Schools," p. 190.

3. "Infant Schools," *Morning Chronicle*, June 1824, p. 3.

metropolis.’⁴ *The Morning Chronicle*, which had reported the meeting, editorialized, ‘While we earnestly recommend these Schools to public patronage, we cannot at the same time help lamenting that the remuneration of so large a portion of the people of this country should be so very inadequate, that the labour of his wife as well as the husband is necessary for the subsistence of the family.’⁵ These two views illustrate a fundamental tension about children’s early enrolment.

As the previous chapter argued and as the Marquess of Lansdown exemplifies, it was through educational reformers, particularly those involved with infant schools, that a belief in the complementarity of early and late learning gradually entered public discourse.⁶ These advantages of early education, I argued, were set against a normative ‘proper age’ for beginning instruction outside of the home, and remained a kind of exception reserved for working parents.⁷ To earn a sufficient household income, it was allowed that some mothers would work, and their children would require care during working hours, if for no other reason than to suppress delinquency. The Infant School Society ostensibly formed to serve this need.⁸

Children’s first experience of education outside of the home therefore arose at different times among different classes. A carer who faced no competing demands on her time may have enrolled her children in school according to a more ‘normative’ age. The determination of this age may perhaps be best understood in relation to wider intellectual and cultural currents described in the previous chapter. It was the exogenous, ideal age of enrolment that would hold in the absence of binding material constraints, and the evidence of the previous chapter suggested that this ‘normative’ enrolment age remained relatively high, albeit poorly defined, into the nineteenth

4. Ibid.

5. *Morning Chronicle*, June 1824, p. 2.

6. For example, see Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 18, 19; Stewart and McCann, *The Educational Innovators, 1750-1880*, pp. 60-3.

7. Brougham puts the quoted phrase in the mouths of his detractors, see “Infant Schools,” *Morning Chronicle*, June 1824, p. 3.

8. McCann, “Samuel Wilderspin and the Early Infant Schools,” p. 194.

century. If the need for care arose sooner, however, school enrolment might also satisfy the demand for care. It was this demand stemming from care that motivated the infant school reformers, and given the lateness of the 'normative' age, it was this demand that seems responsible for the very early attendance of some children at school.

But the Infant School Society was not the first institution to provide early care. Indeed, Brougham complained, 'in leaving the poor children to the care of their parents, neglect is the least that happens: it too frequently occurs that they are turned over to delegates ... who are so utterly unfit for the office they undertake.'⁹ These 'delegates' were apparently the school 'dames', i.e., neighbours and small private schoolteachers, who were already caring for and educating young children.¹⁰ According to Jeffrey Machin, small private schoolteachers in Westminster 'were active propagandists for their own establishments,' over the new infant schools.¹¹ Such schools equally provided 'places of safe confinement,' as the Central Society for Education put it, 'during the hour when ... parents are engaged in daily labour'¹², and they did not necessarily deserve the poor reputation with which the Infant School Society wanted to brand them.¹³ For example, the Education Committee of the Statistical Society of London in 1841 judged the dame schools in Finsbury to be superior to the established charity schools.¹⁴ The demand for child care during early childhood pre-dated the infant school, which merely offered the same service under a more philanthropic form.¹⁵

When did this demand arise and why did this issue come to a head in early

9. *Morning Chronicle*, June 1824, p. 3.

10. Roberts, "A New View of the Infant School Movement," p. 158; Gardner, *The Lost Elementary Schools of Victorian England*, p. 164.

11. Machin, "The Westminster Free Day Infant Asylum: The Origins of the First English Infant School," p. 53.

12. G. R. Porter, *Statistical Inquiries Into the Social Condition of the Working Classes, and Into the Means Provided for the Education of Their Children*, Central Society of Education Reprint (London: Taylor / Walton, 1838), p. 19.

13. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 19-20.

14. Education Committee, "Report ... on the Borough of Finsbury," p. 31.

15. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, p. 7.

nineteenth-century London? Trends in the age of attaining literacy give a sense of the distribution of education over childhood. There is some limited evidence that children learned to read at younger ages around the turn of the nineteenth century. Using the apprenticeship records of the Marine Society, records which also record literacy, David Mitch has tentatively shown that between 1770 and 1824, the percentage of boys able to read or write increased between age 13 and 16, suggesting that boys continued to learn these elementary skills relatively late in those decades. After 1824, however, literacy stopped rising with age among older boys.¹⁶ Mitch also cites a survey of children from the 1840s that documents rising proportions able to read after age 16 (by about 20%), but a levelling-off of the proportion who could write after age 13.¹⁷ This suggests that some adolescent readers may have continued to catch up, even in the mid-nineteenth century, while writing instruction was confined to children under 13 (at least among those who learned to write at all). This kind of evidence, however, relies on inferences made from educational experiences among a relatively late group of learners whose experience does not convey information about enrolment during younger, more typical age ranges. Other studies have looked at the age of enrolment in surviving voluntary school records, which exhibit a certain ‘laxity’ about school-enrolment age, but these records only tell of children’s experience at the schools for which records survive, while children often flitted between teachers and schools throughout childhood.¹⁸ While Jane Humphries’s study of working-class autobiographers mentions the practice of sending children to school at young ages, it does not provide quantitative information on age of enrolment.¹⁹ Comparably little is known about the typical age of enrolment of young children across the whole span of childhood.

16. Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, pp. 139-40.

17. *Ibid.*, p. 139.

18. Madoc-Jones, “Patterns of Attendance and Their Social Significance: Mitcham National School, 1830-39.”

19. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, pp. 319-20.

The model developed in chapter 2 suggests demand for child care will arise earlier in the household life-cycle where women's wages are high relative to men's. It also predicts that small households and a wide spacing between surviving siblings would lead to earlier enrolment, although these demographic factors emerged as relatively less important in the accounting exercise. London fit this description fairly well toward the end of the nineteenth century.

Historians have convincingly made the case that London was caught up in and part of the wider economic changes associated with the industrial revolution.²⁰ While the metropolis may not have held the large mills of the northern textile cities, 'The assembly line ran through the street', and the diversification of the London economy should not detract from the fact that many of its trades underwent 'industrial' transformation.²¹ For women and children working, this transformation expanded and accelerated an established order of work. Outworking opportunities grew, and the division of labour intensified.²² Shoemaking, dressmaking, sewing, furniture-making, bookbinding, and an array of smaller trades all provided employment for women.²³ Meanwhile, the evidence from parish apprenticeships suggests that young children were increasingly employed in manufacturing in London into the early nineteenth century.²⁴

There is considerable debate among historians over whether women's access to labour markets in the city improved over the eighteenth century, much of which depends on what kind of evidence can be marshalled for women's work in the sev-

20. Michael Ball and David Sunderland, *An Economic History of London 1800-1914* (London: Routledge, 2001); David Barnett, *London, Hub of the Industrial Revolution* (London: Tauris Academic Studies, 1998); L. D. Schwarz, *London in the Age of Industrialization: Entrepreneurs, Labour Force and Living Conditions, 1700-1850* (Cambridge: Cambridge University Press, 1992).

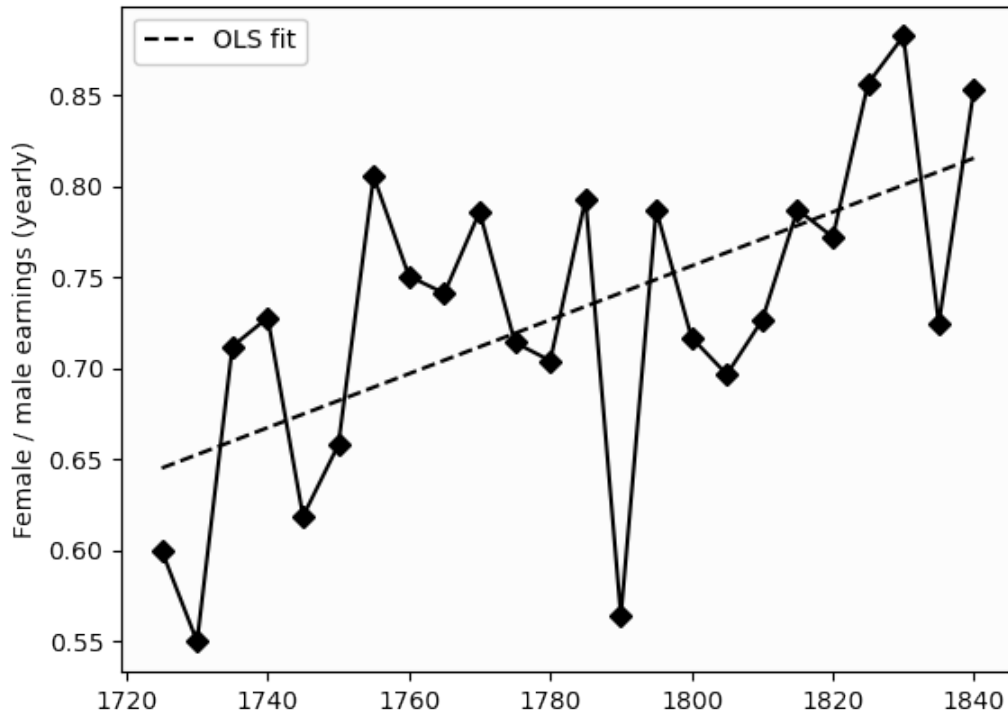
21. This argument is developed in Schwarz, *London in the Age of Industrialization: Entrepreneurs, Labour Force and Living Conditions, 1700-1850*, passim. and p. 33.

22. Ball and Sunderland, *An Economic History of London 1800-1914*, pp. 297-302.

23. Alexander, *Women's Work in Nineteenth-Century London: A Study of the Years 1820-50*.

24. Alysa Levene, "Parish Apprenticeship and the Old Poor Law in London," *Economic History Review* 63, no. 4 (2010): p. 930-7.

Figure 4.1: Women’s earnings relative to men’s, St. Clement Danes



enteenth century for comparison.²⁵ Using a mix of records from the Old Bailey, the livery companies, and Christ’s Hospital, Amy Erickson has recently demonstrated that married women in eighteenth-century London nearly all had an occupational identity.²⁶ On balance, the composition of women’s work seems to have changed little over the eighteenth century; women performed more or less the same jobs as they had before.²⁷ However, lacking a census prior to 1801, and arguably lacking a census with meaningful information about women’s labour force participation until 1851, it is difficult to reach definitive conclusions about the absolute size of the female

25. Earle, “The Female Labour Market in London in the Late Seventeenth and Early Eighteenth Centuries.”

26. Amy Louise Erickson, “Married Women’s Occupations in Eighteenth-Century London,” *Continuity and Change* 23, no. 2 (2008): p. 292.

27. Schwarz, *London in the Age of Industrialization: Entrepreneurs, Labour Force and Living Conditions, 1700-1850*, pp. 14-22.

workforce, still less about wages or the intensity and regularity of work. Alex Shepard has recently demonstrated the variety of margins along which married women in eighteenth-century London may have combined care work with paid work more or less intensively.²⁸ What seems much clearer, however, is that male real wages in the city were stagnating and possibly declining from the mid-eighteenth century to about 1820, corresponding with a rise in labour disputes among male artisans concerned with a loss of status.²⁹ Indeed, Keith Snell reports yearly earnings gleaned from settlement examinations in St. Clement Danes, Westminster, that suggest female earnings caught up to about 80 per cent of male earnings between 1740 to 1840 (table 4.1).³⁰ In terms of the model and accounting exercise, these developments would predict a rise in demand for early care. Moreover, while infant mortality was declining nationally in the second half of the eighteenth century, London retained a very high infant mortality rate until the early nineteenth century.³¹ Insofar as this would affect the spacing of surviving siblings, this too would contribute to the demand for early care according to the accounting exercise. Further, households in London were relatively small, which should have had a similar though limited effect.³²

4.1 Long-run changes in reading age

To investigate this question empirically, I make use of a set of documents produced by several London parishes in the second half of the eighteenth century and into the nineteenth. In 1767, Westminster passed an act requiring extramural London

28. Shepard, “‘Working Mothers’ in Eighteenth-Century London.”

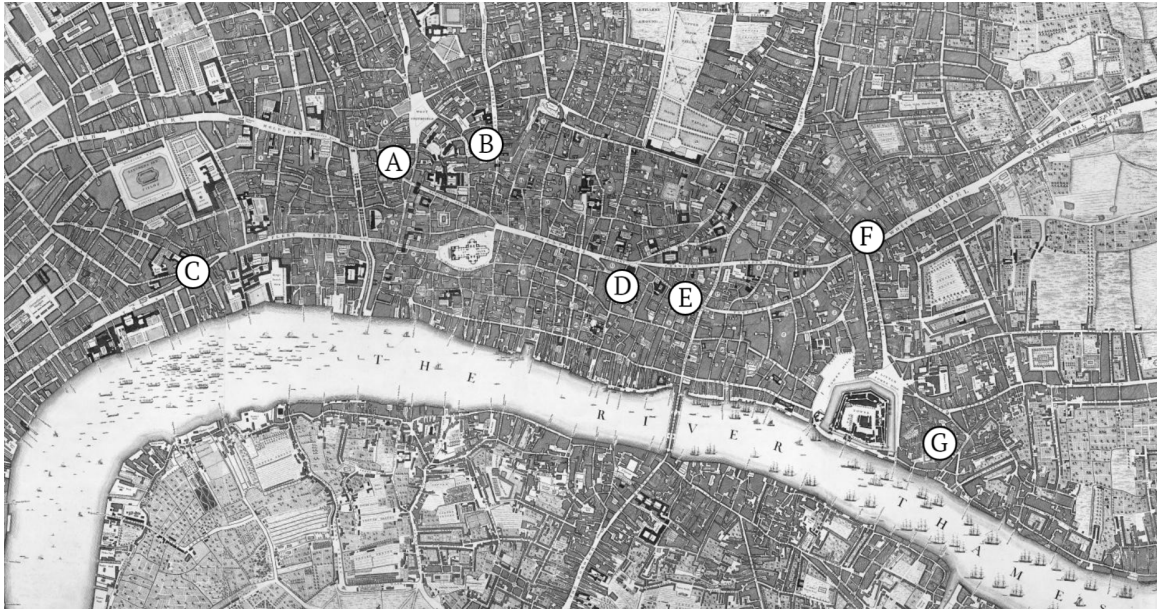
29. Ball and Sunderland, *An Economic History of London 1800-1914*, pp. 72, 105; Green, *From Artisans to Paupers: Economic Change and Poverty in London, 1790-1870*, pp. 121-30; L. D. Schwarz, “The Standard of Living in the Long Run: London, 1700-1860,” *Economic History Review* 38, no. 1 (1985): 24–41.

30. Snell, *Annals of the Labouring Poor: Social Change and Agrarian England, 1660-1900*, p. 39.

31. Romola Davenport, “The First Stage of the Epidemiological Transition in British Cities: A Comparison of Infant Mortality in Manchester and London, 1750-1820,” in *Cambridge Group for the History of Population and Social Structure* (Cambridge), <https://www.repository.cam.ac.uk/bitstream/handle/1810/270656/pdf3.pdf>.

32. Levene, *The Childhood of the Poor: Welfare in Eighteenth-Century London*, pp 42-3.

Figure 4.2: Locations of included parishes within London



Finsbury: (A) St. Sepulchre (B) St. Botolph Aldersgate

The Strand: (C) St. Clement Danes

The City: (D) St. Stephen's Walbrook (E) Allhallows Lombard Street

East London: (F) St. Botolph Aldgate (G) St. Katharines's

Source: 1746 John Rocque Map from *Locating London's Past*, version 1, December 2011, www.locatinglondon.org.

parishes to keep records of the children under age 14 in their care.³³ The legislation was a response to efforts by Jonas Hanway, a director of the Foundling Hospital, to ameliorate the poor standard of care provided for parish children.³⁴ Hanway's earlier efforts targeted high mortality among infant children in the care of parish nurses and led to legislation in 1762 requiring the employment of county nurses away from the metropolis's unhealthy influence.³⁵ In making his case, Hanway took a strongly empirical approach, recording and reporting statistics on, for example, the high rate of infant mortality among parish children, and this spirit found its way into the legislation he advocated.³⁶ Social ills could be cured by exposure to the light of voluminous

33. James Stephen Taylor, *Jonas Hanway, Founder of the Marine Society: Charity and Policy in Eighteenth-Century Britain* (London: Scolar Press, 1985), p. 114; John H. Hutchins, *Jonas Hanway, 1712-1786* (London: Society for Promoting Christian Knowledge, 1940), p. 69; Levene, *The Childhood of the Poor: Welfare in Eighteenth-Century London*, p. 51.

34. George, *London Life in the Eighteenth Century*, pp. 45-7.

35. Hutchins, *Jonas Hanway, 1712-1786*, p. 60.

36. *Ibid.*, p. 47-69.

public fact. Detailed and standardized *Registers of Infant Poor* were stipulated by the earlier law, while the 1767 act provided abstracts of the registers it expected each parish to complete and deliver yearly to the Worshipful Company of Parish Clerks, subject to a £5 fine for failure to comply.³⁷ The range of information that parish clerks were required to collect was expanded, described in the standardized “schedule B”.³⁸

One column in these standardized *Registers of Poor Children under Parish Care*, presumably arising from a concern for children’s spiritual welfare, asks whether parish children were able to read and recite their prayers. These accounts therefore provide data on reading ability over the whole span of childhood from birth to early teenage years, and in some parishes such records continue until around the time of the New Poor Law of 1833. As records, they are unique in several respects. Unlike signatures evidence from marriage documents, which generally reflect writing ability at a moment in early adulthood, i.e., after this skill is typically learned, the documents cover prime learning years. They therefore exhibit changes in reading ability with age. Unlike charity records that targeted the needs of specific constituencies, such as the Marine Society (of which Hanway was also a founder) that offered naval and merchant marine apprenticeships to poor boys and consequently whose records only relate to older boys of an eligible age, the *Registers of Poor Children* are not truncated from below.³⁹ In fact, many parishes continued to keep records of children beyond the prescribed age of fourteen. Thus they provide important information about reading ability in early childhood and beyond. Finally, by recording reading ability and not writing, the source avoids methodological issues with writing discussed in the literature review

37. *An Act for the Better Regulation of the Parish Poor Children, of the Several Parishes Therein Mentioned, Within the Bills of Mortality*, 7 Geo. III c. 39, 1767; Tim Hitchcock, Robert Brink Shoemaker, and Sharon Howard, *Registers of Poor Children Under Fourteen Years in Parish Care (RC)*, 2018, accessed November 21, 2023, <https://www.londonlives.org/static/RC.jsp>.

38. Tim Hitchcock, Robert Brink Shoemaker, and Sharon Howard, *Parliamentary Reform*, 2018, accessed November 7, 2022, <https://www.londonlives.org/static/ParliamentaryReform.jsp>.

39. Taylor, *Jonas Hanway, Founder of the Marine Society: Charity and Policy in Eighteenth-Century Britain*, p. 69-84.

and, importantly, accounts for the aspect of literacy that would have been more likely taught to young children.⁴⁰

The source's shortcomings relate primarily to sample selection. The *Registers* were only kept in London. Although the city attracted a wide pool of migrants, the source can not be taken as representative of the whole country. It is likely that London parishes primarily provided care to the children of parents with a settlement in the city, although it is not possible to verify this as the *Registers* offer no information about place of birth.⁴¹ Second, the children included in the sample must have been to some extent 'poor'. Material hardship drove families to seek parish welfare. General accounts of the old poor law have emphasized how people used the system strategically and flexibly, according to need in an 'economy of makeshifts' that often fell short.⁴² There is some evidence of this in the *Registers*. Tim Hitchcock has described how single mothers in London turned to the parish for temporary child care, placing and withdrawing their children from the workhouse according to need.⁴³ More recently, Alysa Levene's extensive analysis of this same source has uncovered that children were maintained by the parish for longer periods, with children resident for longer than a year in 77 per cent of cases in St. Martin in the Fields and in 58 per cent of cases in St. Clement Danes, and that the majority of poor children came to the parish as a result of parental loss.⁴⁴ In St. Mary Lambeth, between 1810-21, for instance, poverty was attributed to parental death, usually of the father, in 62.2 per cent of children's cases.⁴⁵ Across the whole population in the eighteenth century approximately 30 to

40. Victor E. Neuburg, "Literacy in Eighteenth Century England: A Caveat," *Local Population Studies* 4 (1970): pp. 44-6.

41. Levene, *The Childhood of the Poor: Welfare in Eighteenth-Century London*, pp. 9, 28-30.

42. Steven King and Alannah Tomkins, eds., *The Poor in England 1700-1850: An Economy of Makeshifts* (Manchester: Manchester University Press, 2003), pp. 12-3.

43. Tim Hitchcock, "'Unlawfully Begotten on Her Body': Illegitimacy and the Parish Poor in St Luke's Chelsea," in *Chronicling Poverty: The Voices and Strategies of the English Poor, 1640-1840*, ed. Tim Hitchcock, Peter King, and Pamela Sharpe (Basingstoke: Macmillan, 1997), pp. 70-86.

44. Levene, *The Childhood of the Poor: Welfare in Eighteenth-Century London*, p. 55.

45. *Ibid.*, pp. 36.

40 per cent of children experienced the loss of a parent.⁴⁶ Therefore, while pauper children suffered a particularly acute misfortune, they were not selected from some extremely destitute minority. While not every child experienced the loss of a parent, there were many more households for whom such an event would have triggered immediate material hardship and possibly an application for relief.⁴⁷ Thus while the sample is drawn from a population vulnerable to poverty, this was not necessarily an exceptional group. Indeed, it may be fairly representative of the population for whom child-care demand was responsive to life-cycle fluctuations in income, which in the theoretical model (and evidence of the previous chapter) does not occur where male earnings are highest.

Assuming that those who have learned to read will not later forget, it is possible to use this source to estimate the mean age at which pauper children learned to read from the share of those able to read at each age. In particular, I use a method of survival analysis borrowed from epidemiology and demography, where this kind of data is referred to as current-status data, a special case of interval-censored data.⁴⁸ The models developed for this kind of data assume that an individual observed to have experienced an event at a certain time must have experienced the event in the interval between the observation time and the beginning of the study, which in this case is the beginning of life, while an individual observed not to have experienced the event will experience it at some time between the observation time and ∞ , or more practically age 100. With observations on whether children could read and their age, it is possible to adapt these methods to estimate modal measures of how long children took to learn to read from birth.

46. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 65.

47. Sara Horrell, Jane Humphries, and Jacob Weisdorf, “Beyond the Male Breadwinner: Life-Cycle Living Standards of Intact and Disrupted English Working Families, 1260-1850,” *Economic History Review* 75, no. 2 (2022): 530–560.

48. I. D. Diamond and J. W. McDonald, “The Analysis of Current Status Data,” in *Demographic Applications of Event History Analysis*, ed. J. Trussell, R. Hankinson, and J. Tilton (Oxford: Oxford University Press, 1991), pp. 231–50; John P. Klein and Melvin L. Moeschberger, *Survival Analysis: Techniques for Censored and Truncated Data*, 2nd ed. (New York: Springer, 2005), p. 70.

I conducted a search of surviving “schedule B” records held at the London Metropolitan Archive, some of which have also been digitized and are available online.⁴⁹ Seven parishes had suitable records.⁵⁰ For analytical simplicity, I consider these parishes as part of four wider regions. St. Sepulchre and St. Botolph Aldersgate were located northwest of the City in Finsbury. St. Clement Danes was a large parish west of the City on the Strand, an important commercial road connecting London to Westminster.⁵¹ St. Stephen’s Walbrook and Allhallows Lombard Street were small intramural City parishes located only a few streets apart. Finally, St. Botolph Aldgate was a large parish in East London, and St. Katharine’s was just to the south in the dockyards (see figure 4.2). Exclusive of the city parishes, these were among the poorest and most crowded places in London. The Education Committee described Saffron Hill, an area neighbouring and partially encompassing Saint Sepulchre parish, as ‘proverbially the dirtiest in London; very possibly the dirtiest in the world.’⁵² Poverty in London generally ran from east to west, but even St. Clement Danes, in Westminster, was fever-prone and crowded, for which it was subjected to a whitewashing campaign at the end of the eighteenth century.⁵³

The three extramural regions included in my sample were situated in what Sally Alexander characterizes as London’s ‘industrial belt.’⁵⁴ Casual day labourers found many opportunities for work in East London’s docks, and Whitechapel Street, which ran through St. Botolph Aldgate, was at the centre of a large silk industry employing more than 40,000 men, women and children into the nineteenth century.⁵⁵ Outwork

49. See bibliography for full reference. Some parishes’ records had been digitized but were illegible in parts, and these will appear twice where I consulted the originals to verify missing pages.

50. Many more parishes have the earlier registers, but these only record children up to age four.

51. Jerry White, *London in the Eighteenth Century: A Great and Monstrous Thing* (London: The Bodley Head, 2012), pp. 187-9.

52. Education Committee, “Report ... on the Borough of Finsbury.”

53. George, *London Life in the Eighteenth Century*, p. 53, 63-4.

54. Alexander, *Women’s Work in Nineteenth-Century London: A Study of the Years 1820-50*, p. 18.

55. White, *London in the Eighteenth Century: A Great and Monstrous Thing*, p. 218.

Table 4.1: Balanced cohorts for product-limit estimation of mean reading age

Parish	Cohort 1	Cohort 2	Cohort 3
St. Botolph Aldgate	1755-1773	1774-1800	1801-1835
St. Sepulchre	1755-1775	1776-1795	1796-1825
St. Clement Danes	1755-1768	1769-1795	
Allhallows Lombard Street			1796-1825
St. Botolph Aldersgate			1806-1835
St. Katharine's	1755-1775	1776-1805	

was common throughout London, particularly in tailoring.⁵⁶ The seamstresses working in The Strand generally received the more common run of 'slop work,' while small workshops proliferated throughout the area north of the city.⁵⁷ The City, on the other hand, was the commercial centre of London, while many master craftsmen continued to live within the walls of the City above their workshops at the end of the eighteenth century.⁵⁸

To convert current-status data on reading and age from these London parishes into estimates of the mean age at which children learned to read, I use the Turnbull product-limit estimator (PLE) of the survival function for reading status (i.e. the estimated proportion yet to learn to read) when children first appear on the *Register of Poor Children*.⁵⁹ I take observations of children's reading ability when they first enter the *Register* to capture pauper children's likely educational experiences outside of the poor law system. The merits of this approach are that it allows a reliable estimate to be made of each individual parish-cohort group so that trends can be explored at this level. The method assumes very few restrictions on the form of the survival function, key among which is that the probability of knowing how to

56. Ball and Sunderland, *An Economic History of London 1800-1914*, p. 302; Alexander, *Women's Work in Nineteenth-Century London: A Study of the Years 1820-50*, p. 30.

57. Alexander, *Women's Work in Nineteenth-Century London: A Study of the Years 1820-50*, p. 36.

58. White, *London in the Eighteenth Century: A Great and Monstrous Thing*, pp. 176, 213-4.

59. A full description of the algorithm used to calculate the estimator is available in Klein and Moeschberger, *Survival Analysis: Techniques for Censored and Truncated Data*, pp. 143-9.

read is non-decreasing with age in the population of interest. The shape of the survival function is otherwise unrestricted. I must also assume that censoring times are independent of reading age, i.e., that the age children come under parish care and are observed in the dataset is unrelated to the age at which they would learn to read.⁶⁰ As discussed above, pauper children in this sample were most commonly in receipt of relief due to the death of a parent. Although it is theoretically possible that some phases of the life-cycle were riskier than others, I assume this misfortune could broadly happen at any age. Indeed, sibling groups often appeared next to each other in the *Register* all at once, suggesting the assumption of independence is broadly tenable.

However, as the estimator is only evaluated at the time (age) values in the underlying data, it performs poorly if the range of ages upon which it is estimated are unevenly distributed or patchy in their coverage, and it is undefined beyond the range of the underlying data.⁶¹ Therefore, where I have defined successive cohorts to track change over time, I select year of birth ranges that make the underlying age distribution as even as possible both within and between cohorts. The process of selecting cohorts is described in more detail in the appendix, where histograms of the age distribution in each cohort are also presented. The selected cohorts for each parish are reported in table 4.1. Although not every parish has surviving data for each cohort, the three cohorts roughly correspond to children born in the third quarter and fourth quarter of the eighteenth century and the first quarter of the nineteenth century.

For each cohort-parish group, I estimate a survival function using the Turnbull PLE. From the survival function, I calculate the mean age at which children in each sample learned to read, making an adjustment to allow for a proportion of children who never learn to read.⁶² In the language of survival analysis, some subset of the

60. Klein and Moeschberger, *Survival Analysis: Techniques for Censored and Truncated Data*, p. 91.

61. *Ibid.*, p. 92.

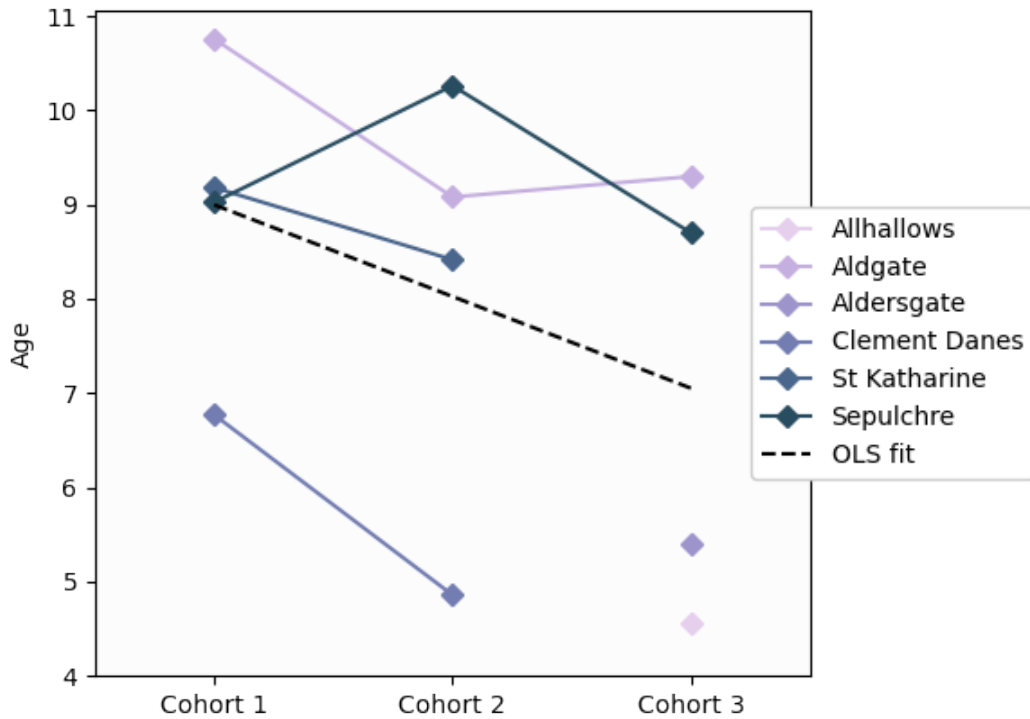
62. The algorithm for calculating the survival function assumes that all children learn to read

population may be ‘at risk’ of an event while another is not. I assume, in this case, that the estimated value of the survival function at the right-most point of its underlying support (i.e., the age of the eldest child in the cohort) represents the proportion of the population not ‘at risk’ of learning to read. For most cohorts, this is equivalent to assuming that children older than about 12 or 13 will never learn to read. As the literature discussed above indicates, some children did learn to read at older ages than this. However, as my model concerns changes in the age of school enrolment as a response to child-care needs for young children, I ignore this population of late-learners in the present analysis. Figure 4.3 can thus be taken to indicate changes in the mean age at which children learned to read among the population ‘at risk’ of learning to read during childhood.

The trend in figure 4.3 may be interpreted by considering the parishes together as a group or separately. The fitted trend for all parishes suggests a decline of nearly two years across the three cohorts. Because the asymptotic distribution of this statistic is not well-defined in the literature, I calculate bootstrap confidence intervals, re-sampling with replacement by parish and cohort. This gives a 95-percent confidence interval of -0.696 to -1.669 for the decline in mean reading age with each successive cohort. However, perhaps because of doubts that the surviving parish records represent a random sample, it may be preferable to favour evidence of change over time within each parish. For three of the four parishes for which there are sufficient records to address this question, mean reading age declined. Consider first the difference between cohorts one and two. In St. Botolph Aldgate, mean reading age declined by 1.68 years; in St. Katharine’s, it declined by 0.77 years; in St. Clement Danes, it declined by 1.91 years; and in St. Sepulchre, it rose by 1.23 years. This gives an average decline of 0.78 years per cohort, still within the confidence interval identified for

at the last period (age) in the underlying data. I modify this step in the algorithm to define the population ‘at risk’ of learning to read to be equal to the value of the survival function evaluated at the second-to-last period

Figure 4.3: Estimate of mean reading age across cohorts, 1755-1835 (PLE)



the whole sample. Only two parishes have consistent records across cohorts two and three, and these suggest little change. Thus taking the more conservative methodological approach nonetheless suggests mean reading age declined, albeit primarily in the interval between cohorts one and two and somewhat less sharply than the whole sample suggests.

The one parish that did not register a decline, St. Sepulchre, is exceptional in other ways that suggest an explanation. When the London Statistical Society sent surveyors to the district of Saffron Hill, an area west of St. Sepulchre across the Fleet Ditch that partly overlapped the parish, they reported, ‘The ... district was searched by three of your committee’s agents on three several occasions at considerable intervals of time, but no dame school or common day school was found by either’.⁶³ The absence of

63. Education Committee, “Report ... on the Borough of Finsbury,” p. 29.

these schools, which I argue were the primary institution providing early care, in this part of London where reading ages did not decline, suggest this was the exception to prove the rule.

Moreover, local labour markets in this area possibly offered limited alternatives to elder siblings, another group of would-be carers. Alyssa Levene has argued that pauper apprenticeship in London reflected the demand for labour locally, as ‘Pauper parents had little room for negotiation in the last instance, and could theoretically be deprived of relief if they refused to allow their child to be bound.’⁶⁴ Parishes who bound young children apprentice thus did so because masters found it profitable to employ such children, and trends in the age of binding ‘may thus be an indicator of changed demand for child labour’.⁶⁵ St. Sepulchre had the highest average age at binding in Levene’s sample, perhaps indicating an absence of local demand for child labour.⁶⁶ Absent this alternative use of time, children in this part of London were possibly more likely to care for their younger siblings, as suggested by the model developed in chapter 2.

Around the turn of the nineteenth century, then, poor children in London acquired elementary literacy earlier because the demand for care arose sooner. This was related to changes in women’s and children’s opportunities for work, but equally to declining male real wages over the same time period. Secondly, surviving sibling groups in London were small and widely spaced in age due to high infant mortality up to the nineteenth century. These were conditions on which wider trends drawing carers into more intensive paid work could operate to raise the demand for care.

64. Levene, “Parish Apprenticeship and the Old Poor Law in London,” p. 918.

65. *Ibid.*, p. 919, 924-5.

66. *Ibid.*, p. 929.

4.2 Evidence of a sensitive period for literacy

This source also provides evidence that earlier learning was likely to place children into a sensitive period for acquiring literacy. The *Registers of Poor Children* were completed annually for all children still under parish care. Thus it is possible to construct a panel data set with repeated observations of children under parish care, including a measure of their reading ability over time. This can be used to track the persistence of illiteracy across childhood, or inversely, how quickly children learned to read. In particular, this source can provide insight into age-specific differences in the time it took children to acquire literacy.

Hanway's law, however, stipulated that London parishes must place children differently depending on their age. Being primarily concerned with infant mortality, Hanway's law was designed to remove young children from London's supposedly harmful environment to the care of private 'nurses' residing in the more healthful suburban villages fringing the city.⁶⁷ The law specified that children under six should be removed in this way, while older children remained in the city workhouses.⁶⁸ Thus the parish delivered a different welfare package, and a different 'treatment', to children depending on their age. Unfortunately, six is around the age that important developmental effects are thought to operate on literacy, and this aspect of Hanway's policy makes it impossible to separate the effect of age from the effect of differential treatment in parishes that followed the policy to the letter.⁶⁹

St. Clement Danes, exceptionally among the parishes in the sample, had not constructed a workhouse when the registers were first introduced. It therefore adopted a policy of sending children in its care to private 'nurses' irrespective of age until the

67. Taylor, *Jonas Hanway, Founder of the Marine Society: Charity and Policy in Eighteenth-Century Britain*, pp. 102-15.

68. *An Act for the Better Regulation of the Parish Poor Children, of the Several Parishes Therein Mentioned, Within the Bills of Mortality*.

69. Tzipi Horowitz-Kraus et al., "How to Create a Successful Reader? Milestones in Reading Development from Birth to Adolescence," *Acta Paediatrica* 106, no. 4 (2017): pp. 534-44.

workhouse was constructed in 1773.⁷⁰ Differential outcomes by age in this parish, for the group admitted before the construction of the workhouse, therefore do not simply reflect age differences in application of welfare policy. In the remainder of the chapter, I follow a group of children admitted illiterate to the care of St. Clement Danes through the annual registers to observe how their literacy status changed as they aged. Figure 4.4 illustrates the estimated survival curves for the duration of time between admission and when children are first reported able to read, broken down by age group when admitted. This is constructed using a product-limit estimator adapted to account for right-censoring as children left parish care, typically when their parents' material circumstances improved and they became no longer eligible for parish welfare. The raw data is presented in the appendix, along with a more detailed description of the method used to construct the estimator.⁷¹ Crucially, as did the earlier method, this method assumes that censoring times and event times (learning to read) are independent.

The first thing to note from figure 4.4 is that nurses taught children to read. Across all age groups, the estimated proportion of children who were unable to read declined the longer children were in nurses' care. Alyssa Levene cites specific instances from parish accounts of parish nurses writing to the parish guardians for books and learning materials, and it seems the nurses employed by St. Clement Danes were following a similar practice.⁷² Moreover, there were important differences by age. Those who were unable to read and admitted to the care of parish nurses aged four, five, or six took an average of 2.82 years before they were first able to read.⁷³ In contrast, children admitted at ages seven, eight, or nine took an average of 4.56 years to learn to read. The hypothesis that these two means are equal can be rejected at the 95-

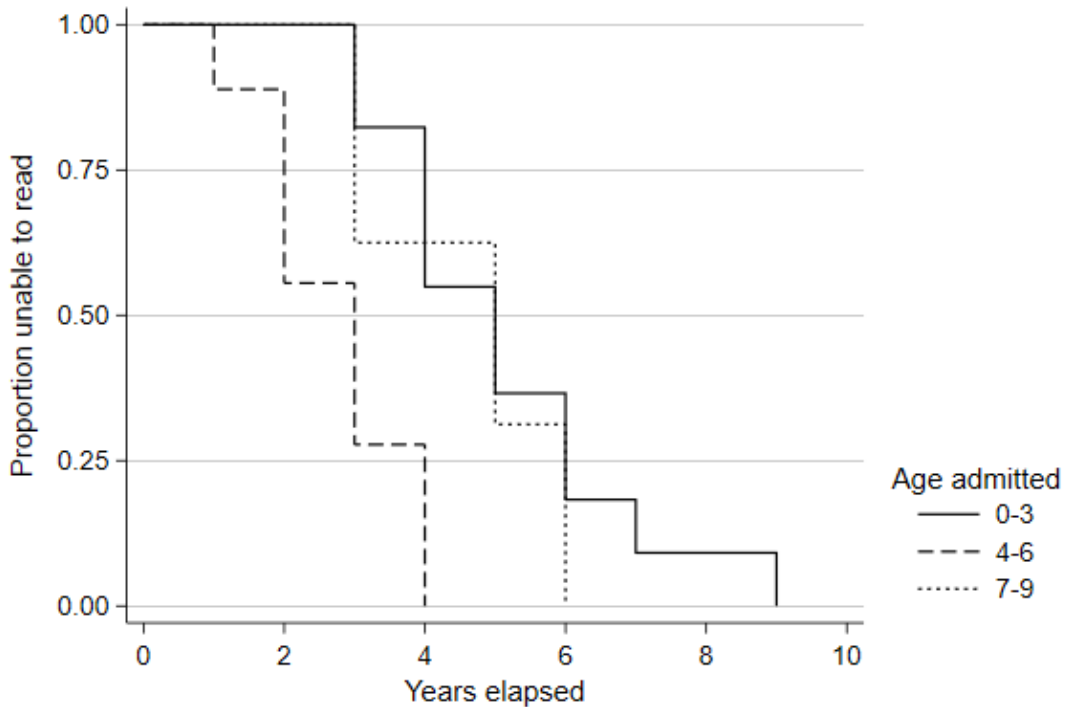
70. This is indicated in the header of the printed registers.

71. For details, see Klein and Moeschberger, *Survival Analysis: Techniques for Censored and Truncated Data*, pp. 92-103.

72. Levene, *The Childhood of the Poor: Welfare in Eighteenth-Century London*, p. 87.

73. The mean is calculated by summing across the survival function.

Figure 4.4: Time to literacy acquisition by age when taught (Kaplan-Meier)



percent level.⁷⁴ Children admitted below age four took an average of 5.10 years to learn to read.

I interpret these differences as a reflection of sensitive period effects in literacy development. Contemporary research linking literacy to the stages of cognitive and linguistic development suggests children should achieve basic literacy by about age seven or eight.⁷⁵ Children entering parish nurses' care between the ages of four and six, taking about three years to learn how to read, fell within this sensitive period. At earlier ages, children's brains will not have sufficiently developed to master literacy—and nurses may not have attempted it—while children whose reading is delayed beyond these ages have likely experienced some environmental deficiency or neurological im-

74. Stata calculates standard errors for this statistic, and their derivation is described in Klein and Moeschberger, *Survival Analysis: Techniques for Censored and Truncated Data*, pp. 117-22.

75. Horowitz-Kraus et al., "How to Create a Successful Reader? Milestones in Reading Development from Birth to Adolescence," p. 538.

pairment (e.g. dyslexia).⁷⁶ Although I can not rule out the latter explanation for delayed learning in the older group of parish children, I simply note that the evidence presented earlier in the chapter demonstrates that it was not uncommon for children to begin to learn to read in later childhood. Indeed, in the first cohort of children at St. Clement Danes, which corresponds most closely to this group of children admitted prior to the completion of the workhouse, the mean age at which children learned to read was about seven. The distribution is skewed, but this nonetheless corresponds to about 25 per cent of children in the cohort, all of whom would eventually learn to read at some point after their seventh birthdays. Late learners were by no means a small minority, and in other parishes they were even more common. However, as the earlier evidence showed, this group became less common in successive cohorts of poor children.

Poor children in London learned to read at successively younger ages over the late eighteenth and early nineteenth centuries, I argue, because they were placed in schools as a form of early childhood care. This was also the conclusion that motivated the Infant School Society reformers in June 1824, at the outset of the chapter, to establish substitutes for what they took to be the poor quality of existing child-care and schooling provision.⁷⁷ The evidence of this chapter, however, suggests the Society's concerns were overwrought. Private nurses, paid by the parish, apparently taught children how to read while under their care. If the most damning of critiques of parish nursing were true, i.e., that nurses cynically collected fees from the parish only to neglect their charges, it is difficult to understand this behaviour.⁷⁸ Indeed, there is evidence that parish nurse-inspectors understood education as a signal of care quality. The nurse-inspector in St. Dunstan in the West, for instance, was instructed

76. Horowitz-Kraus et al., "How to Create a Successful Reader? Milestones in Reading Development from Birth to Adolescence," p. 542.

77. "Infant Schools," *Morning Chronicle*, June 1824, p. 3.

78. Ivy Pinchbeck and Margaret Hewitt, *Children in English Society*, vol. 1 (London: Routledge / Kegan Paul, 1972), pp. 176-7; Levene, *The Childhood of the Poor: Welfare in Eighteenth-Century London*, p. 45.

to ‘examine the Children & bring a Report in Writ[ing] stat[ing] How the Children are in Health Cloaths & in resp[ec]t of Cleanliness and their Learn[ing]’, and in addition to the general cleanliness of nurses’ homes, inspectors in other parishes regularly commented on the progress of children’s education.⁷⁹ Parishes subsequently rewarded nurses’ diligence with yearly bonuses and removed children from those suspected of neglect.⁸⁰

This aspect of parish nursing—the principal-agent problem inherent in trusting another person to care for children—was also common to the private ‘dame’ schools that served as joint providers of child-care and education for young children outside of the poor law. There, too, a common criticism centred on the possibility of neglect.⁸¹ The quality of these schools will be explored in more detail in the following chapter, but for the moment, I simply note that the educational provision of parish nurses and of dames was likely very similar. Where direct evidence survives on the teaching provided by parish nurses, it suggests they focused on elementary literacy, from both religious and secular reading materials, with a minority also teaching writing, just as the dames did.⁸² However, whereas dame schools did not produce records of their activities, the poor law left an abundance of documents, particularly in London. Absent direct evidence from the dame schools, children’s experience with these parish nurses is probably the closest analogue for the wider institutions that provided early child care in this period.

Rather than a detriment to children’s human capital, this early child care was more likely a positive educational externality arising from carers’ greater labour supply in response to rising relative household earnings. The story of an accelerating division of labour, loss of adult male status, and degraded male earnings at the turn of the

79. St Dunstan in the West, Committee of the Guardians of Poor Children, 27 April 1790, qtd. in Levene, *The Childhood of the Poor: Welfare in Eighteenth-Century London*, pp. 77-9.

80. *Ibid.*, pp. 79.

81. Rose, *The Intellectual Life of the British Working Classes*, p. 153.

82. Levene, *The Childhood of the Poor: Welfare in Eighteenth-Century London*, p. 87.

nineteenth century in London is not often told as a happy one for its protagonists,⁸³ but I argue that the consequent rise in demand for child care at young ages, contrary to the Infant School Society's view that such care was 'no education at all', provided children with a rather effective education. Children placed in child-care between the ages of four and six found themselves inadvertently in a 'sensitive period' for learning, and these children learned to read in less time than their elder peers by nearly two years. This episode in London provides micro-level insight into a process that unfolded throughout the country, as subsequent chapters demonstrate.

83. Green, *From Artisans to Paupers: Economic Change and Poverty in London, 1790-1870*.

Appendix 1: construction of survival function for illiteracy in St. Clement Danes

Table 4.2: Ability to read by years of exposure to nurses' care by age group

Time	At risk	Failed	Censored	Survivor Function
Aged 0 to 3				
1	53	0	24	1.00
2	29	0	12	1.00
3	17	3	5	0.82
4	9	3	0	0.55
5	6	2	0	0.37
6	4	2	0	0.18
Aged 4 to 6				
1	17	1	8	0.94
2	8	3	1	0.59
3	4	2	1	0.29
4	1	1	0	0.00
Aged 7 to 9				
1	12	0	2	1.00
2	10	0	2	1.00
3	8	3	3	0.63
5	2	1	0	0.31
6	1	1	0	0.00

Table 4.2 presents the raw data underlying the estimates of the time it took children of different age groups to learn to read while under the care of parish nurses. Time is the number of years elapsed since entering parish care. The number 'at risk' is the number of children who were in parish care in the preceding year. The number who 'failed', adopting the terminology of survival analysis, represents the number of children who learned to read in the preceding year. The number of 'censored' observations represents the number of children who left parish care. Finally, the survivor function represents the estimated proportion of children who have yet to learn to read after a given number of years.

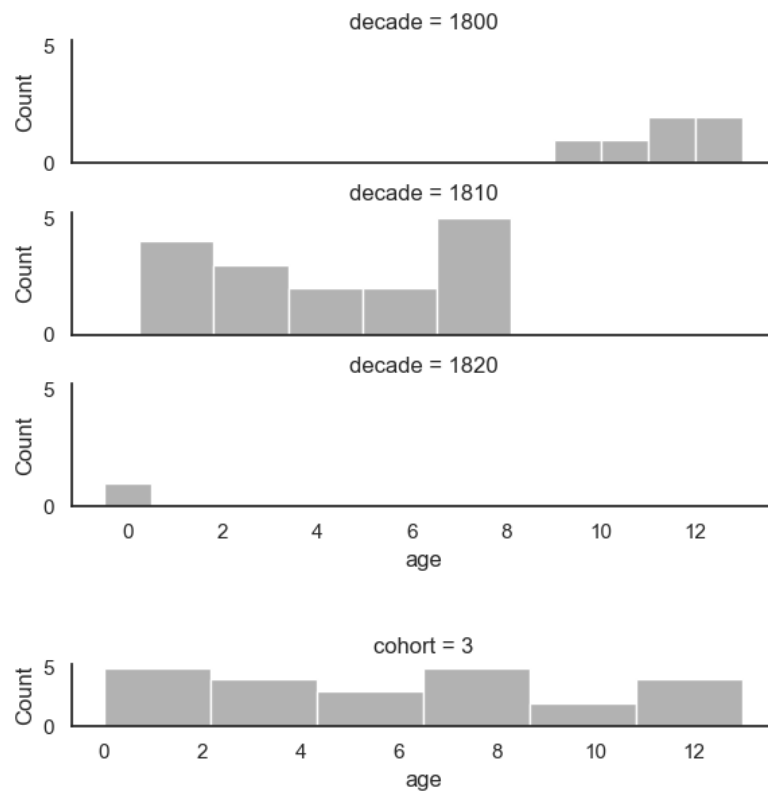
I describe the construction of the estimated survivor function for the group of children aged 4 to 6 as a worked example. Initially, there are 17 children unable to read in this age group. After one year, one of these children is able to read. Thus I estimate that $\frac{16}{17}$, or 94 per cent, of children are still unable to read after one year. Eight children leave parish care and are therefore censored. The method assumes that these children would have learned to read at some later point. However, because they are no longer observed, they are removed from the pool of children 'at risk' of learning to read, along with the one child who learned to read in the preceding year.

In the second year, three additional children are able to read. Only eight children remain 'at risk' of learning to read in this period. Thus five-eighths of children 'at risk' remain unable to read after another year. In total, I thus estimate that $\frac{16}{17} \times \frac{5}{8}$, or 59 per cent, of children are still unable to read after two years. One child leaves parish care and is censored. Therefore, in the third year, four children remain 'at risk' of learning to read. Two additional children are able to read in the third year. Thus, extending the logic developed above, I estimate that $\frac{16}{17} \times \frac{5}{8} \times \frac{2}{4}$, or 29 per cent, of children remain unable to read after three years. One child leaves parish care, leaving only one child 'at risk' of learning to read. In the fourth year, this child learns to read, and I estimate that 0 per cent of children remain unable to read after four years. This describes the entire survival function, and a similar process is carried out to estimate the survival function for the other two groups.

Appendix 2: selection of cohorts for mean reading age analysis

For each parish, I begin by examining the age distribution of children born around each 10-year interval. I then merge these groups together with the goal of forming cohorts with as even an age distribution as possible, although the process is done by eye and remains imperfect. At a minimum, I define cohorts so that the eldest child in the cohort is at least 12 years old.

Figure 4.5: Allhallows Lombard Street



NOTE: For Allhallows Lombard Street, I defined the cohort (1796-1825) to include all children in the sample.

Figure 4.6: St. Botolph without Aldgate

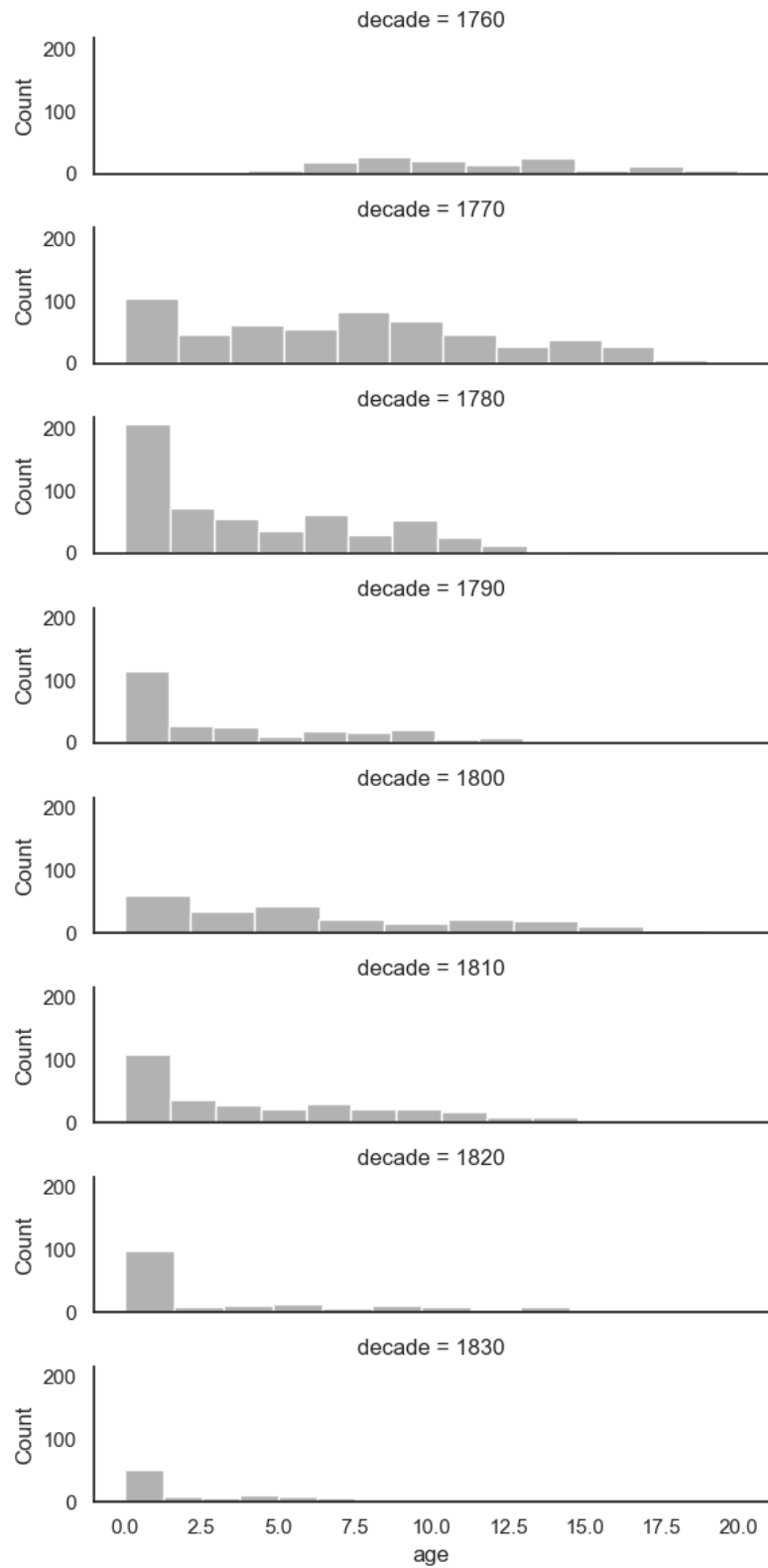
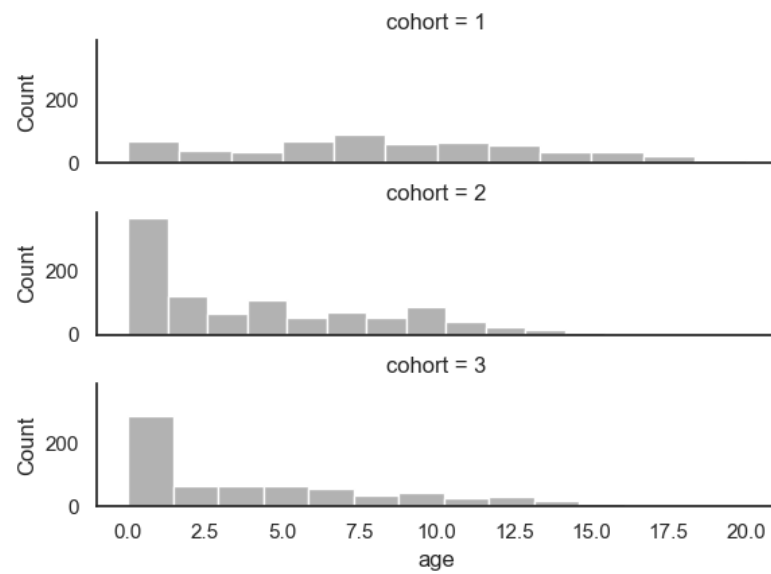
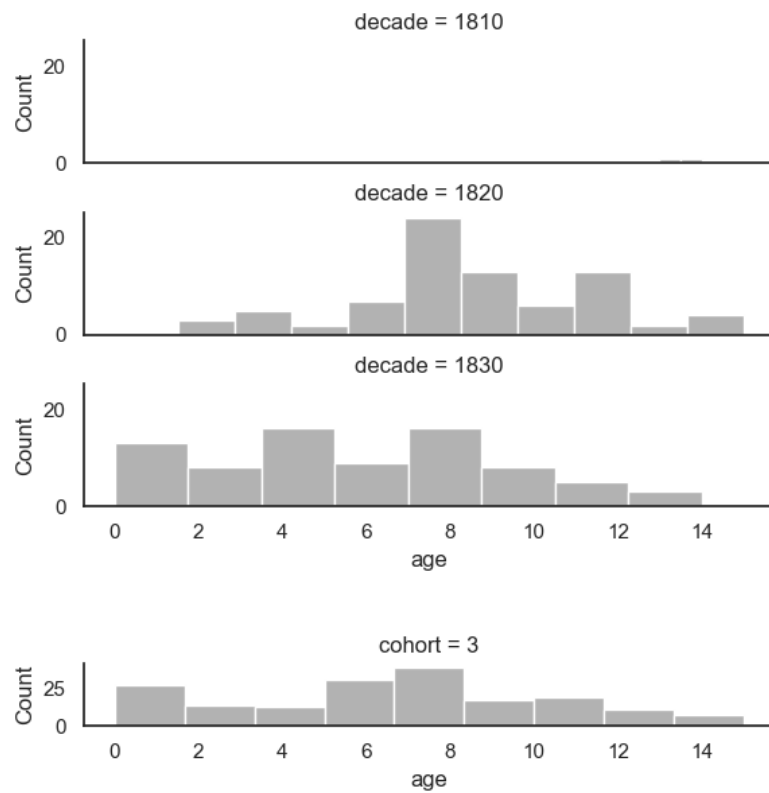


Figure 4.7: St. Botolph without Aldgate, continued



NOTE: For St. Botolph without Aldgate, I defined three cohorts: (1) 1755-1773, (2) 1774-1800, and (3) 1801-1835.

Figure 4.8: St. Botolph without Aldersgate



NOTE: For St. Botolph without Aldersgate, I defined the cohort (1806-1835) to include all children in the sample.

Figure 4.9: St. Sepulchre

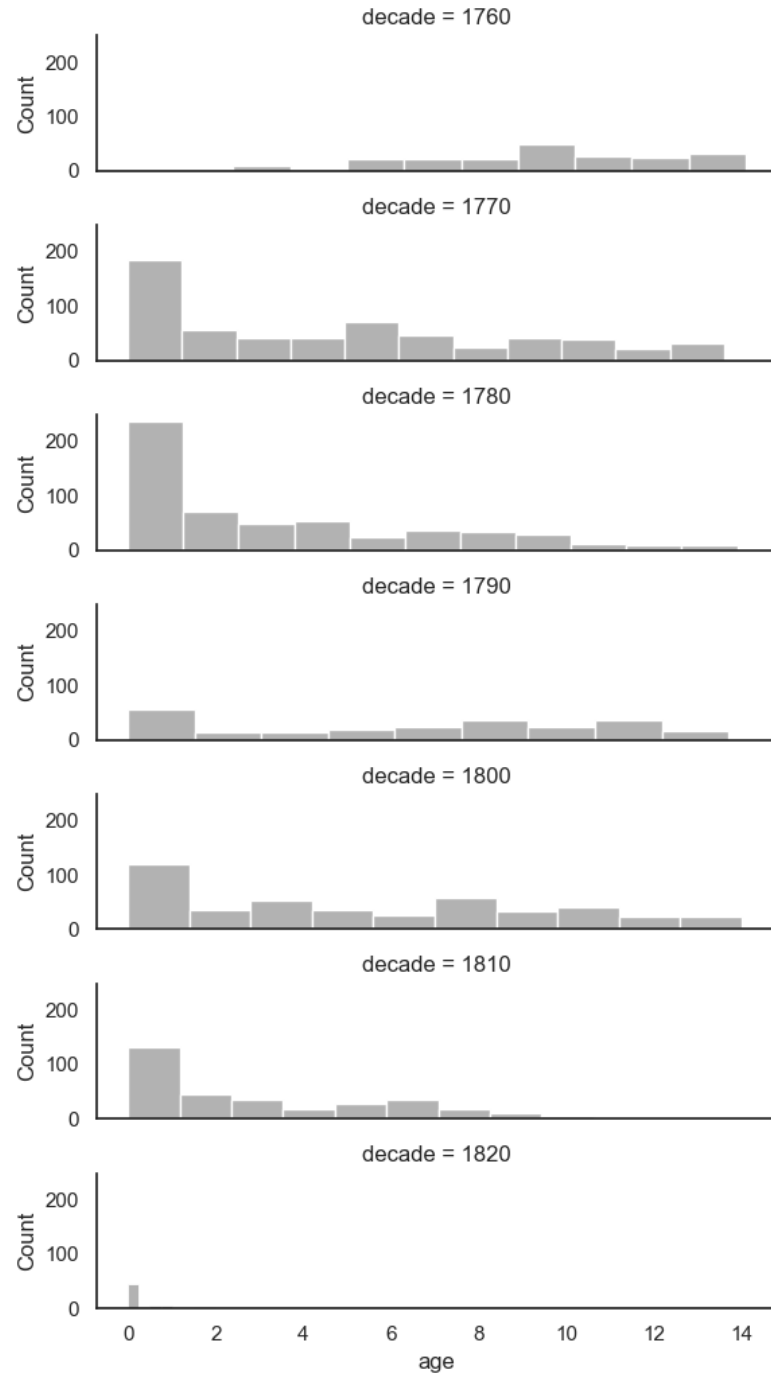
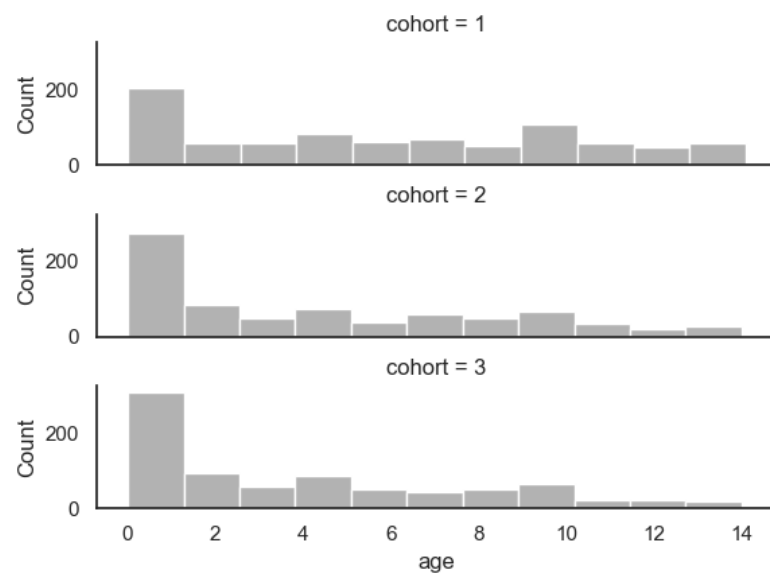
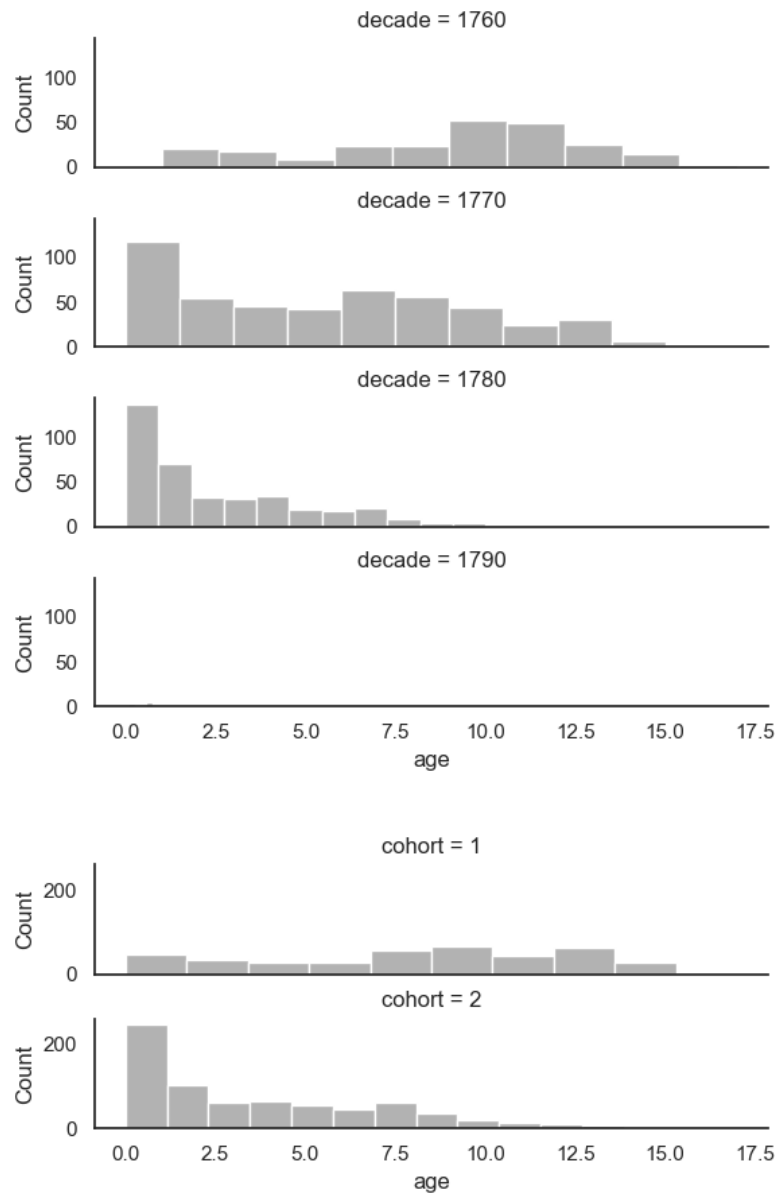


Figure 4.10: St. Sepulchre, continued



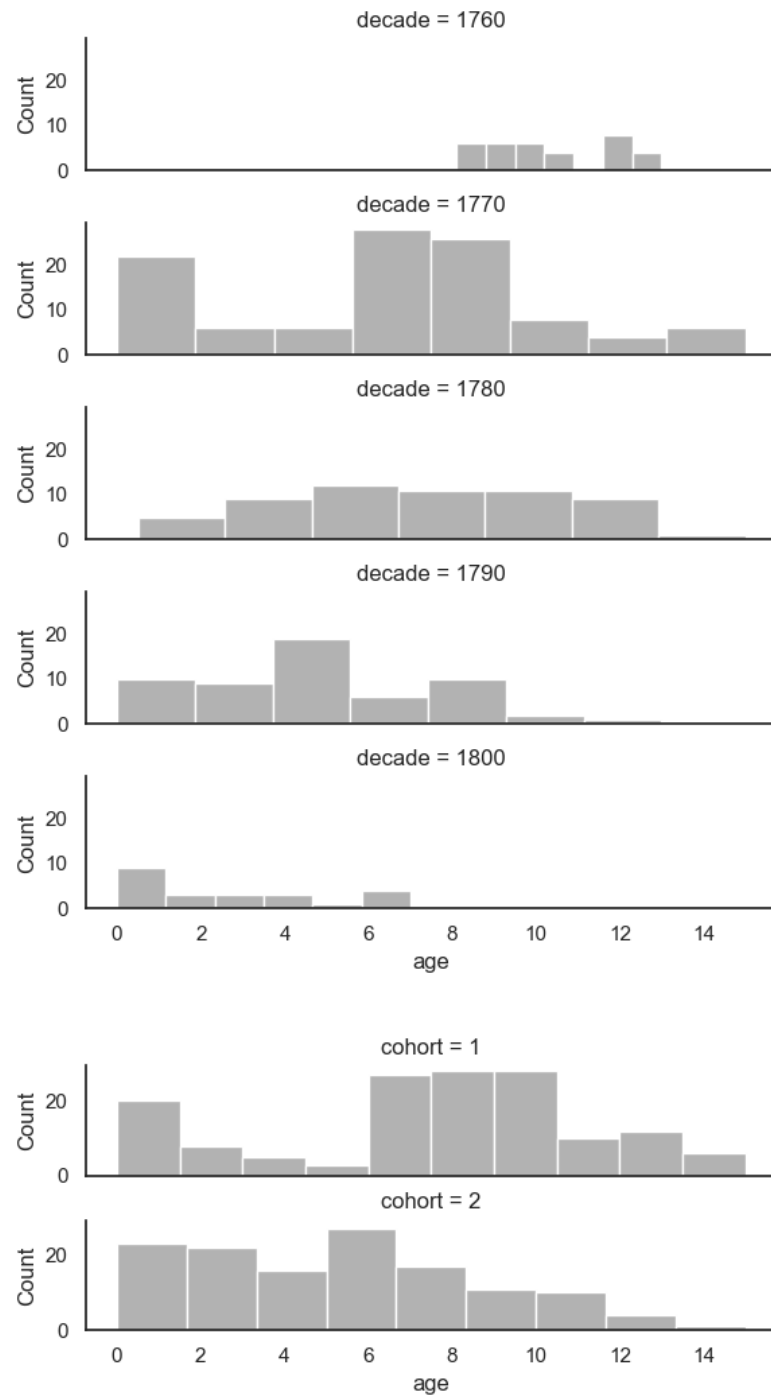
NOTE: For St. Sepulchre, I defined three cohorts: (1) 1755-1775, (2) 1776-1795, and (3) 1796-1825.

Figure 4.11: St. Clement Danes



NOTE: For St. Clement Danes, I defined two cohorts: (1) 1755-1768, and (2) 1769-1795.

Figure 4.12: St. Katharine's by the Tower



NOTE: For St. Katharine's by the Tower, I defined two cohorts: (1) 1755-1775, and (2) 1776-1805.

Chapter 5

Object lessons: the quality of experience in schools for infants

The hypothesis that industrialization pushed children to attend schools at ever younger ages is, at this point, still a relatively abstract one. Its image lacks qualitative detail — the behaviour of the scholars, the lesson of the teacher, the furnishings of the room. Those who wrote about the institutions to accommodate early childhood learning drew on two models to exposit their views, the dame school and the infant school, and although no school perfectly lived up to either ideal, a comparison of the two in general outline is fruitful. Much reform-minded writing, with its tendency to favour the newer, philanthropic infant school, survives as the primary source material for educational histories, and some reading between the lines is necessary to avoid the more egregious biases introduced by these documents in coming to an assessment of the quality of the schools for early education.¹ But an assessment of these schools' quality is nonetheless important, because what makes and differentiates a school from other kinds of social reproduction is essentially the quality of experience within its sphere. Such an assessment makes concrete the notion that valuable learning could occur even at young ages.

The historiography of the dame schools is challenging, as they were subject to a

1. Laqueur, "Working-Class Demand and the Growth of English Elementary Education, 1750-1850," pp. 198-9.

kind of double erasure. Called by many names, including “reading school,” “adventure school,” or “common school,” they were distinct in relying solely on fees for support and for their lack of a national organization and standards.² Historians of women’s work will not be surprised to learn that an occupation predominantly employing women and taking place almost entirely within the veil of private households would be under-counted by official enumerators.³ Acting in the same direction, a reformist impulse to replace private school provision for the poor with public and charitable alternatives could be strong, and such schools were more likely to be dismissed as mere child-minding centres or have their curricula denounced.⁴ Here is James Kay-Shuttleworth, a prominent Liberal educationalist, on the duties of reformers:

No fallacy is more transparent or more monstrous than that which assumes that knowledge, or whatever training is got in schools, is a natural want, certain to assert itself like the want of food, or clothing, or shelter, and to create a demand. The fact is the very reverse of this assumption.... Mental, moral and religious destitution have no appetite—they have no desire—they make no demand. All statesmen who have wished to civilise and instruct a nation have had to create this appetite.⁵

By dissecting official education reports and comparing them to other surveys, Phil Gardner makes a compelling argument that this kind of attitude predisposed enumerators to paper over much evidence for the “naturalness” of this very demand.⁶ Operating in the same direction, a kind of mutual distrust between small private

2. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 16-9.

3. These underenumeration problems often arise in accounting for women’s employment Jane Humphries and Carmen Sarasua, “Off the Record: Reconstructing Women’s Labor Force Participation in the European Past,” *Feminist Economics* 18, no. 4 (2012): p. 45; for evidence of underenumeration, see Gardner, *The Lost Elementary Schools of Victorian England*, ch. 2, esp. p. 72.

4. Victor E. Neuburg, *Popular Education in Eighteenth Century England* (London: Woburn Press, 1971); Rose, *The Intellectual Life of the British Working Classes*, pp. 151-5, pp. 20-2.

5. Kay-Shuttleworth qtd. in Smith, *A History of English Elementary Education 1760-1902*, p. 258.

6. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 52-61.

schoolteachers and the state, whose sponsored schools these teachers thought would threaten their livelihoods, led many to hide or understate their pedagogical activities to Westminster's representatives.⁷ In fact, dame and common day schools were quantitatively significant and persisted long into the 19th century, even after subsidized public schools had become a cheap and viable option in many places.⁸

For the early nineteenth century, the most reliable data on these schools comes from the statistical society reports. There were two national attempts to count the number of scholars at this time, the Brougham commission (1818) and the Kerry report (1833), but historians believe these are inaccurate and particularly liable to undercount private schools.⁹ The early statistical societies, whose attention was keenly tuned to education in the 1830s, provide some corrective evidence. Their commissioners were reportedly more careful. 'Without pretending that the returns now presented are altogether free from inaccuracies', wrote the committee investigating education in Bristol, 'the Committee feel convinced that no pains have been spared on the part of the agent to render them in every way complete, and that no general results of this kind can so justly merit public confidence as those which have been obtained (as in this case) by the *personal* inquiry of a disinterested and impartial agent'.¹⁰ Much of their time was apparently spent convincing schoolmasters that they represented no government initiative.¹¹ But this effort came at the expense of breadth. The main statistical society queries are summarized in Table 5.1, where Lancashire looms large due to the outstanding role of the Manchester Statistical Society in collecting the data.

Table 5.1 makes clear that dame and common schools accommodated a signifi-

7. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 56-7, 63.

8. *Ibid.*, pp. 45-74.

9. Coleman, "The Incidence of Education in Mid-Century," p. 398; Gardner, *The Lost Elementary Schools of Victorian England*, pp. 17-8.

10. Statistical Society of Bristol, "Statistics of Education in Bristol," *Journal of the Statistical Society of London* 4, no. 3 (1841): 250-267, <https://www.jstor.org/stable/2979624>, p.250.

11. *Ibid.*, p.250.

Table 5.1: School provision summaries from statistical societies, 1834-40.

	Day Scholars						Sunday Scholars		Totals	
	Dame	Common	Superior	Infant	Public	< 5	Total	Bi-enrolled	Scholars	1831 Pop.
<i>Manchester (1834)</i>										
M	1,939	4,107	1,350	345	2,481	—	16,303		21,634	88,661
F	2,783	2,795	1,579	304	973	—	16,893	30%	20,259	98,361
<i>Pendleton (1835)</i>										
M	69	93	15	20	280		814		860	4023
F	159	131	72	45	273	15%	872	53%	1,090	4412
<i>Liverpool (1835)</i>										
M	2,168	3,421	2,111	1,118	6,582		8,188		15,465	76,626
F	3,072	2,675	1,969	1,087	4,713	14%	7,250	76%	15,256	88,549
<i>Bury (1835)</i>										
M	258	535	51	137	272		1,899		2,639	7,439
F	582	273	123	106	137	20%	2,325	27%	2,918	7,647
<i>Salford (1835)</i>										
M	563	1215	382	170	715		4826		6,182	24,212
F	980	599	500	203	688	14%	4928	35%	6,173	26,598
<i>York (1836)</i>										
M	270	300	264	205	1,155		1,722		2,625	11,989
F	475	249	452	211	1,126	13%	1,641	75%	2,923	14,271
<i>Westminster (1837)</i>										
M	125	402	475	362	633		573		2,243	20,781
F	215	382	557	298	568	22%	982	57%	2,442	22,215

(continued on following page)

	Day Scholars						Sunday Scholars		Totals	
	Dame	Common	Superior	Infant	Public	< 5	Total	Bi-enrolled	Scholars	1831 Pop.
<i>Rutland (1838)</i>										
M	277	272	85	0	941	16%	1,650	60%	2,235	9,721
F	401	268	51	0	669		1,546		2,007	9,664
<i>Hull (1839)</i>										
M/F	8,988					11%	6,800	95%	9,328	32,958
<i>Bristol (1840)</i>										
M	1,357	1,679	510	1,004	2,741	22%	5,780	37%	10,932	46,535
F	1,658	1,800	230	701	2,180		5,904		10,289	57,351
<i>Birmingham (1840)</i>										
M	1,829	2,007	989	471	2,100	20%	9,284	25%	14,359	71,756
F	2,071	2,273	1,177	332	1,231		7,473		12,690	75,230

Sources: Manchester Statistical Society, *State of Education in the Borough of Manchester*; "State of Education in the County of Rutland"; Manchester Statistical Society, *Report of a Committee of the Manchester Statistical Society, on the State of Education in the Borough of Liverpool*, 1836; Manchester Statistical Society, *State of Education in the Borough of Manchester*; Manchester Statistical Society, *State of Education in the Borough of Liverpool*; *State of Education in the City of York*; *State of Education in Westminster*; "State of Education in the County of Rutland"; "Report on the State of Education in the Borough of Kingston-Upon-Hull," *Journal of the Statistical Society of London* 4, no. 2 (1841): 156–175, <https://www.jstor.org/stable/2337888>; Statistical Society of Bristol, "Statistics of Education in Bristol"; "Report of the State of Education in Birmingham"

cant proportion of children, and the more detailed reports indicate they taught the majority of those under five.¹² However, the data also suggest possible differences in the kind of school provision for young children available throughout the country. In the industrial northern cities and towns, including Manchester, Pendleton, Liverpool, Bury, and Birmingham, far more children were enrolled in dame schools than in infant schools. In Bristol, York, and Westminster, in contrast, long-established commercial and administrative centres, infant school provision kept closer pace with the dame schools, and in Westminster even exceeded them. Rutland is an exception, which by 1838 had not introduced any infant schools.¹³ In every case, dame schools accommodated more girls than boys, which Purvis attributes to the low priority placed on girls' schooling and the prevalence of gender segregation in supported schools.¹⁴ Gender differences in enrolment do not necessarily reflect differences in the incidence of enrolment but may instead reflect gender differences in the duration of attendance in each type of school. While boys may have moved on to other schools which offered lessons in writing and arithmetic, girls may have stayed on in the dame schools for longer, contributing to gender differences. Although one should not extrapolate too far from this evidence, the dame schools were probably of particular importance in the education of girls and of children outside of the long-established mercantile and commercial cities.

Gardner's revisionism about the quality of these schools rests on less solid ground. Gardner argues that dame and common day schools were more culturally integrated with working-class communities and responded flexibly to the pace of each student's

12. For example, in Bury the dame and common schools accounted for 55 per cent of children in school aged less than five; see Manchester Statistical Society, *Report of a Committee of the Manchester Statistical Society on the State of Education in the Borough of Manchester in 1834*, 1835, p. 18; Roberts, "A New View of the Infant School Movement," p. 161.

13. The Kerry returns of 1833 had identified ten infant schools, but the commissioners corrected them, 'the ten schools in question are mere dame-schools'. "State of Education in the County of Rutland," p. 303.

14. Purvis, *Hard Lessons: The Lives and Education of Working-Class Women in Nineteenth-Century England*, pp. 71-98.

learning and any interruptions that might occur.¹⁵ This view, however, is at odds with much of the primary evidence, including some commentary from working class autobiographies themselves.¹⁶ Observers more likely described these schools as cramped, their teachers as indifferent and occasionally incompetent, and their teaching of little intellectual substance.¹⁷ However, there is enough ambiguity in how children themselves recalled their experiences in these schools that historians drawing upon essentially the same body of autobiographical sources have reached starkly different conclusions. John Burnett concludes that the accounts of those “who attended such schools indicate a wide variety of experience, with the majority more favourable than critical,” whereas Jonathan Rose contends that “the verdict of working-class memoirists is not far short of unanimous: they did not mourn the passing of dame schools.”¹⁸ Jane Humphries offers a median assessment of this same evidence: “as far as first experiences of education are concerned, the verdict of these earlier working-class autobiographers is far from unanimously negative.”¹⁹

Clearly, experiences varied, and much must have depended on the individual teacher. In this respect, it is notable that while “dame and common school” refers to a generic category of school, in practice such schools were more likely to be known by the familial name of their head teacher, e.g., “Dame Corner’s school.”²⁰ The dame’s reputation within the community was thus important to the school’s success and continuity, and it is significant that, although there were certainly inexperienced teachers, in Manchester, Salford, Bury, Liverpool, York, Birmingham, Rutland and London, 54.8 percent of dame and common school teachers had more than five years experi-

15. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 81-4, 107.

16. Rose, *The Intellectual Life of the British Working Classes*, p. 152; Neuburg, *Popular Education in Eighteenth Century England*, pp. 20-2.

17. Smith, *A History of English Elementary Education 1760-1902*, pp. 39-40.

18. John Burnett, *Destiny Obscure: Autobiographies of Childhood, Education, and Family from the 1820s to the 1920s* (London: Routledge, 1994), p. 140; Rose, *The Intellectual Life of the British Working Classes*, p. 152.

19. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 356.

20. Campkin, *The Struggles of A Village Lad*, p. 5.

ence, and some had significantly more.²¹ An obituary in the 1803 *Norfolk Chronicle* read: ‘Same day died, at Wells, aged 86, Mrs. Cicely Moy, who had filled the humble yet useful office of School-dame, for 56 years, with great credit to herself and advantage to her numerous little pupils.’²² Teaching occurred in small groups of about ten to 20 pupils, and the Manchester Statistical Society reported that children entered dame schools at 2.75 years and common day schools at 4 years on average.²³ Most dame school teachers taught reading and some kind of textile craft, either sewing, needlework, or knitting, and the more striving students of common day schools could take writing and other subjects if their parents were willing to pay the extra fees.²⁴

The typical dame school met in the kitchen or another room in the dame’s house.²⁵ Furnishings and teaching materials could be austere, a few simple benches or stools and a bible, but they would also incorporate the personal possessions of the teacher. For example, John Askham’s florid description of his ‘old dame’s school’ conjures up the right kind of image. Children shuffled in at nine o’clock to sit at “low forms that...ranged across the house,” and all were “provided with chill toes and catechisms.” The “antiquated, sleepy” furnishings consisted of “two great brass candlesticks...some small pictured plates, and a few Dutch tiles in squares” on the mantel, while “an ear of Indian corn, dusty, and in the last stage of consumption,” adorned a shelf, along with a weather indicator. A great clock stood in the corner, whose mechanism interested the young Askham very much, and a “goodly array of pictures adorned the walls.” The only other room in the school was a “coal hole,” which doubled as a disciplinary isolation space.²⁶ There is much in this description to capture the curiosity of a child, but it does not put to rest the charge that dame schools might

21. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 136.

22. Miscellaneous, *Norfolk Chronicle* (Norfolk), June 25, 1803, p. 2

23. Manchester Statistical Society, *State of Education in the Borough of Manchester*, p. 36.

24. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 19-22.

25. *Ibid.*, p. 149.

26. John Askham, *Sketches in Prose and Verse* (Northampton: S. S. Campion, 1893), pp. 10-13.

be “unhealthy, dirty and ill-ventilated.”²⁷

Yet the material limits of humble classrooms could be creatively expanded.²⁸ Teachers were not confined to their four walls and would bring children in their care out of the schoolroom to play on the village green, etc., as one dame school in Nettleham, Lincolnshire did on a summer day in 1827 (the account of which only survives because it was the unfortunate occasion for the death of an infant at the hands of a passing “brutal-minded” boy throwing stones and reported in the local newspaper).²⁹ More happily, when the sun shone, Old Betty, a school dame from the Staffordshire potteries, reportedly took the children with their books and knitting into the garden of her cottage and ‘lapsed into continual smiles’.³⁰ William Hersee’s school dame withheld this pleasure from misbehaving children, keeping them back, ‘pinned to her apron’, while their peers played outdoors, and John Dudeney complained that we was withdrawn from his dame school because “I learnt nothing there but to drive the ducks into the moat.”³¹ However obliquely, such examples illustrate that dame schools spilled out into their wider environment.

Likewise, the Manchester Statistical Society reported that, at the initiative of parents and children, the austere limits of the school’s resources could be broadened by pooling resources, particularly books.³² Thomas Carter, who was a student at his mother’s dame school, recounts how he was introduced to an abridged *Robinson Crusoe* and Anna Barbauld’s *Hymns for Children* when other children brought in books from home.³³ James Hopkins describes playing with marbles in his school, and

27. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, p. 7.

28. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 356.

29. “Births, Deaths, Marriages and Obituaries” [in English], Issue: 6888 Volume: 132 3, *Stamford Mercury*, July 1827, 3, ISSN: 09622357, accessed June 29, 2021, <https://ezproxy-prd.bodleian.ox.ac.uk:2083/apps/doc/JA3239458762/BNCN?u=oxford&sid=bookmark-BNCN&xid=29f4e3e0>.

30. Shaw, *When I Was a Child*, pp. 4-5.

31. Caffyn, *Sussex Schools in the 18th Century: Schooling Provision, Schoolteachers and Scholars*, pp. 13, 98.

32. Manchester Statistical Society, *State of Education in the Borough of Manchester*, pp. 8-9.

33. Carter, *Memoirs of a Working Man*, p. 40.



Figure 5.1: Depiction of a dame school

SOURCE: 'A woman school-teacher sitting on a chair with birches in her hand as a small boy stands in front of her and another child holding a book looks on', engraving by W.H. Simmons after T. Webster, Wellcome Collection, <https://wellcomecollection.org/works/rvzrhq9e>

an image created by Thomas Webster depicts students playing cat's cradle together while the dame teaches a smaller group of children to read (Figure 5.1).³⁴ Thus a child's experience of her dame or common school could include various materials to facilitate play or learning and could perhaps be relatively enriching in the material and social context of the time, but much depended on the circumstances.

Whereas the dame and common day school was a kind of autonomous, grassroots institution, the new infant school was very much its reformist sibling. Major philanthropic effort supported these schools from their very beginning. In 1816, Robert

34. Burnett, *Destiny Obscure: Autobiographies of Childhood, Education, and Family from the 1820s to the 1920s*, p. 141.

Owen established an experimental infant school at his mills in New Lanark, which served as the inspiration for the ‘Westminster Free Day Infant Asylum’ established in 1818 by leading Whigs and Radicals.³⁵ Two years later, the school committee offered Samuel Wilderspin the job of headmaster at a second infant school in Spitalfields.³⁶ Wilderspin soon became the schools’ primary evangelist through the agency of the Infant School Society, founded in 1824.³⁷ He developed a pedagogical approach while teaching and took it to the lecture circuit and publishers for an emerging market of provincial infant school societies eager to receive and emulate.³⁸ Wilderspin’s own estimates of his influence range widely, and he later expressed a sense of regret over the quality of existing infant schools, some of which, he wrote, were ‘little better than Dame Schools and very badly conducted’.³⁹

The infant school’s large class sizes were likely the most obvious departure from the dame schools in practice.⁴⁰ Henry Brougham himself once quipped that an infant school was merely a large dame school.⁴¹ Wilderspin was critical of the monitorial methods used by the voluntary societies to teaching older children and instead advocated ‘simultaneous instruction’, in which the schoolmaster gave lessons to all the children at once, although in he nonetheless allowed some older monitors to teach ‘purely mechanical’ subjects.⁴² On such a system, the London schools were able to provide places for about 200 infants each.⁴³ The infant school classrooms were them-

35. Stewart and McCann, *The Educational Innovators, 1750-1880*, pp. 66-7, 242; Machin, “The Westminster Free Day Infant Asylum: The Origins of the First English Infant School,” pp. 43-50.

36. Stewart and McCann, *The Educational Innovators, 1750-1880*, p. 256.

37. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 11-3.

38. McCann, “Samuel Wilderspin and the Early Infant Schools,” p. 194.

39. Roberts, “A New View of the Infant School Movement,” p 159-60.

40. Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, p. 146.

41. Roberts, “A New View of the Infant School Movement,” p. 161.

42. McCann, “Samuel Wilderspin and the Early Infant Schools,” p. 198; Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, p. 15.

43. Machin, “The Westminster Free Day Infant Asylum: The Origins of the First English Infant School,” pp. 46, 51.

selves large, occupying “airy and commodious” buildings.⁴⁴ The ideal infant school was made up of a hall and gallery within which young children were arranged in rows. Blackboards covered the walls for children’s use, and many of the supported schools had playgrounds.⁴⁵

Lessons on reading and grammar were often set to rhyming songs as a mnemonic device, and Wilderspin produced various objects—wooden blocks or special abacuses—to assist with teaching counting and basic arithmetic.⁴⁶ The profusion of set-texts and standardized learning materials left the schools open to accusations of a kind of rote teaching that Wilderspin explicitly sought to avoid. There is a kind of contradiction here insofar as Wilderspin’s writings promote developmentally-appropriate lessons and sympathy towards children’s need for play and care in addition to instruction but lacked an underlying organizing framework.⁴⁷ ‘The fundamental principle of the infant school system is love’, he wrote, signaling the ambiguity.⁴⁸ In the absence of training schools, the more ineffable features of Wilderspin’s pedagogy were tied closely to his person.⁴⁹ A later mood of resignation in his writings suggests that this was lost, in Wilderspin’s view, when others sought to emulate it,⁵⁰ an occasion that might just as easily turn instruction into indoctrination:

I’m not too young for God to see;

He knows my name and nature too,

And all day long he looks at me,

44. Askham, *Sketches in Prose and Verse*, p. 11.

45. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 25-6.

46. Jill Shefrin, “Adapted for and Used in Infants’ Schools, Nurseries, &c.’: Booksellers and the Infant School Market,” in *Educating the Child in Enlightenment Britain: Beliefs, Cultures, Practices*, ed. Mary Hilton and Jill Shefrin (Farnham, Surrey: Ashgate, 2009), 163–180; Stewart and McCann, *The Educational Innovators, 1750-1880*, p. 260.

47. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 13-4.

48. Samuel Wilderspin, *The Infant System*, 6th ed. (London: Simpkin / Marshall, 1834), p. 83.

49. Stewart and McCann, *The Educational Innovators, 1750-1880*, p. 266.

50. McCann, “Samuel Wilderspin and the Early Infant Schools,” p. 203.

And sees my actions through and through.⁵¹

It is important not to lionize Samuel Wilderspin, and there are signs that his “love” went unrequited. Notably, infant schools had trouble attracting working-class parents despite charging rates that were subsidized by charitable subscribers—sometimes free—and consequently lower than the private dame schools.⁵² Historians have emphasized the benefit of flexibility offered by dame schools as opposed to the fixed hours of more formal schools, which were often at odds with the rhythms of working class life.⁵³ Infant schools also enforced standards of hygiene and cleanliness which meant in practice that such families had to pay for the cost of respectable clothing, raising “a more important consideration than the small weekly payment to the master,” according to the Manchester Statistical Society.⁵⁴ The fickle heart may have also turned away from what it took for middle-class proselytizing.⁵⁵ Thus while the infant schools probably benefited from funds and resources that came from being part of a charitable network, they struggled against inconsistency, class prejudice, and competition with dame schools.

Nonetheless, they survived. Over the 19th century, many infant schools became attached to public schools as a kind of preparatory institution and introduction to monitorial methods for the younger siblings of public-school children.⁵⁶ Supported schools often had a “babies department,” as did board schools in the final quarter of the century.⁵⁷ With their growth, these spaces for young children in supported schools

51. Ann Taylor, *Hymns for Infant Schools* (London: B. J. Holdsworth, 1827), <http://dbooks.bodleian.ox.ac.uk/books/PDFs/600100788.pdf>, p. 9.

52. Roberts, “A New View of the Infant School Movement,” p. 156; Gardner, *The Lost Elementary Schools of Victorian England*, pp. 161-2; this was emphasized by contemporaries G. Stocks, *The Infant School* (Uxbridge: H. G. Cosier, 1841), <http://dbooks.bodleian.ox.ac.uk/books/PDFs/600051221.pdf>.

53. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 357; Gardner, *The Lost Elementary Schools of Victorian England*, pp. 96-7.

54. “State of Education in the County of Rutland,” p. 69.

55. Roberts, “A New View of the Infant School Movement,” p. 156.

56. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 15.

57. *Ibid.*, pp. 22-6, 42-4.

presumably drew in children who would have otherwise attended dame schools.⁵⁸ Especially after the education act of the 1870 and 1876, which introduced a system of compulsory attendance at ‘efficient’, publicly supported schools for children over five, many elder students’ younger siblings likely accompanied them to such schools out of convenience.⁵⁹ However, the conversion was not spontaneous. In Devon, for instance, school boards failed to enforce the efficiency criteria on dame schools, and many of them survived well into the era of board schools.⁶⁰ Not until the 1890s did the education department grow more insistent that such dame schools be closed, although this process probably occurred earlier under urban school boards.⁶¹ The elimination of fees in 1891 was also likely an additional encouragement in drawing away young children from dame schools into the babies departments and infant schools.⁶²

For those more focused on the expansion of public schooling, therefore, the dame school might have seemed a vestige of the past—superstitious, inefficient and unhealthy—whose fate was to be replaced by the better-organized, perhaps higher-quality infant school. In practice, the distinction between types of school was not so clear cut, as most schools could fall somewhere along a spectrum of classification.⁶³ For one, the names used to describe schools were still ambiguous in the nineteenth century.⁶⁴ Mary Smith described being sent ‘to another dame school, where I learned to knit and sew, the sole object for which I attended.’⁶⁵ In the next sentence, however, she says, ‘It was a parish school, and was visited by ladies from the vicarage. It was kept, as most

58. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, p. 49.

59. *Ibid.*, pp. 42-50.

60. Roberts, “A New View of the Infant School Movement,” p. 163.

61. *Ibid.*

62. Mitch, surprisingly, finds that subsidies introduced in this period had the largest effect on raising the enrolment of children aged two to four, who were not subject to compulsory education Mitch, “The Impact of Subsidies to Elementary Schooling on Enrolment Rates in Nineteenth-Century England,” p. 383-4; Roberts, “A New View of the Infant School Movement,” p. 163.

63. I have already noted how Wilderspin thought some infant schools were comparable to dame schools; see Roberts, “A New View of the Infant School Movement,” pp. 159-61.

64. Gardner, *The Lost Elementary Schools of Victorian England*, p. 18.

65. Smith, *The Autobiography of Mary Smith, Schoolmistress and Nonconformist, a Fragment of a Life*, p. 24.

village schools were kept then, by a woman, who, by some disease or other was unable to move from her chair or lift her hand to her mouth.’⁶⁶ Perhaps she was inclined to call it a ‘dame school’ because it was run by a woman and taught needlework, but the implied support it received from the parish and the visitations suggest that it may have instead been some kind of charity school. John Burnett et al.’s annotated bibliography of historical working-class autobiography includes an “education” index indicating those autobiographies that recalled time spent at a specific kind of school.⁶⁷ The most frequently mentioned schools resemble blocks of a timetable, not classifications by type.⁶⁸ “Sunday school” makes up 11.3% of entries, with “Day school” at 9.8% and “Evening classes” at 7.7%. The number of “unclassified” schools, at 9.6%, is also notable. Gardner argues that, in their lived experience, working-class families were more likely to acknowledge time spent at “school,” without qualification or category. It follows that those who cared to distinguish “dame schools” may have been drawing on negative connotations evoked by this word, as in an assuming and socially poignant joke reprinted in several provincial newspapers in the early 1830s:

A lady went into a dame-school not long ago...and seeing a little girl at work, asked her what she was making. The child dropped a courtesy, and replied ‘A Hemise, ma’am.’ ‘A what?’ said the lady, ‘why, it looks like a shirt?’ ‘Yes, ma’am,’ rejoined the little work-woman, ‘only Governess says we ought to say *Hemises* for these, the same as *Shemises* for the others.’⁶⁹

The other sign that distinctions between school types for early children were more ideal than real is that teachers probably combined various methods and ideas accord-

66. Smith, *The Autobiography of Mary Smith, Schoolmistress and Nonconformist, a Fragment of a Life*, p. 24.

67. Burnett, Vincent, and Mayall, *The Autobiography of the Working Class: An Annotated, Critical Bibliography*, pp. 456-8.

68. Gardner, *The Lost Elementary Schools of Victorian England*, p. 27.

69. “Refinement” [in English], Issue: 6822, *Berrows Worcester Journal*, October 1833, accessed June 29, 2021, <https://ezproxy-prd.bodleian.ox.ac.uk:2083/apps/doc/R3208938176/BNCN?u=oxford&sid=bookmark-BNCN&xid=80749dd9>.

ing to need. For example, David Winstanley, schoolmaster of a charity school in Miles Platting, explained:

Owing partly to the diversity in the ages of the children, and partly to my own inexperience and want of ability as a teacher, I had considerable difficulty in forming a system by which I could manage to keep the children constantly employed. I have attended one examination of the pupils of the Lancasterian school, Three at the Mechanics' Institution, and I have been twice at the Infant School, Elm Street, and from hints which I have been able to gather at the above mentioned places the method of teaching which I now practise was formed. I teach infant school exercises, reading, writing, slate and mental arithmetic and the Girls are taught to sew and to knit. But to teach both youths and infants in one school room, the former by the Sessional School plan and the latter by the plan practised in infant schools with any degree of success is a difficult matter. Such however I have attempted to do....⁷⁰

Faced with an influx of young children, Winstanley adopted and combined instructional methods to accommodate them.

The reform of a dame school into an infant school in rural Hampshire in 1824, as recounted in the *Southampton Herald*, is illustrative of the conceptual distinctions and similarities between the two institutions.⁷¹ The change was brought on by the school's growing attendance—perhaps a sign of its success more than its failure—and the encouragement of a Lady and correspondent of the British and Foreign School Society. “Finding...that the number of scholars was increased, and that the progress of some of them was creditable,” the article reports, the dame agreed to reforms, “dividing the school into classes, according to the proficiency of the learners...and

70. Winstanley, *Schoolmaster's notebook*, p. 30.

71. This paragraph relies upon 'Village dame schools in Hampshire' *Southampton Herald* (Southampton), Jan. 11, 1834, p. 4.

hearing them read a sentence at a time in rotation,” since it was no longer possible to “hear one child read at a time” with sufficient attention, given now her class of 30 students. The lessons were to be “Alphabets, spelling and reading lessons,” for the lower class, “useful and simple books” for the middle class, and “Testaments” and religious questioning for the highest class, so “providing the children with such lessons as their uninstructed minds could best comprehend, and then, by simple and familiar questions, inviting them to the exercise of the mental faculties.” But the dame had already been teaching from “Reading Made Easy” and various spelling books, which also apparently catered to primary learning. The second reform was to deputize “a clever girl to instruct each of the lower classes, whilst her [the dame’s] own attention was exclusively devoted to the highest class,” but this raised the ire of parents and was therefore abandoned for awhile. The “cleverest of her scholars,” a little boy, was eventually sent to a nearby British School for a week to learn the monitorial method and introduce it back to the dame school. Finally, “borrowing another hint from the Infant School system,” the dame school teacher was “presented with a few pictures of farm yards, agricultural and domestic scenes,” which she was instructed to use as educational aids, and she was told to give up doing needlework during school hours.

Undoubtedly, these reforms may have brought about some improvement in the quality of teaching at the dame’s school, but this is by no means certain. Indeed, the biggest change might have been the expansion of class sizes, and this was often celebrated as an indication of good performance. For instance, after the Hampshire schoolteacher implemented the recommended reforms, she found herself with fifty students, which the lady considered “a sure proof of the increasing confidence of the parents.”⁷² Another schoolteacher, Mary Smith, invariably took the growing number of pupils in her school as a sign of her success in similar terms, considering 30 students

72. *Southampton Herald* (Southampton), Jan. 25, 1834, p. 4.

to be an admirable number at one point.⁷³ The Manchester Statistical Society, in its report on schools in Bury, wrote spiritedly that the two infant schools “are rapidly increasing their numbers,” although there were already 240 infants divided between them, “and will, it is to be hoped, be speedily followed by other establishments upon a similar principle.”⁷⁴ Likewise, when Janet Bathgate’s small school in the Scottish Borders doubled in size to 18 students one Monday, she took it as nearly a sign of “the goodness and wisdom of God” himself.⁷⁵ But while more students undoubtedly brought in more fees and may have been understood as a sign of a high-quality school, larger classes would not have been necessarily conducive to individualized instruction.

One can move beyond ad hoc judgements about the merits of various schools with a framework for contemplating school quality borrowed from modern empirical studies and adapted, however imperfectly, to the historical setting. Broadly speaking, quality is defined along either ‘structural’ or ‘process’ dimensions.⁷⁶ The former attempts to capture more objective features of the early childhood learning environment, such as teacher-to-pupil ratios or the professional qualifications of staff, while the latter evaluates pedagogical practice and interactions between children and adults.

On the ‘structural’ side, one landmark experiment, Project STAR, provides important evidence. The study involved 11,600 Tennessee students randomly assigned in kindergarten to either a small classroom, a large classroom, or a large classroom with a teacher’s aide for the first four years of school, and notably, their teachers were also randomly assigned to teach one kind of class. Children assigned to smaller classes scored about 4% higher on standardized tests in the first year, an advantage over those in larger classrooms which grew in subsequent years, and the presence of

73. Smith, *The Autobiography of Mary Smith, Schoolmistress and Nonconformist, a Fragment of a Life*, pp. 98-102.

74. Manchester Statistical Society, *State of Education in the Borough of Manchester*, p. 11.

75. Janet Bathgate, *Aunt Janet’s Legacy to Her Nieces, Recollections of Humble Life in Yarrow in the Beginning of the Century*. (Selkirk: George Lewis & Co., 1894), pp. 188-9.

76. Kathy Sylva, “Quality in Early Childhood Settings,” in *Early Childhood Matters: Evidence from the Effective Pre-School and Primary Education Project* (Abingdon: Routledge, 2010), 70–91.

teacher's aides made little difference.⁷⁷ Studies of classroom size among older students fail to find such strong effects or any effect, highlighting perhaps the special sensitivity of the early childhood period to smaller class size.⁷⁸ Moreover, follow-up studies found that students who attended kindergarten under a teacher with more than ten years of experience earned \$1,093 more per year than their peers in other classes.⁷⁹ Codified standards of quality (e.g. ECERS) in early childhood education also include the importance of appropriate furnishings and space for play and privacy, adequacy of personal care, health, and safety, and the presence of various toys and age-appropriate learning materials.⁸⁰ In sum, there is good evidence that low pupil-to-teacher ratios and experience in the classroom translate into cognitive and economic advantages for students, while a professional consensus exists around the importance of well-equipped classrooms.

The dame schools do not compare poorly to other contemporary schools on these 'structural' measures. Table 5.2 presents data on the average dame's fees, number of students, income (fees times number of students), and years of experience in various cities surveyed by the statistical societies. It also reports information on prevailing women's wages in the locality, taken from the Rural and Urban Queries of the 1834 Poor Law Commission. Dame school pupil-teacher ratios, at about 10 to 20 children per teacher, were below average, which Mitch reports to be about 55 to one in this period.⁸¹ As discussed above, some infant schools operated with considerably higher ratios, which in addition to its consequences for children's care, working-class parents understood raised the risk of infection.⁸² It must, however, be admitted that dame

77. Krueger, "Experimental Estimates of Education Production Functions."

78. Jonah Rockoff, "Field Experiments in Class Size from the Early Twentieth Century," *Journal of Economic Perspectives* 23, no. 4 (2009): 211–230.

79. Raj Chetty et al., "How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project STAR," *The Quarterly Journal of Economics* 126, no. 4 (2011): p. 1594.

80. Sylva, "Quality in Early Childhood Settings," pp. 87-8.

81. Mitch, "The Impact of Subsidies to Elementary Schooling on Enrolment Rates in Nineteenth-Century England," p. 378.

82. Gardner, *The Lost Elementary Schools of Victorian England*, p. 260.

Table 5.2: Dame-school teachers income (weekly) and experience

City	Fees (d.)	Pupils	Income (d.)	Local Wages (d.)	Years Exp.
Birmingham	3.55	14.5	51	84 ^a	4.24
Bristol	3.66	12.8	47	48 ^b	
Bury	3.66	26.25	96.1	73.8 ^c	5.71
Liverpool	3.42	20.96	71.68		4.75
Manchester	4	20.2	80.7	108 ^d	4.27
Rutland	3.25	13.56	44.07	34.6 ^e	6.14
Salford	4.18	23.38	97.7		4.16
Westminster	6	16.2	97.1	57.6 ^f	
York	2.88	18.8	54.2	84 ^g	6.44

Source: School data from statistical society reports, see table 5.1. Local wages approximate reported female wage in *Parliamentary Papers*, House of Commons Papers 44, Report from His Majesty's commissioners for inquiring into the administration and practical operation of the Poor Laws (London, 1834), <https://ezproxy-prd.bodleian.ox.ac.uk:2285/parlipapers/docview/t70.d75.1851-027699?accountid=13042>, town queries, part 3.

a: Leamington, 'charing', p. 240 h.

b: Bristol, St. Philip and Jacob. Labourer earns 10 s. per week, but with his family earns 14s. to 16s. p. 48 h.

c: £16 per year; p. 64 h.

d: Oldham, hand-loom weavers wife, 8 s. or 9 s. per week; p. 69 h.

e: Rural queries, Whissandine, £7 10 s. per year; p. 384 a.

f: St. Paul, Covent Garden, about £12 per year; p. 183 h.

g: York, St. Michael, 'not more than 7 s. per week'; p. 257 h.

schools likely had fewer teaching aides and poorer school environments. A dame's average earnings from her school fees corresponded fairly closely to local wages, leaving little surplus for investment in educational capital. The statistical societies also reported data on teacher's years of experience. As a technical note, I use a Tobit procedure to correct for right-censoring at seven years' experience in this data. Across the different places surveyed, dames had between four to six years of experience on average. This does not seem particularly low. Table 5.3 offers a comparative perspective and reports the predicted number of years' experience in different types of school. The omitted category is dame schools, column (1) reports baseline results, and column (2) reports results with place fixed effects. According to the statistical society evidence, therefore, dame-school teachers had fewer years of experience than charity-school teachers by 1.6 years, 1.51 fewer years than common-school teachers, and 2.75 fewer years than superior private-school teachers. As a whole, therefore, dame-school teachers tended to report fewer years of experience than day-school teachers that catered to older children, although average age is not reported, and this measure does not reflect dames' experience in providing child care. Infant-school teachers tended to report even fewer years of experience, although the difference with dame schools is not statistically significant. Thus among schools that served children in early childhood, dame schools measured up fairly well, and on the 'structural' measure of pupil-teacher ratios they radically outperformed alternatives.

However, as Margaret Burchinal notes, such variables are merely enabling; 'structural' quality reflects the resources available to teacher and pupil with which they may enact the practice of quality education.⁸³ But leaving the comparatively simple world of 'structural' measures behind, those who would evaluate educational 'process' bump up against fraught issues of subjectivity and value.⁸⁴ Attention has been

83. Margaret Burchinal, "Measuring Early Care and Education Quality," *Child Development Perspectives* 12, no. 1 (2018): p. 4, <https://doi.org/10.1111/cdep.12260>.

84. Lilian G. Katz, "Multiple Perspectives on the Quality of Early Childhood Programmes," *European Early Childhood Education Research* 1, no. 2 (1993): 5–9.

Table 5.3: Teacher’s years of experience at different kinds of school, c. 1830

	(1)	(2)
	Tobit: Experience (yrs)	Tobit: Experience (yrs)
Charity	1.60*** (0.34)	1.26*** (0.34)
Common private	1.51*** (0.22)	1.55*** (0.22)
Superior private	2.75*** (0.27)	2.79*** (0.27)
Infant	-0.75 (0.62)	-0.82 (0.62)
Constant	4.68*** (0.14)	4.67*** (0.20)
Observations	2224	2224
Pseudo R^2	0.015	0.019
Place FE		✓

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: dame school is the omitted category.

given to interactions between teachers and children in the classroom as the site of important pedagogical work, and a broadly ‘child-centred’ model, in which children’s needs are prioritized, has emerged as a leading standard.⁸⁵ Once again, randomized experiments point the way. For instance, the High/Scope preschool curriculum study, in addition to randomly assigning children to high-quality preschool in general, now randomly varied the curriculum from which teachers taught: either the direct instruction, nursery school or High/Scope curriculum.⁸⁶ Direct instruction was the more academically-oriented track, focusing on language, reading, and mathematics

85. Note, however, that this term is contested in practice Neitzel et al., “A Comparative Analysis of the Early Childhood Environment Rating Scale-Revised and Early Childhood Environment Rating Scale, Third Edition,” p. 417; Gunilla Dahlberg, Peter Moss, and Alan Pence, *Beyond Quality in Early Childhood Education and Care: Languages of Evaluation*, 2nd ed. (London: Routledge, 2007), p. 43.

86. Lawrence J. Schweinhart and David P. Weikart, “The High/Scope Preschool Curriculum Comparison Study Through Age 23,” *Early Childhood Research Quarterly* 12 (1997): p. 119.

in “precisely planned, 20-minute question-and-answer lessons.” For pedagogical materials, children in this group only had workbooks.⁸⁷ The nursery school model was more “child-centred,” less directive, granting children the choice between activities grouped into general themes, and it emphasized social skills over academic skills.⁸⁸ Finally, the High/Scope model was again more child-centred, drawing upon Jean Piaget’s theories of child development, with teachers acting to facilitate learning and interest in a wide variety of thematic intellectual, physical, and social activities.⁸⁹

Remarkably, while the outcomes of this study suggest that all three curriculum types yielded improvement in various academic and social indicators over those in the control group who attended no such preschool, there was no outcome variable, academic or otherwise, on which the High/Scope or nursery program significantly underperformed the direct instruction track.⁹⁰ Indeed, the child-centred approaches both led to outcomes that broadly suggest children on these curricula became more socially integrated. For instance, those in the child-centred classrooms were less likely to have separated from a spouse, more likely to perform volunteer work, less likely to have been suspended from work, less likely to have a felony arrest and less likely to have committed property crime by the time of follow-up at age 23 than those under direct instruction, and after controlling for gender, both child-centred curricula were not significantly different from one another on any outcome variable.⁹¹ Furthermore, professional best practice, as codified in the Early Childhood Environment Rating Scale, for instance, has shifted focus from ‘ensuring that children have access to developmentally appropriate materials to how teachers facilitate the learning for young children throughout the day,’ adding standards around teacher’s ability to elaborate upon materials and experiences in the classroom by, for instance,

87. Schweinhart and Weikart, “The High/Scope Preschool Curriculum Comparison Study Through Age 23,” p. 119.

88. *Ibid.*, p. 120.

89. *Ibid.*

90. *Ibid.*, p. 138.

91. *Ibid.*, pp. 134-5, 138.

pointing out new words or connections between ideas, and a recent review of the early childhood education quality literature similarly emphasizes the value of teachers ‘scaffolding,’ without controlling, their young students’ experiences.⁹²

If this brief comparative history of early childhood pedagogy in the present is any guide, therefore, it is not obvious that the centrally-organized infant schools would have been of a higher quality than the dame schools. In particular, the example of the Hampshire dame illustrates how low pupil-teacher ratios had enabled her to pay more individual attention to each child’s reading in contrast to the infant school’s method of simultaneous instruction. Indeed, Gardner asserts that a method of ‘individual instruction’ was generally followed in private schools, with teachers acting to support pupil’s interests and their parents’ desires.⁹³ As simultaneous instruction developed, moreover, predictable problems arose in its implementation and were catalogued by a former school inspector in 1876: ‘If in the simultaneous part of the reading lesson the children do not imitate the voice and accent of the teacher, but repeat after her in a monotonous tone; or if part of the class is lazy, and catches up the words repeated by the diligent children in a perfunctory manner, such simultaneous teaching is positively harmful.’⁹⁴ In other words, children became disengaged, and with hundreds of children to attend to, it was undoubtedly difficult for teachers to pique their interest and ‘scaffold’ new concepts to their individual understanding.

Similar problems arose in the ‘object lessons’ introduced to infant schools upon the influence of Johann Pestalozzi.⁹⁵ Believing that teaching was most effective when rooted in experience, infant school teachers developed object lessons in which they presented a commonplace object to the pupils, whose curiosity they drew out in a series of thematically linked questions. One experienced infant school teacher provided

92. Neitzel et al., “A Comparative Analysis of the Early Childhood Environment Rating Scale-Revised and Early Childhood Environment Rating Scale, Third Edition,” pp. 417-19; Burchinal, “Measuring Early Care and Education Quality,” p. 7.

93. Gardner, *The Lost Elementary Schools of Victorian England*, p. 167.

94. D. R. Fearon, *School Inspection* (London: Macmillan, 1876), p. 12.

95. Smith, *A History of English Elementary Education 1760-1902*, p. 128.

the following example for her readers:

Q. What is this I hold in my hand?

A. *A piece of glass.*

Q. Is it smooth or rough?

Hard or soft?

What is the window made of?

[...]

Anything you can see through is called transparent—you must remember that long word.

Q. What is glass called?

A. *Transparent.*

Q. What does transparent mean?⁹⁶

Teachers were to be attentive that their pupils did not tire of the lesson, she insisted, and to that end ought to “vary the manner of teaching as much as possible” and ‘study the characters of the children; for each child may require a different treatment.’⁹⁷ Such an approach could often be engaging—and perhaps reflects a ‘child-centred’ spirit—but according to the former school inspector, ‘if all that is going to be done with them is to hold up a piece of coal, or of wool, before them, to tell them its properties in long outlandish words, and to expect them to repeat those words after the teacher, they will of course be listless and dull.’⁹⁸ On the other hand, a teacher before a class of infants could find that “Her difficulty will rather be to moderate their excitement.”⁹⁹ The experience of the school inspector illustrates that even infant school teachers could fall short, while some were also evidently quite capable and thoughtful. No

96. John Heywood, ed., *Hand-book for Teachers of Infant Schools* (London: Simpkin / Marshall, 1869), p. 43.

97. *Ibid.*, pp. 9, 16.

98. Fearon, *School Inspection*, p. 16; See also Smith, *A History of English Elementary Education 1760-1902*, p. 128.

99. Fearon, *School Inspection*, p. 16.

matter how capable the teacher, however, their task would be made undoubtedly more difficult with a very large class of infant pupils.

Structural challenges such as these were experienced by Wilderspin himself while teaching in Westminster. On the first day of the school, with 165 infants present, “when the door closed on the last mother...there soon began from one a faint cry of ‘*Mammy*,’ then another ‘Ma,’ and in a few seconds it became epedinnic [sic], and such an universal chorus of grief.”¹⁰⁰ He left the room and could only bring calm by introducing an impromptu puppet and playing children’s games, but when the mothers discovered that their children had not been learning to read as they expected, they banded together. “A committee of mothers very shortly waited on me,” reports Wilderspin, “‘My boy says, Sir, he has been playing at ‘Duck’ here, but I sent him to learn his book.’”¹⁰¹ Clearly, some parents expected important learning to occur in early childhood and were frustrated with the method or pace of learning in the infant schools. Problems attracting working class children away from the dame schools in Westminster persisted, and it continually baffled the infant school committee that such parents would pay higher fees for, as they understood it, a poorer service, when the infant school charged (or perhaps was constrained by weak demand to charge) only a penny per week.¹⁰²

If it was true of the infant schools that some teachers were more capable than others, the same can in fairness be said for dame and common schools. By the same token, it cannot be taken for granted that all such classes were of poor quality. While there are plenty of scandalized reports ‘of bad management and want of discipline, carelessness or incapacity on the part of the masters and mistresses, the want of a proper supply of books and writing materials, and the almost universal absence of

100. Samuel Wilderspin, “Mr. Wilderspin’s First Lecture on Infant Schools at Branch A 1.,” *The New Moral World*, 3rd ser., 19, no. 1 (November 1840): pp. 291, <https://hdl.handle.net/2027/mdp.39015034639743>.

101. *Ibid.*, pp. 291-2.

102. Machin, “The Westminster Free Day Infant Asylum: The Origins of the First English Infant School,” p. 52.

proper school rooms,¹⁰³ there is also evidence of a certain bias against such teaching. The Manchester Statistical Society included the following anecdote in its report on dame and common schools in Manchester, as an example of inadequacy: ‘One master stated that he had adopted a system which he thought would at once supply the great desiderata in education—“it is simply,” he said, “in watching the dispositions of the children, and putting them especially to that particular thing which they take to.”’ Note the germ of a child-centred approach. The report continued, “In illustration of this system, he called upon a boy about ten years of age, who had *taken to* Hebrew, and was just beginning to learn it: the Master acknowledging that he himself was learning too, in order to teach his pupil.”¹⁰⁴ On the issue of the schoolmaster learning Hebrew alongside his pupil—perhaps less a shortcoming than a difference of pedagogical opinion—the teacher of the Free Grammar School in Bury was given a much gentler treatment for essentially the same fault: “They require the master to be a graduate of Oxford or Cambridge, and to be skilled in Greek, Latin and Hebrew, (giving him a year to acquire the latter).”¹⁰⁵

It is against this bias that evidence from other writers recounting their positive experiences within the dame and common schools should be weighed. Indeed, there are numerous authors who fondly recalled their time in the dame school and expressed appreciation for what they learned there. The rural poet John Clare commended in verse his dame school teacher’s role in nurturing an early interest in learning:

On the young plant its tender shoot to aid
Must give the promise of a statley tree
And the first cause of its perfections be
In the same sence of her it may be said
Who’s guiding hand my infant foot-steps led

103. Manchester Statistical Society, *State of Education in the Borough of Liverpool*, p. 17.

104. Manchester Statistical Society, *State of Education in the Borough of Manchester*, p. 10.

105. *Ibid.*, p. 15.

To learning path—that her impressing plan
First laid the basis of the future man
And by imbibing what she simply taught
My taste for reading there was surely caught¹⁰⁶

Perhaps the Romantic poet coloured his childhood memories in an innocent light, but it is nonetheless interesting how Clare's verse reflects the notion that early learning plays a foundational role as the "first cause" of later development. Joseph Gutteridge recalled his early teacher's "gentle placid features and her motherly kindness."¹⁰⁷ The unnamed writer of "The Dame School Forty Years Ago," written in 1872, likewise contrasted his early years at a dame school favourably with later time he spent attending a National School.¹⁰⁸ Some accounts give a picture of how this learning may have happened in practice. Mary Smith recalled how, as a child, her teacher had called, "one by one, all the little ones to her knee to read," and how, in combination with instruction at home, she could already comprehend and retain a verse from the primer, "the first moral lesson I received," although she was only a little more than four years old.¹⁰⁹ As an adult and dame school-teacher herself, Smith explained, "My pupils from the first were struck with my simple ways and the absence of tuitional hauteur, and my odd ways, 'like a mother,' of telling them bits of things in explanation of the life and nature around them."¹¹⁰ Charles Shaw described his dame's pedagogical method as 'very simple, and graded with almost scientific precision'. In vivid detail, Shaw recalled how 'Old Betty' began with an illustrated alphabet, then the 'reading-made-easy book, with black letters, making words in two, three and four letters',

106. John Clare, *The Early Poems of John Clare: 1804-1822* (Oxford: Clarendon, 1989), pp. 197-8.

107. Joseph Gutteridge, p. 84, qtd. in Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 355.

108. "The Dame School Forty Years Ago," *School Board Chronicle*, May 11, 1872, qtd. in H.C. Barnard, *A History of English Education from 1760* (London: University of London Press, 1961), p.3.

109. Smith, *The Autobiography of Mary Smith, Schoolmistress and Nonconformist, a Fragment of a Life*, pp. 16-17.

110. *Ibid.*, pp. 210-1.

then spelling, and finally, reading the Bible.¹¹¹ She rewarded children's achievements by granting privileges—for example, the right to take the ashes from the fire-grate out to the ash-heap or the right to 'sit on the highest visible stair in the winding staircase', both highly desirable according to Shaw—that only someone attuned to children's enchanted sense of the world could appreciate.¹¹² These examples illustrate how, independently and without formal precepts, some dame and common teachers arrived upon a method of teaching that was, if not perfect, at least appropriate to the circumstances.

The other staple of early education, particularly in the dame schools, was some form of textile craft—usually knitting for children of both sexes and embroidery for girls—and there is evidence that parents valued this skill dearly. For instance, Thomas Cooper described his dame teacher as 'an expert and laborious teacher of the art of reading and spelling,' and 'Her knitting, too—for she taught girls as well as boys—was the wonder of the town.'¹¹³ Mary Smith recalled how girls were taught various intricate needlework designs, "including muslin and net, on which we worked, or flowered squares for the shoulders, veils, caps, collars, and borders," and she noted, "Parents were prouder then of their daughters' pieces of needlework than of their scholarship."¹¹⁴ In factory districts, sewing skills were a prerequisite to lucrative informal apprenticeships for girls in mending.¹¹⁵ While the separation of embroidery as girls' domain was undoubtedly effected in organized schools, dame schools could be less rigid. Of his time in a dame's school, Frederick Hobley (b. 1833) recalled, "I have a distinct remembrance of the teacher giving me a needle and thread and a piece

111. Shaw, *When I Was a Child*, pp. 2-3.

112. *Ibid.*, p. 3.

113. Cooper, *The Life of Thomas Cooper*, p. 7.

114. Smith, *The Autobiography of Mary Smith, Schoolmistress and Nonconformist, a Fragment of a Life*, p. 30.

115. Deirdre Busfield, "Job Definitions and Inequality: The 'Unskilled' Women Workers of the West Riding Textile Industry, 1850-1914," *Textile History* 19, no. 1 (1988): p. 77, <https://doi.org/10.1179/004049688793700573>.

of rag to pass away my time during one of the afternoons.”¹¹⁶ Such craft skills were not academic, but they should perhaps not be written off too quickly. In one modern study, knitting and sewing were judged to require spatial skills—the ability to visualize and mentally manipulate shapes and forms—and practicing these activities was positively correlated with later performance on tests of spatial ability.¹¹⁷ Moreover, there is some evidence of complementarity between spatial activities in childhood and later life and in the acquisition of some spatial cognitive skills.¹¹⁸ As Charles Shaw put it, these children ‘learnt reading and knitting, instead of reading and writing’.¹¹⁹

It may have seemed to reformers the fate of the traditional dame schools to be replaced by the newer infant school, but this was not the case. The early nineteenth century seems more likely to have been a period of growth in the enrollment of children under five, and much of this must have been supplied by dame schools. I have already mentioned the Brougham commission (1818) and the Kerry report (1833), both of which underestimate private school provision for this period, particularly in urban centres. Worse, as B. I. Coleman argues, the 1818 statistics seem to be less accurate than the 1833 statistics, and the categories they report are not directly comparable.¹²⁰ These problems have encouraged historians to take a cautious approach to inferring the growth of education from these sources.¹²¹ Before 1851, therefore, when the education census and the personal census produced more reliable data on school enrollment, estimates of the growth of early school attendance are fairly impressionistic.

116. Burnett, *Destiny Obscure: Autobiographies of Childhood, Education, and Family from the 1820s to the 1920s*, p. 176.

117. Nora Newcombe, Mary M. Bandura, and Dawn G. Taylor, “Sex Differences in Spatial Ability and Spatial Activities,” *Sex Roles* 9, no. 3 (1983): 377–386.

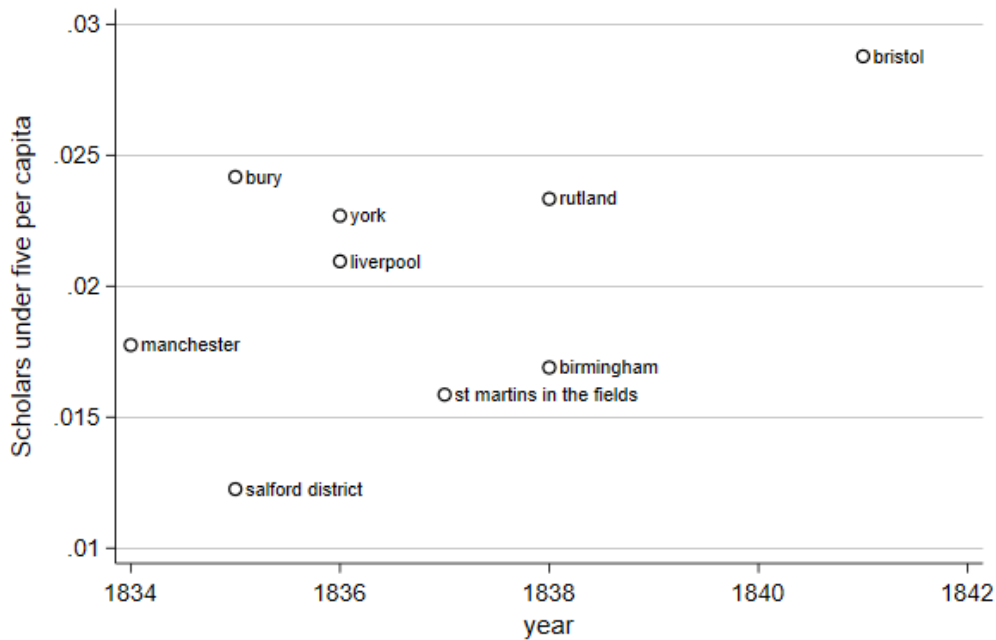
118. Emily Grossnickle Peterson et al., “Spatial Activity Participation in Childhood and Adolescence: Consistency and Relations to Spatial Thinking in Adolescence,” *Cognitive Research: Principles and Implications* 5, no. 43 (2020): n.p., <https://doi.org/https://doi.org/10.1186/s41235-020-00239-0>.

119. Shaw, *When I Was a Child*, p. 3.

120. Coleman, “The Incidence of Education in Mid-Century,” pp. 398-9; Gardner, *The Lost Elementary Schools of Victorian England*, p. 17.

121. Smith, *A History of English Elementary Education 1760-1902*, p. 133.

Figure 5.2: Estimated time-trend in under-fives enrollment, c. 1835



NOTE: Conditional on place fixed effects, source fixed effects, and the natural logarithm of population, which has been linearly interpolated from the nearest census year for statistical-society reports

I here produce an estimate of the growth of under-five school enrollment in the pre-1851 period using only the high-quality data collected by the statistical societies in the 1830s and by census enumerators in 1851. As data-collection methodologies varied so much across the different surveys in these years, interpreting change in enrollment data between two points in time is ambiguous. Change may reflect actual enrollment trends or be an artifact of methodological differences. To side-step this problem, I use the fact that the statistical societies essentially applied the same data-collecting methodology at different points in time. Figure 5.2 demonstrates the various estimates of under-five school enrolment according to the various survey dates, with population linearly interpolated from the nearest census years.¹²² Where the Statistical Societies surveyed later, they generally found higher rates of early childhood enrolment.

122. I relied on <http://www.visionsofbritain.co.uk> for easily accessible population data for the relevant administrative boundaries.

Next, I add observations of under-five enrolment taken from the 1851 census for the same places surveyed by the statistical societies to enable me to introduce two kinds of fixed effects. I include a dummy variable to indicate whether the observation came from either the census or the statistical society survey, which should account for possible over-counting or under-counting in either source. Additionally, because the census was only undertaken in one year, this control leaves residual variation in time that only comes from the different dates at which the statistical societies carried out their surveys, which ranged from 1834 to 1840. In addition, I control for place fixed effects to attempt to reduce the variance of residuals and yield a more precise estimate of the time trend and also to correct for methodological difficulties associated with specific places. Liverpool, for instance, was often singled out as being particularly difficult to survey as it had so many narrow alleyways.¹²³ The results of this exercise are presented in table 5.4. Column (1) presents the simple time trend in the statistical society surveys, equivalent to figure 5.2. Column (2) includes the two fixed effects. Both estimates suggest under-five enrolment was growing, although with such a small sample these estimates are not statistically significant. Over five years, this suggests the ratio of children in school under five to total population in these areas would have risen by around 0.005, and much of this growth must have occurred in dame schools. As I demonstrate in the final chapter (table 7.2), as late as 1861 only 28 per cent of all under-fives were attending either an infant school or a ‘baby’ class in a supported day school. The remainder likely attended something like a dame school.

I conclude analytically, considering why the dame schools were so long-lived and interpreting their role as specialized institutions for promoting human capital accumulation in early childhood. On the supply side, dame schools appear to have been very flexibly provided. Average fees at dame schools, with the exception of West-

123. Smith, *A History of English Elementary Education 1760-1902*, p. 287.

Table 5.4: Growth of under-fives enrolment, c. 1835

	(1)	(2)
	OLS: Under 5 p.c.	OLS: Under 5 p.c.
Year	0.0013	0.00082
	(0.00)	(0.00)
Stat		0.014
		(0.01)
Bristol		0.0077**
		(0.00)
Bury		0.0063*
		(0.00)
Coventry		0.0074*
		(0.00)
Liverpool		0.0019
		(0.00)
Manchester		0.0021
		(0.00)
Penzance		0.0074*
		(0.00)
Rutland		0.0044
		(0.00)
Salford District		0.000044
		(0.00)
St Martins In The Fields		-0.0029
		(0.00)
York		0.0060*
		(0.00)
Constant	-2.35	-1.50
	(1.39)	(1.21)
Observations	9	20
Pseudo R^2		

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

minster, generally ranged between three and four pence per week (table 5.2). The average number of pupils, in contrast, varied substantially more so that the average dame's income (fees times pupils) was in large part determined by the number of pupils. Although the sample is too small and the underlying earnings data too imprecise to draw firm conclusions, it seems that dame-school income loosely tracked women's local labour market opportunities. In Rutland, for instance, where the Poor

Law Commissioners report low weekly wages for women of 34 pence, dames might expect to earn the least in the sample, 44.07 pence, whereas in Bury and all the other textile towns in the sample, their earnings were relatively high to match the relatively lucrative labour market for women in these areas. Although I reiterate that the small sample calls for caution, this evidence suggests that dame schools had a high elasticity of supply and that these markets cleared on quantity, not price, in response to greater demand. In effect, existing dames took on more pupils and new dames entered the market until their incomes from teaching were nearly equivalent to other labour-market opportunities for women.¹²⁴ In contrast to some writers who characterize dame schools as ‘last-resort’ employment, on the basis of this evidence they appear to have been well-integrated into local women’s labour markets and to have expanded in response to local demand for their services.¹²⁵

On the demand side, I have argued in previous chapters that working-class parents distrusted pedagogical innovation, rejecting the novel teaching methods introduced by ambitious schoolteachers and the infant schools, but this may have been a perfectly rational kind of conservatism. When asked by the statistical society surveyor why she had withdrawn her child from the local infant school, one mother explained, ‘They are all for play, and I wish him to learn something. Infant schools are very ready to take children out of their parents’ way while they does their work.’¹²⁶ Wilderspin himself had the same experience when he first set up his school in Westminster, hearing the complaint that parents expected their young children to learn to read. If parents primarily sent their children to schools during early childhood as a form of child care, it is difficult to understand why so many of them also insisted on having their children learn to read.

124. Gardner, *The Lost Elementary Schools of Victorian England*, p. 157; Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 357.

125. Curtis and Boulwood, *An Introductory History of English Education Since 1800*, p. 12.

126. “State of Education in the County of Rutland,” p. 70.

Although parents surely valued reading lessons for their own sake, and perhaps following religious motives, they may have cared more about the information these lessons provided about their children's experience under non-familial care. I assume parents did not want their children to be neglected (and pay for it) and that it was costly for parents to directly monitor teachers, particularly if the point was to enable familial carers to work. This problem would be more acute for young children who were less able to speak for themselves and convey information to their parents. It is clear from the qualitative material discussed above that reading lessons were part of a common set of expectations about what a dame school should do. Autobiographers recalled a common formula, depicted so well in W. H. Simmons's engraving in figure 5.1, according to which these lessons were taught by the dame-school teacher who took aside a small group of children to instruct them 'one-by-one'.¹²⁷ Teachers like Walter Freer's, who 'left us [children] to do whatever we wanted, while he went out to get tipsy', would have found it very difficult to maintain this neglect and also instruct his children to read using this method, while those like Mary Smith, who seemingly took an active interest in her pupils' well-being, would have found these lessons a natural extension of the school's activities.¹²⁸ In signaling theory, a signal only provides good information about an agent's underlying traits, in this case her diligence and consideration, if it is less costly for those who possess the trait to produce the signal than those who do not possess the trait.¹²⁹ Children's ability to read, particularly if it was customarily taught in a one-on-one method, would thus be a fairly effective signal of the dame's quality. Moreover, it would be a signal that most parents could verify relatively cheaply. Parents likely knew how to read themselves, although they may not have been competent writers or mathematicians, and many households possessed at least a bible with which to examine their child's developing

127. Lassonde, "Age, Schooling, and Development," p. 217.

128. Freer, *My Life and Memories*, po. 128-9.

129. Bacharach and Gambetta, "Trust in Signs," p. 160.

abilities.

On the other hand, much pedagogical innovation in this period, from parents' point of view, cheapened this signal. Monitorial and 'simultaneous' methods, delegating instruction to elder students and effecting an educational 'division of labour', were attempts to impart elementary knowledge as cheaply as possible on an industrial scale.¹³⁰ Parents' rejection of these methods in favour of the dame school may reflect a distrust of anything that ostensibly weakened reading's value as a signal of conscientiousness, explicitly in the case of the reformed Hampshire dame school,¹³¹ described above, where 'so much opposition was raised by the parents' against the introduction of a child monitor.¹³² If parents only cared about the outcome, reading, efficient instructional methods should have been a welcome development. That they were not suggests that parents cared about more than just the efficiency with which their children learned to read. Perhaps, however, instead of thinking about schools as providing either instruction or child care, it is more appropriate to think of these services as complements in the sense that caring facilitated instruction, particularly at young ages, and less intuitively, instruction facilitated caring through its signaling function. If so, dame schools possibly provided both services more effectively than other schools by offering them jointly and not specializing too strongly in one element at the expense of the other.

Thus the longevity of dame schools as an institution is explained by their flexible supply and their efficient bundling of both child care and instruction. Where other schools required substantial investments in physical and administrative capital to establish, dames were able to meet demand more quickly. Given the emphasis in earlier chapters on the variability of demand for early child care over the life-course, this was

130. Mesquita, "The Lancastrian Monitorial System as an Education Industry with a Logic of Capitalist Valorisation."

131. 'Village dame schools in Hampshire' *Southampton Herald* (Southampton), Jan. 11, 1834, p. 4.

132. Gardner makes a similar but slightly different point Gardner, *The Lost Elementary Schools of Victorian England*, pp. 166-7.

undoubtedly an advantage. Perhaps more significantly, however, dame schools were an institution well-adapted to the needs of parents with young children. Principal-agent problems beset all kinds of education, but the instructional methods adopted in dame schools, somewhat paradoxically, may have provided a more valuable signal of their quality than other schools more focused on efficiency and results. Parents cared about both school instruction and child care and therefore favoured the dames over their more innovative, and thus less trustworthy, competitors.

Chapter 6

Pattern tracing: the geography of early enrolment in 1851

On the 7th of January, 1834, David Winstanley was put in charge of a school founded that year by his employer to benefit his tenants in Miles Platting, Manchester.¹ Winstanley's experience revealed an unmet demand for early child care, which many parents satisfied by enrolling their children in school. 'At first I did not intend to admit children under six years of age,' Winstanley explained, 'but applications for children of four and five came so often that I could not well refuse to take them in.' Winstanley continued, observing how some parents made 'any sacrifice within their power' for their children's education, while others hoped 'merely to get them out of their way.'² As a consequence, Winstanley adjusted his admissions practices; the mean age of his schoolchildren dropped from 7.2 to 6.3 after only 18 months.³ Earlier chapters have developed the hypothesis that early industrialisation induced parents to enrol their children at younger ages as a form of child care. This chapter develops a geographical analysis of this question. In other words, it asks whether Winstanley's experience in Miles Platting was replicated elsewhere and whether the area's industrial character explains the growing presence of younger children in Winstanley's classroom.

In particular, I demonstrate a causal relationship between industries known to

1. Winstanley, *Schoolmaster's notebook*, p. 29.

2. *Ibid.*, p. 30.

3. Own calculations from *ibid.*, pp. 24-30.

employ large numbers of women and children and early childhood attendance at school using detailed data from the digitized 1851 census and instrumental-variable regression. Through the effect of complementarity, earlier attendance may have, perhaps unintentionally, made subsequent investment in human capital more efficient—in Sunday schools, apprenticeships, learning-by-doing, or even in self-help style study groups, i.e., the mutual improvement societies. I explore these relationships between early attendance and later channels of human capital investment at the national level to suggest that human capital acquired in early childhood likely facilitated the acquisition of skills. In addition, I find that early childhood education was associated with indicators of non-cognitive skills.

6.1 Data

Measuring early enrolment is not straightforward, and many educational surveys are biased or incomplete.⁴ In his survey of early nineteenth-century school enumerations, B. I. Coleman argued for the 1851 enumerator’s books as the most accurate measure of school enrolment for this period.⁵ Others have cautioned that discrepancies exist between this measure and the separate education schedule filled in by individual schoolmasters and schoolmistresses in the same year.⁶ While different historians have argued in favour of either the population or education-census measure, both are nonetheless strongly correlated, suggesting that any potential measurement error introduced by using one over the other will be relatively small.⁷ Given documented under-enumeration of the kind of small, private schools that many children attended

4. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 45-9, 70-4; Coleman, “The Incidence of Education in Mid-Century.”

5. Coleman, “The Incidence of Education in Mid-Century,” p. 410.

6. Edward Higgs, *Making Sense of the Census: The Manuscript Returns for England and Wales, 1801-1901*, Public Record Office Handbooks 23 (London: Her Majesty’s Stationery Office, 1989), pp. 83-5.

7. David Mitch, who prefers the education census enrolment measure, reports a correlation coefficient between both measures of enrolment at the county level of 0.70; see Mitch, “Education and Economic Structure: Evidence from Victorian England,” unpublished paper shared by the author.

in early childhood and the inclusion of detailed age data in the enumerator's books, these will be my preferred source.⁸

Household heads reporting the occupations of household members were instructed to label children as 'scholars' if they were more than five years old and 'daily attending school'.⁹ This raises a number of technical issues. There was a sharp spike in enrolment at age five, reflecting adherence to this direction and suggesting that early childhood enrolment below age five is likely under-enumerated in this source.¹⁰ Additionally, while the data can be tabulated in various ways, it does not directly report the age at which children enrolled. To borrow a terminology from epidemiology, the number of children enrolled at any one time, the 'prevalence' of school enrolment, will be a function of the rate of enrolment over time, its 'incidence', and the duration of attendance once enrolled.¹¹ The incidence and duration of school enrolment are not directly observed so that, for example, variation in the average age of 'scholars' reported in the census could reflect variation in either factor. It is likely that in some places children remained in school for longer than elsewhere, a question of duration, while in others they entered school at younger or older ages, a question of incidence. As my research asks whether children attended school earlier in response to industrialisation, it is in the incidence of education that I am most interested.

Without information about the duration of school attendance, however, it is not possible to estimate incidence from prevalence-type data. I therefore propose a rough approximation to the incidence of early attendance. Consider the following hypothetical illustration. Suppose that children may enter school from age three but are not compelled to do so. In fact, assume parents enrol their children in school at each

8. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 47-8, 52-3.

9. Higgs, *Making Sense of the Census: The Manuscript Returns for England and Wales, 1801-1901*, p. 83.

10. Own calculations from Minnesota Population Center, *Integrated Public Use Microdata Series, Intentional: Version 7.2 [dataset]*, Minneapolis, MN: IPUMS, 2019.

11. Jonathan Freeman and George Hutchinson, "Prevalence, Incidence and Duration," *American Journal of Epidemiology* 112, no. 5 (1980): pp. 108-10.

age with equal probability. In place A, all children attend school for three years. Five-year-old schoolchildren may therefore have enrolled at any point between age three and age five. Place B is in other respects identical to place A except that children attend school for only two years. Five-year-old schoolchildren in place B may therefore have enrolled aged either four or five. In place A, the prevalence of students enrolled at a given age, such as age five, will be a poorer measure of their incidence of enrolment at that age because of the retention in the school of children who attend for an additional year.

Instead, if four-year-old schoolchildren are compared, the number of children attending in both places will be the same. As it was assumed that two-year-old children are too young to enrol, such children would not be counted on the attendance rolls of place A at the time they turned four. Prevalence will still overestimate the incidence of enrolment, but the extent of the overestimate will be the same in both hypothetical places. In general, this logic would also hold if school enrolment was not a deterministic process and if it were merely very unlikely that children enrol below a certain age. The prevalence of school enrolment at young ages can be a valuable proxy for the incidence of enrolment, as possible differences in duration introduce less bias at these ages.

However, in the case of the 1851 census, it is not possible to measure the prevalence of early enrolment at the very youngest enrolment ages because, as described above, the 1851 census likely underestimated enrolment of under-fives. As a kind of compromise between these limitations, I opt to measure the proportion enrolled in the youngest age group not affected by under-reporting—age five—as an indicator of the incidence of early enrolment. Because the average duration of school attendance ranged from around three to five years by 1851 and children were very unlikely to enrol below age two, this measure should capture most children who enrolled some-

time before turning six.¹² Of course, irregular attendance was a common occurrence, and this would further obscure the picture. Correcting for this issue in the census data, however, is not possible; I can only note that highly irregular attendance was likely not captured because the census instructions asked that only children receiving ‘daily’ and ‘regular’ instruction be enumerated.¹³

6.2 The influence of Wales, London, and Edinburgh

The proportion of five-year-olds returned as ‘scholars’ is depicted for each 1851 census registration district in figure 6.1. Although my purpose is to consider this pattern in relation to child-care demand derived from carers’ labour force participation, the map suggests at least three ways in which regional factors likely affected the distribution of early enrolment in important ways. First, the majority of Wales falls within the bottom quintile of the distribution and appears as an undifferentiated white mass in the map. The development of education in Wales proceeded along a distinct path to that of England, owing to differences of language, religion, remoteness, and nationalism. By 1851, this amounted to a separate educational culture in which day school was secondary.¹⁴

Wales in the eighteenth century was characteristically rural, with small plots divided comparably equitably among tenant farmers and no major urban centres.¹⁵ An early successful educational movement to probe this terrain emerged under the direction of Griffith Jones.¹⁶ In such an exceptionally rural country, however, Jones did

12. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 314.

13. Higgs, *Making Sense of the Census: The Manuscript Returns for England and Wales, 1801-1901*, p. 83.

14. Smelser, *Social Paralysis and Social Change: British Working-Class Education in the Nineteenth Century*, pp. 157-71; Snell, “The Sunday-School Movement in England and Wales: Child Labour, Denominational Control and Working-Class Culture,” p. 162.

15. Smelser, *Social Paralysis and Social Change: British Working-Class Education in the Nineteenth Century*, p. 150.

16. W. T. R. Pryce, “The Diffusion of the ‘Welsh’ Circulating Charity Schools in Eighteenth-Century Wales,” *Welsh History Review* 25, no. 4 (2011): 486-519.

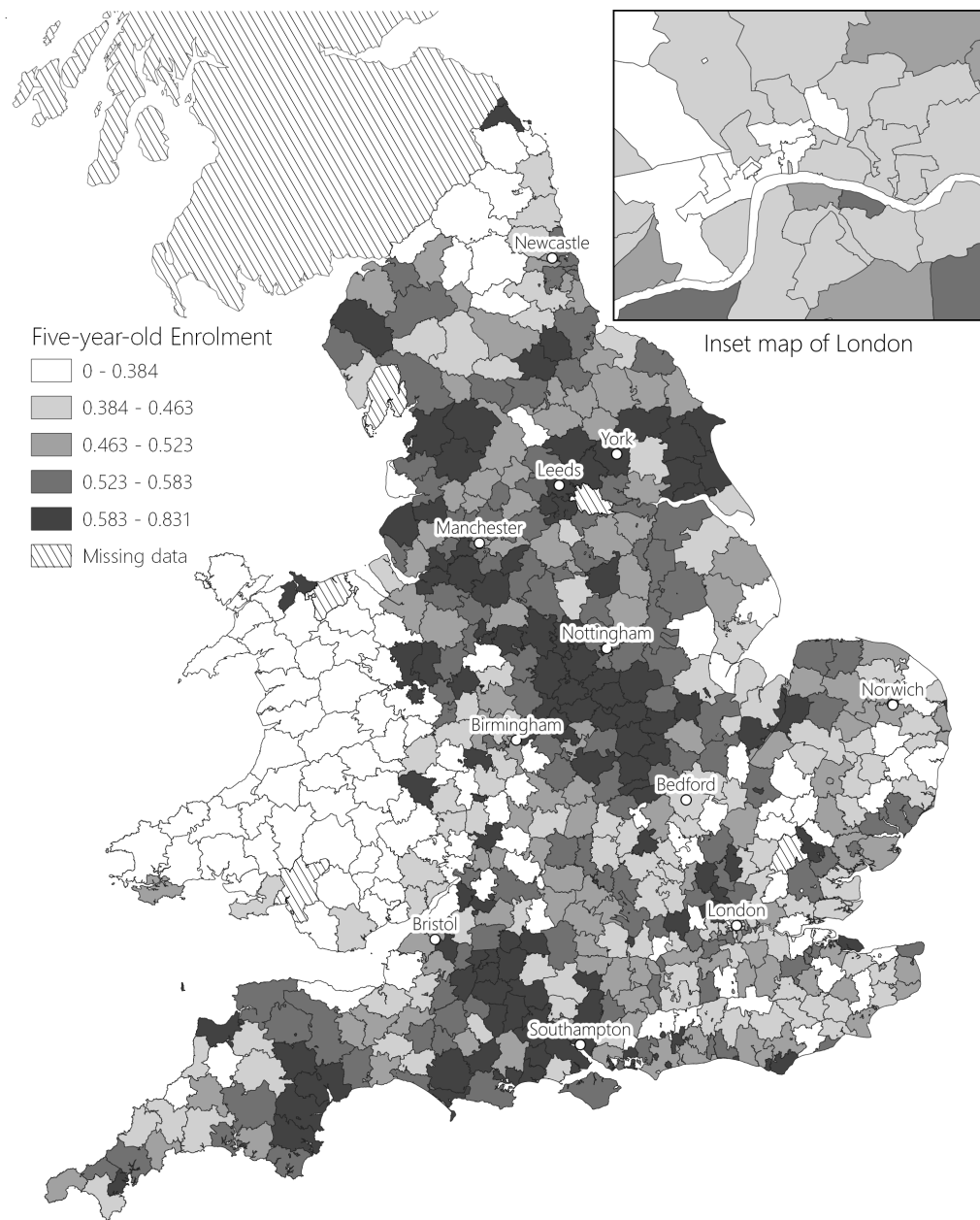


Figure 6.1: Map of five-year-old enrolment, 1851

not construct brick-and-mortar schoolhouses like his contemporaries in the English SPCK, but instead hired perambulating instructors and rented temporary premises for a few months at a time in each locale along a circuit.¹⁷ With such a short win-

17. Paula Yates, "Saving Souls on a Shoestring: Welsh Circulating Schools in a Century of Change," *Studies in Church History* 55 (2019): p. 278.

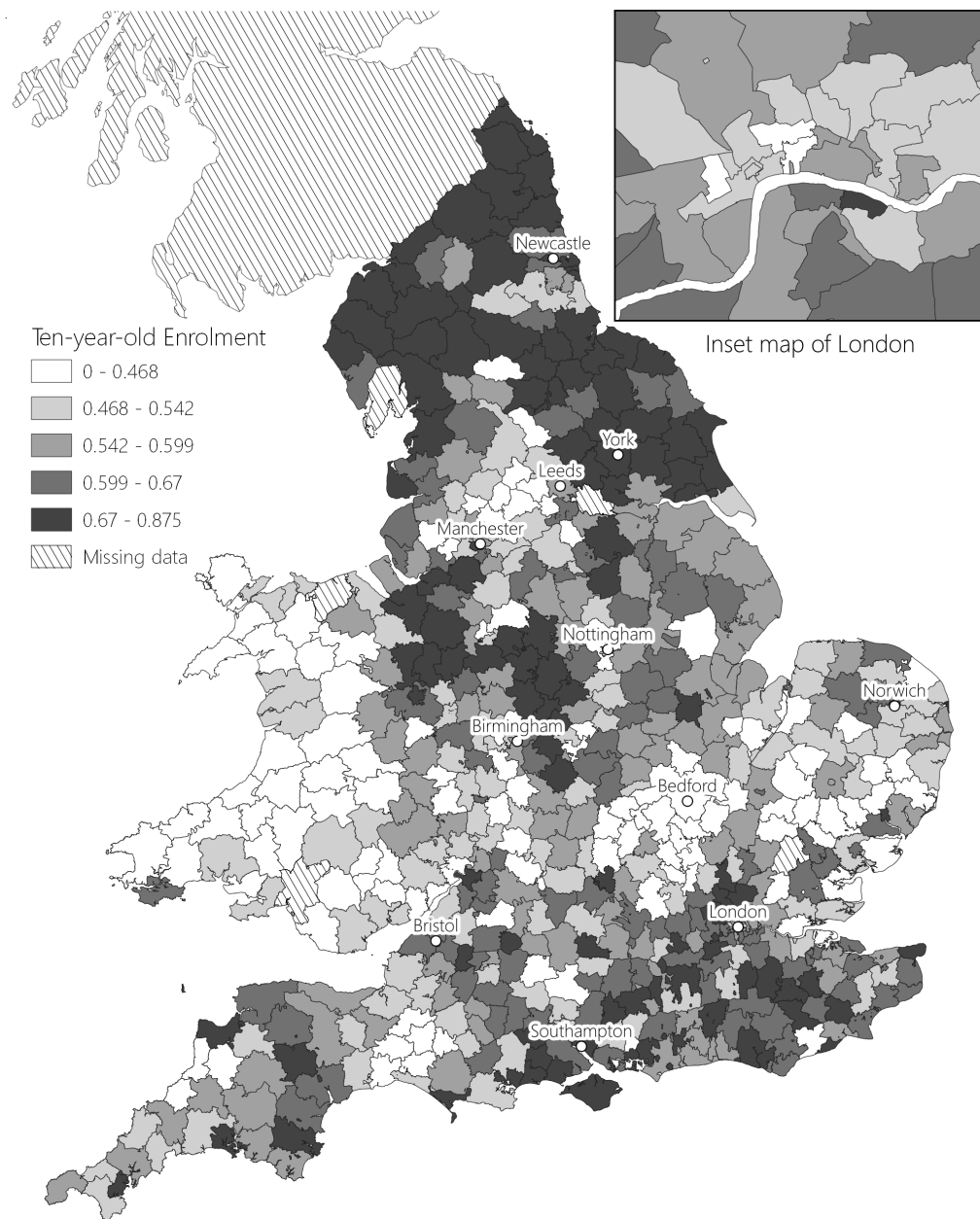


Figure 6.2: Map of ten-year-old enrolment, 1851

dow of opportunity, the ‘circulating schools’ adopted the fastest method of getting scripture into heads. They taught in the local language, and they taught only the basics of reading.¹⁸ Nearly 200,000 people learned to read by this method, mostly in

18. Eryn M. White and Geraint H. Jenkins, “Popular Schooling and the Welsh Language 1650-1800,” in *The Welsh Language Before the Industrial Revolution* (Cardiff: University of Wales Press, 1997), pp. 325-6.

Welsh.¹⁹ By one account, the absence of a ‘middle class’ of wealthy tenant farmers in Wales led to cultural polarization, with the Welsh-speaking majority, recently empowered to read scripture for themselves, turning toward dissent.²⁰ By 1851, some 70 per cent of sittings were in dissenting chapels according to the census of religion, while landowners usually belonged to the Church of England.²¹

When the nineteenth-century voluntary societies entered Wales, then, it was the Anglican National Society that found ready subscriptions to erect schoolhouses but few dissenters’ children willing to fill them.²² While nine out of ten of the Newcastle commissioners agreed that difference of religious opinion ‘seldom appears a matter of much weight with parents in the choice of a school,’²³ the single exception was Mr. Jenkins, assistant commissioner for Wales, who found that

...in Wales, where almost all the labouring classes and nearly all the farmers are dissenters, whilst the landowners and gentry belong for the most part to the Established Church, considerable difficulty often arose, and subscriptions from the latter could be obtained only on terms, as to religious teaching, to which the parents would not submit.²⁴

Purpose-built schools in the nineteenth century thus acquired an association with the established church, but equally with the English language, which the National Society curriculum often adopted.²⁵ What is unusual is that this linguistic association apparently clung to private day schools as well.

19. White and Jenkins, “Popular Schooling and the Welsh Language 1650-1800,” pp. 331.

20. Smelser, *Social Paralysis and Social Change: British Working-Class Education in the Nineteenth Century*, pp. 147-50.

21. *Ibid.*, p. 153.

22. *Ibid.*, p. 158.

23. *Report of the Commissioners Appointed to Inquire Into the State of Popular Education in England*, p. 34.

24. *Ibid.*, p. 38.

25. Smelser, *Social Paralysis and Social Change: British Working-Class Education in the Nineteenth Century*, p. 158.

Many private schools were established where the directors of a National school held to particularly dogmatic policies, for example by failing to allow conscience-based exceptions to reciting the Anglican catechism.²⁶ Private initiative could thus sidestep official intolerance—for those who would pay a fee, anyway—but there were also dame schools in Wales providing care and education for very young children, much as they did in England.²⁷ In only 15 per cent of such schools, according to the 1847 blue books, was Welsh taught at all.²⁸ For children of affluent families aspiring to upward social mobility, and whose school fees represented an investment upon this venture, there is perhaps no puzzle. As G.R. Grigg contends, ‘English was the language of advancement’; it was the clerical language in both senses of the word, the language of administration and of the church in Wales.²⁹ However, in small schools whose ostensible purpose was to keep children out of harm’s way, English-language instruction would seem superfluous. Schools, like other institutions, may exhibit path dependency, and expectations concerning their function and content, once set, may be difficult to adapt to different circumstances.³⁰ In any case, the association with English stuck, and it likely diverted children away from day schools. Day school enrolment rates in Wales were consistently lower than in England at whatever age, and Sunday schools succeeded the ‘circulating’ schools as the main educational institutions for Welsh language and culture by mid-century.³¹ The geographical pattern of enrolment

26. G. R. Grigg, “Nurseries of Ignorance’? Private Adventure and Dame Schools for the Working Classes in Nineteenth-Century Wales,” *History of Education* 34, no. 3 (2005): p. 252.

27. *Ibid.*, p. 252-3.

28. *Ibid.*, p. 255.

29. Grigg, “Nurseries of Ignorance’? Private Adventure and Dame Schools for the Working Classes in Nineteenth-Century Wales,” p. 255; Smelser, *Social Paralysis and Social Change: British Working-Class Education in the Nineteenth Century*, p. 147-9.

30. Paul A. David, “Why Are Institutions the ‘Carriers of History’?: Path Dependence and the Evolution of Conventions, Organizations and Institutions,” *Structural Change and Economic Dynamics* 5, no. 2 (1994): 205–20.

31. Paula Yates, “Sunday Schools and Welsh National Identity: An Historiographical Study,” in *Religion, Identity and Conflict in Britain: From the Restoration to the Twentieth Century: Essays in Honour of Keith Robbins*, ed. Frances Knight and Stewart J. Brown (Taylor / Francis, 2016), pp. 93–104; Yates, “Saving Souls on a Shoestring: Welsh Circulating Schools in a Century of Change,” pp. 282-5.

makes such a linguistic explanation seem plausible. South Pembrokeshire, for instance, otherwise fairly comparable to north Pembrokeshire, had been culturally and linguistically Anglophone since probably the middle ages. Perhaps not coincidentally, it also stands out for having comparably high day-school enrolment and comparably low Sunday-school enrolment, alongside Cardiff and Swansea, where many English-speaking immigrants settled.³² Per-capita Sunday school enrolment in the registration district of Pembroke was 0.15, of Cardiff 0.12, and of Swansea 0.17, compared to 0.23 for South Wales as a whole.³³ In North Wales, Conwy had the highest age-five enrolment rates, but it appears to be an outlier. The northern Welsh coast became a popular destination for Anglophone tourists towards the second half of the nineteenth century, but tourism introduced a seasonal kind of bilingualism and did not displace the influence of Welsh.³⁴

Second, the influence of London as a cultural, political and economic centre of gravity generated significant wealth, which in turn affected school provision. Establishing schools in their home parishes was a reliable part of wealthy Londoners' efforts to secure a legacy.³⁵ To give one example, London draper Charles Parrett instructed the executors of his estate to distribute a bible to every home in his native Bow Brickhill, Buckinghamshire, and endowed a school with £10 to teach and arrange apprenticeships for boys from the village.³⁶ In the eighteenth-century charity school movement, Jones notes that support for such schools continued to be more forthcoming around wealthy southern cities, and especially London. She proposes that

32. W. T. R. Pryce, "Language Zones, Demographic Changes, and the Welsh Culture Area 1800-1911," in *The Welsh Language and Its Social Domains 1801-1911*, ed. Geraint H. Jenkins (Cardiff: University of Wales Press, 2000), pp. 40, 47-63.

33. *Parliamentary Papers*, pp. lxxvi, 253-4.

34. David Llewelyn Jones and Robert Smith, "Tourism and the Welsh Language in the Nineteenth-Century," in *The Welsh Language and Its Social Domains 1801-1911*, ed. Geraint H. Jenkins (Cardiff: University of Wales Press, 2000), pp. 152-62.

35. Lawson and Silver, *A Social History of Education in England*, pp. 50-1, 182; Jordan, *The Charities of London, 1480-1660: The Aspirations and the Achievements of the Urban Society*, p. 220.

36. W. K. Jordan, *The Charities of Rural England, 1480-1660: The Aspirations and Achievements of the Rural Society* (London: George Allen / Unwin, 1961), p. 57.

a deeper labour market for teachers in London, the distribution of wealth, and the influence of culture and politics were important factors in bringing about this concentration.³⁷ The conversion of many eighteenth-century charity schools into subscription schools under the two primary educational societies represented a thread of continuity between the eighteenth-century endowments and nineteenth-century school organization.³⁸ This influence becomes much clearer by comparing five-year-old to ten-year-old enrolment, depicted in figure 6.2. As discussed above, ten-year-old enrolment captures both longer duration and later incidence of school enrolment. As the survey in chapter one suggested, schools set up on a charitable or semi-charitable basis were those most likely to enforce age criteria for admission and to cater to older children. For instance, in 1858, the Newcastle commissioners identified a clearly bimodal age distribution, represented in figure 6.3, with supported schools catering to older children on average. The distribution of ten-year-old scholars therefore may in part reflect the relative strength of free and subsidised day schools in a region. By the mid-nineteenth century, local funding, which was still required to supply half of the funds for new school construction to qualify for parliamentary grants after their introduction in 1833, tended to reinforce the pre-existing distribution of school provision.³⁹ The persistence of this stock of charity and the social capital it implied affected the supply of schooling and likely explains some of the strength of ten-year-old enrolment in the home counties.

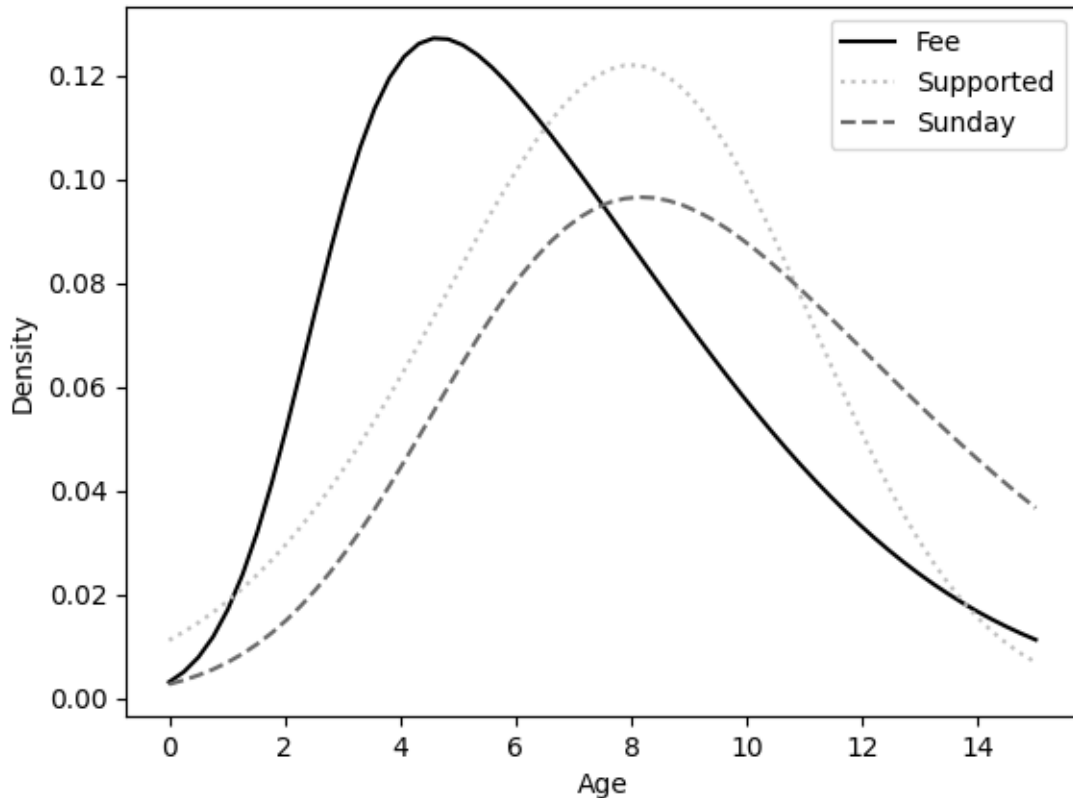
Looking north, the districts bordering Scotland also exhibit some of the highest enrolment rates for ten-year-olds and some of the lowest enrolment rates for five-year-olds. Historians have suggested that Northumberland and Cumbria, by their proxim-

37. Jones, *The Charity School Movement: A Study of Eighteenth Century Puritanism in Action*, pp. 61-72.

38. Lawson and Silver, *A Social History of Education in England*, p. 243; Curtis and Boulwood, *An Introductory History of English Education Since 1800*, p. 4.

39. Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, pp. 115-27.

Figure 6.3: Age distribution by type of school, 1858



NOTE: Data are drawn from school visits made by Assistant Commissioners, in districts they took to be representative of the country, to 1,740 public schools, 3,450 private schools, and 2,487 Sunday schools. The original data bins ages 3-5 inclusive and reports age in years at every other point. I therefore smoothed the data out by fitting a log-normal distribution (using non-linear least squares and the Python package Scipy) to the reported bins, taking the average across ages 3-5. SOURCE: *Parliamentary Papers*, Command Paper 2794-I, Report of the Commissioners Appointed to Inquire into the State of Popular Education in England, I (London, 1861), pp. 8-11, 653-657.

ity, were influenced by the Scottish system of parochial schools.⁴⁰ In the eighteenth century, Scotland instituted a system of parish-level funding for schoolmasters out of local rates. Although a traditional historical view held that these schools provided Scotland with a distinct human capital advantage during the period of the Scottish Enlightenment, their quality and universality has since been contested.⁴¹ Perhaps as a sign of their weakness rather than their strength, Scottish burghs undertook periodic

40. Stone, "Literacy and Education in England 1640-1900," p. 123; Stephens, *Education, Literacy and Society, 1830-70: The Geography of Diversity in Provincial England*, pp. 54-5.

41. R. A. Houston, *Scottish Literacy and the Scottish Identity: Illiteracy and Society in Scotland and Northern England, 1600-1800* (Cambridge: Cambridge University Press, 1985), pp. 1-19, 21-2.

attempts to introduce compulsory schooling at the parish school in an effort to exert control over teaching and usually named seven as the mandatory school-entry age.⁴² According to Lassonde, compulsory education laws introduced in England at the end of the nineteenth century acted to define school-enrolment norms, and it is possible that Scotland's early experiments with compulsory school contributed to patterns of relatively late but widespread school enrolment in that country and the bordering English counties.⁴³

In contrast, the hills and dales between Manchester and Leeds, important centres for textile manufacturing, had some of the lowest ten-year-old enrolment rates, most likely reflecting the effects of child labour.⁴⁴ However, five-year-old enrolment rates here were above the median. A similar pattern suggests itself for the straw-plaiting districts of Bedfordshire and Hertfordshire, in which exceptionally large shares of women and children were employed.⁴⁵ This discrepancy in age-specific enrolment rates suggests a pattern of substitution of early for late school attendance where married women and children worked extensively, while in other places, notably the East Midlands, parts of Devon, and Cornwall, enrolment was approximately average across both age groups.

6.3 Child-care demand in industry, agriculture, and handicrafts

This last point can be illustrated more clearly by comparing the spatial distribution of school enrolment to carers' reported labour supply. To demonstrate, I construct a simple index of the labour force participation rate (LFPR) of potential carers, understood to encapsulate household members other than adult men, using the geometric

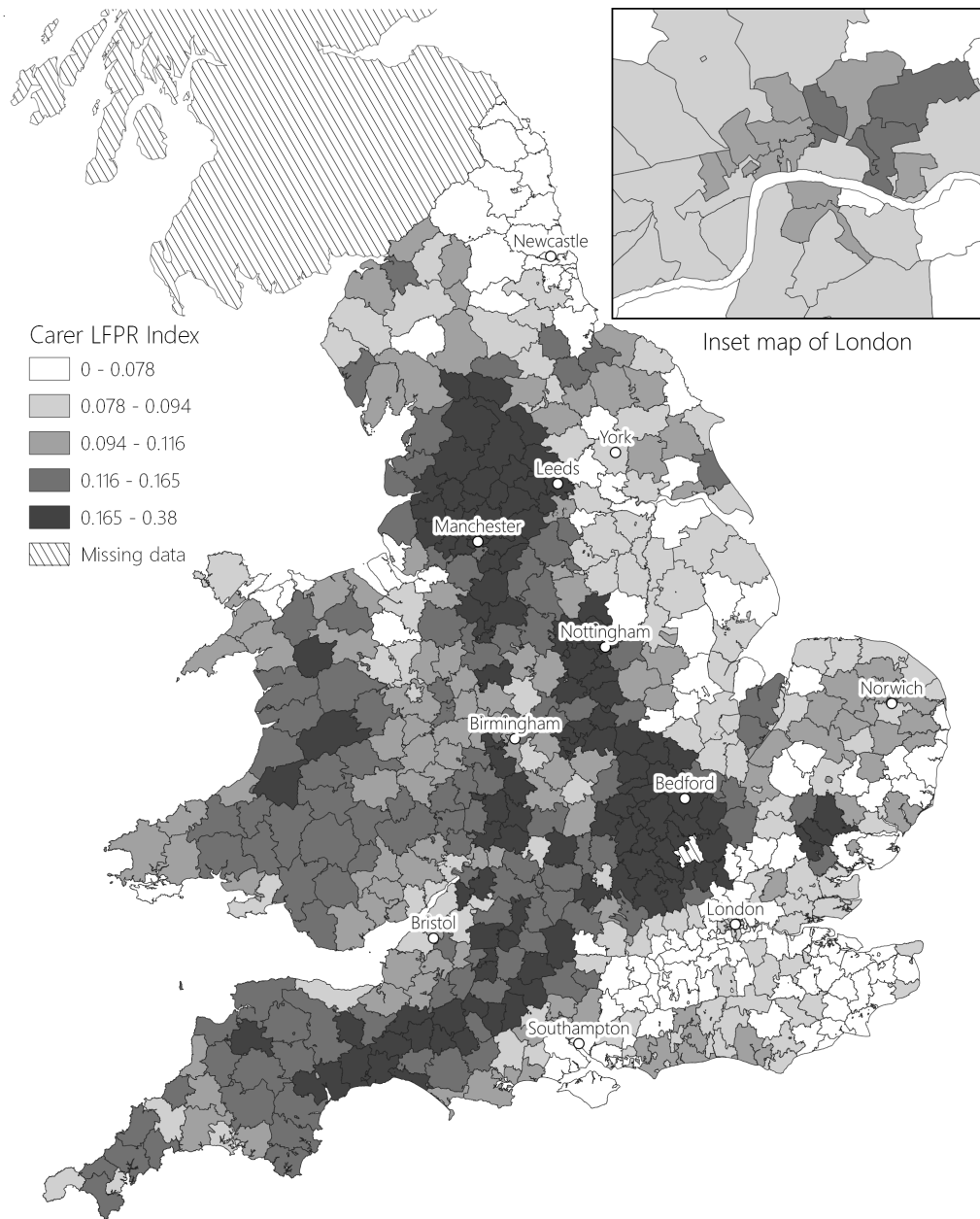
42. Lindy Moore, "Urban Schooling in Seventeenth- and Eighteenth-Century Scotland," in *The Edinburgh History of Education in Scotland*, ed. Robert Anderson, Mark Freeman, and Lindsay Paterson (Edinburgh: Edinburgh University Press, 2015), pp. 82-4.

43. Lassonde, "Age, Schooling, and Development."

44. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, pp. 317-9.

45. Goose, "The Straw Plait and Hat Trades in Nineteenth-Century Hertfordshire."

Figure 6.4: Map of labour force participation of potential carers, 1851



NOTE: See text for construction.

mean of the LFPR (measured as the proportion reporting an occupation) of married women, boys aged 10 to 13, and girls aged 10 to 13 in each 1851 census registration district.⁴⁶ Taking the geometric mean prevents the index from being pulled upward or

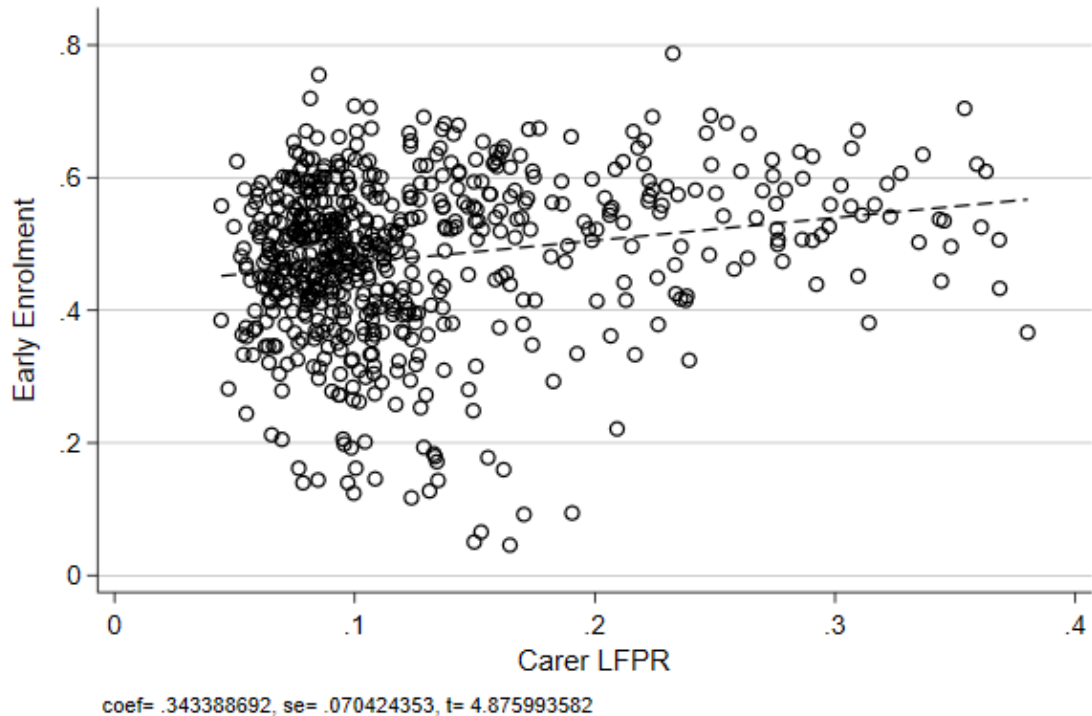
⁴⁶ I report how each variable used in the analysis was constructed in an appendix to the chapter to avoid interrupting the development of the main argument in the text.

downward by an outlying measure of LFPR for one group of potential carers. Where the carer LFPR index is high, it suggests that boys, girls, and married women were all relatively active in the local labour market, although all three measures were closely correlated in practice.⁴⁷

Figure 6.5 presents a simple scatter plot of early enrolment and my index of carers' LFPR. Across districts, a one percentage-point increase in carer LFPR is associated with a 0.34 percentage-point increase in five-year-old enrolment rates. Figure 6.6 represents the same relationship in an added-variable plot, which approximates a scatter plot in multivariate settings. Now the x-axis plots the residuals from a regression of carers' LFPR on a dummy variable equal to one if the district is in Wales, the natural log of distance to London and to Edinburgh (separately), and the age-ten enrolment rate, while the y-axis plots comparable residuals for a regression of age-five enrolment. The geographical controls aim to crudely capture variation in the supply and cultural context of education described above. Age-ten enrolment is included to capture substitution of age-five enrolment for age-ten enrolment. Because many factors were likely to influence both age-five and age-ten enrolment—e.g., the supply of schools and teachers, regional income effects, and the tendency for families to enrol all their children in school at once—these variables are closely correlated. However, in some regions the relationship is weak. The scatter-plot of these residuals identifies districts where age-five enrolment was higher than would be expected, given age-ten enrolment. Age-ten enrolment has the biggest effect of all the included variables on the slope of the fitted line, but interestingly, its inclusion makes the relationship between age-five enrolment and carers' LFPR steeper. A one-percentage point increase in carers' LFPR now predicts a 0.69 percentage-point increase in age-five enrolment rates. This change of slope implies that carer LFPR is negatively correlated with ten-year-old attendance, likely due to the effect of child labour crowding out human

47. None of the results in the subsequent paragraphs are qualitatively affected by analyzing any component LFPR individually.

Figure 6.5: Relationship between carers' LFPR and age-five enrolment, 1851

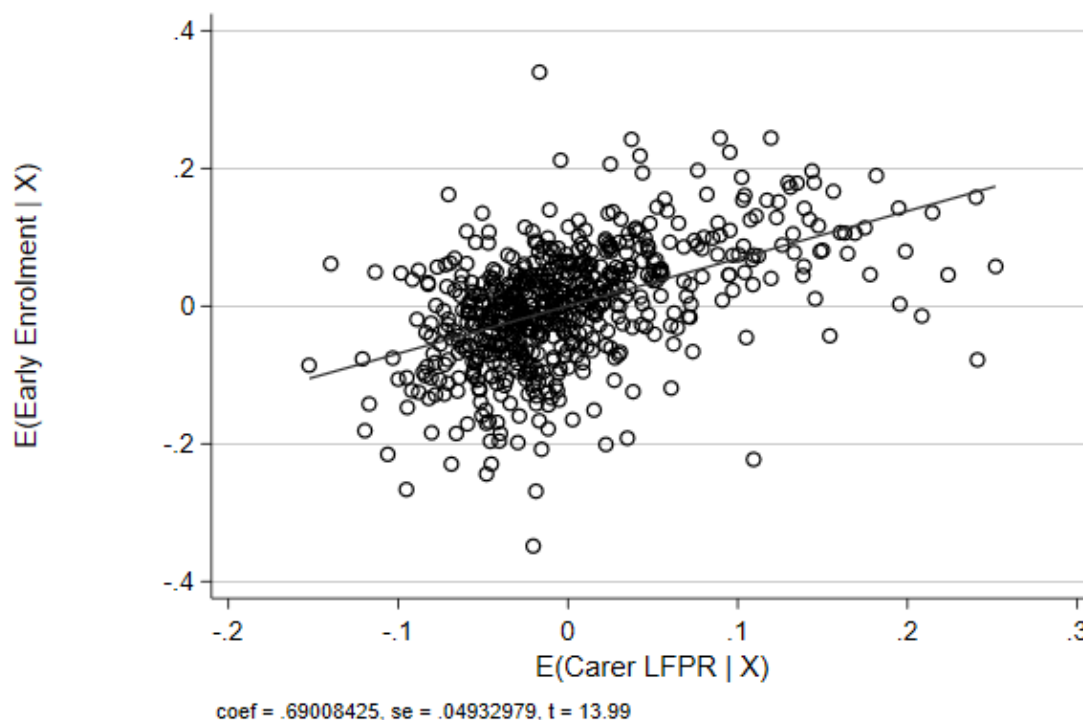


capital investment for older children. The same was not true of age-five enrolment. This evidence suggests that where carers' LFPR was higher, early school attendance primarily substituted for later schooling.

The remainder of this section attempts to relate differences in the regional structure of the economy to the enrolment rates of young children using causal econometrics. There are considerable methodological challenges associated with isolating the causal effect of women's and children's labour. Their decision to participate was made jointly with a bewildering variety of other demographic, social, and economic decisions and constraints. Further, measuring women's and children's LFPR is difficult and controversial, particularly for married women.⁴⁸ Much of married women's work was irregular, carried out in private, and seasonal, and it would not be well-

48. Michael Anderson, "What Can the Mid-victorian Censuses Tell Us About Variations in Married Women's Employment?," in *Women's Work in Industrial England: Regional and Local Perspectives*, ed. Nigel Goose (Hatfield: Local Population Studies, 2007), pp. 182–208.

Figure 6.6: Conditional relationship between carers' LFPR and age-five enrolment, 1851



NOTE: Conditional on district in Wales, log distance to London, log distance to Edinburgh, and age-ten enrolment rate.

captured by a single occupational title reported in the census.⁴⁹ Measures based on reported occupation, as above, therefore likely underestimate the true labour supply of children and women. On the other hand, the existence of spatially concentrated regional demand for women's and children's labour is well-attested in a number of recent contributions to this literature.⁵⁰ For example, You has demonstrated that where key industries were present, all women's participation rates were higher regardless of where in the life cycle their households found themselves or the level of their husbands' wages.⁵¹ Local demand from industry affected children's participation rates

49. Tilly and Scott, *Women, Work, and Family*, pp. 124-5.

50. Humphries and Sarasua, "Off the Record: Reconstructing Women's Labor Force Participation in the European Past," p. 53.

51. Xuesheng You, "Women's Labour Force Participation in Nineteenth-century England and Wales: Evidence from the 1881 Census Enumerators' Books," *Economic History Review Early View* (2019): pp. 117-123.

in a very similar, regionally disparate, fashion.⁵² Methodologically, it will be simpler to isolate the impact of these industries and relate them to plausible underlying incentives, which have been explored in the theoretical sections of earlier chapters.

Textiles were perhaps the leading example of an industry creating a strong local demand for women's and children's labour, but other industries played a similar role. As in textiles, technological change undermined male artisanal skill and independence in paper-making and the potteries, which also used steam as a source of motive power and employed women and children under conditions of strict discipline.⁵³ Indeed, one theory to explain the widespread employment of women and children in the early nineteenth century, drawing on the U.S. historical experience, credits unskilled-labour bias in steam technology. Women and children, in this account, were employed simply because they supplied unskilled labour at low wages, demand for which rose due to a greater capital-labour ratio in industries that introduced the steam engine, the related reorganization of production into factories, and relative complementarity between capital and unskilled labour under this mode of production compared to artisanal modes of production.⁵⁴ Handicrafts and small manufactures, however, also created pockets of strong demand for household labour. Prominently, lace-making, straw-plaiting, and straw hat-making employed large numbers of women and children throughout the south Midlands, while in the Black Country and Sheffield, women and children worked making a wide variety of metal goods, from nails and pins to

52. Hugh Cunningham, "The Employment and Unemployment of Children in England C.1680-1851," *Past & Present* 126 (1990): 115-150.

53. Leonard Rosenband, "Industriousness and Its Discontents: Wages, Workloads, and the Mechanisation of Papermaking, 1750-1820," *Continuity and Change* 36, no. 3 (2021): p. 369; A. E. Musson, "Industrial Motive Power in the United Kingdom, 1800-70," *Economic History Review* 29, no. 3 (1976): pp. 415-39; John Thomas, "The Pottery Industry and the Industrial Revolution," *Economic History* 3, no. 12 (1937): pp. 399-414; Neil McKendrick, "Josiah Wedgwood and Factory Discipline," *Historical Journal* 4, no. 1 (1961): pp. 30-55.

54. Goldin and Katz, *The Race Between Education and Technology*, pp. 121-4; Lawrence F. Katz and Robert A. Margo, "Technical Change and the Relative Demand for Skilled Labor: The United States in Historical Perspective," in *Human Capital in History: The American Record*, ed. Leah Platt Boustan, Carola Frydman, and Robert A. Margo (Chicago: University of Chicago Press, 2014), pp. 15-59.

buttons and cutlery.⁵⁵ Indeed, in their study of working-class budgets, Sara Horrell and Jane Humphries find that households of men who worked in textile factories and as outworkers contributed a larger share of household income than those of men who worked in agriculture and the trades, and the households of men who worked in mining, which in their categorization includes the households of metal workers, also contributed significant shares of household incomes at key moments in the life-cycle.⁵⁶ Unfortunately, their analysis does not separate the households of metal workers from those of miners, despite likely differing demands on household labour in these industries following the 1842 Mines and Collieries act barring women and children from underground work.⁵⁷ Women and children were known to participate in heavy industries like metal working, although regional experiences varied, with household labour being more widely employed in South Wales.⁵⁸

To isolate the effect of these industries on demand for education among young children, I adopt an instrumental variable methodology developed in a series of recent papers.⁵⁹ The approach focuses on exogenous variation in the geographical distribution of inputs with high transport costs. For instance, coal deposits, which are used as an instrumental variable below, were formed on a geological timescale outside of human influence. Additionally, however, the instrument must also satisfy the exclusion restriction. In other words, the distribution of coal must not affect the outcome variable except through industrialisation, conditional on the included controls. The logic of the approach therefore rests on narrowing the range of possible endogenous

55. Pinchbeck, *Women Workers and the Industrial Revolution, 1750-1850*, pp. 202-39, 271-80.

56. Horrell and Humphries, "The Origins and Expansion of the Male Breadwinner Family: The Case of Nineteenth-Century Britain," p. 36.

57. Jane Humphries, "Protective Legislation, the Capitalist State, and Working Class Men: The Case of the 1842 Mines Regulation Act," *Feminist Review* 33, no. 7 (1981): 1-33.

58. Alan Birch, *Economic History of the British Iron and Steel Industry, 1784-1879: Essays in Industrial and Economic History with Special Reference to the Development of Technology* (London: Frank Cass / Co., 1967), p. 251.

59. Pleijt, Nuvolari, and Weisdorf, "Human Capital Formation During the First Industrial Revolution: Evidence from the Use of Steam Engines"; Adrien Montalbo, "Industrial Activities and Primary Schooling in Early Nineteenth-Century France," *Cliometrica* 14 (2020): 325-365.

Table 6.1: Coal consumption by industrial sector, 1869

Industry	Coal Used (Tons)
Pig-iron	16,337,271
Merchant iron	16,109,335
Tin smelting	22,679
Copper smelting	460,083
Lead smelting	145,299
Zinc smelting	231,170
Coal mining	6,714,222
Metal mining	511,201
Steam Navigation	3,277,562
Army	195,000
Railways, locomotives, etc.	2,027,500
Gasworks	6,311,980
Waterworks	1,500,000
Malting	270,000
Brewing, distilling	1,692,000
China clay	692,000
Burning bricks	900,000
Burning lime	360,000
Earthenware	730,000
Glass making	740,415
Woollen and worsteds	1,135,912
Cottons	2,456,138
Silks	85,296
Flax	714,376
Shoddy	39,473
Hosiery	8,707
Chemicals	1,908,207
Paper	621,027
Tanning	65,157

SOURCE: Report of the commissioners appointed to inquire into the several matters relating to coal in the United Kingdom. Vol. I. General report and twenty-two sub-reports. Appendix E., pp. 204-5.

influences to only those plausibly correlated with the distribution of coal, key among which will be other variables influenced by geology and topography.

I first note that coal is heavy relative to value, resulting in high transport costs. There were thus strong incentives for industry to locate nearer to a coalfield where coal was an important input into production. As the steam engine diffused through-

out the economy, these costs grew in importance, and although the scope for steam power expanded very slowly over the eighteenth century, this changed towards the middle of the nineteenth century. Between 1830 and 1870, the amount of horsepower provided by steam grew by over 1000 per cent.⁶⁰ By 1869, table 6.1 demonstrates the variety of industries for which coal was an important input, in most cases providing motive power through steam but also to generate heat for physical and chemical transformations.

The transport costs of this coal, however, were significantly reduced if it could be carried by water. According to Flinn, contemporaries held as a rule-of-thumb that ‘coal could be carried twenty times as far by water as by land for the same unit cost.’⁶¹ Shallow boats travelled up and down the great inland rivers and their tributaries laden with coal for all commercial purposes. These natural systems were often altered by constructing towpaths or eliminating meanders, while canals allowed the possibility of modifying the existing river network itself.⁶² Such modifications, however, were largely local in effect.⁶³ With a few notable exceptions, it was rare for a canal to open distant markets for coal or to radically alter an area’s hydrological endowments.⁶⁴ Access to a large endowment of coal through the river system would therefore reflect exogenous variation in the costs of industrial production. I measure this variation using the area of coal-containing rock strata to which each registration district was connected through its waterways.

Figure 6.7 illustrates how this is calculated for the Stafford registration district as an example. Catchments are defined as the drainage area upstream of a point where two named watercourses meet. Examples of the smallest catchments are illustrated

60. Nicholas Crafts, “Steam as a General Purpose Technology: A Growth Accounting Perspective,” *Economic Journal* 114 (2004): p. 342.

61. Michael Flinn, *The History of the British Coal Industry: 1700-1830*, vol. 2 (Oxford: Clarendon Press, 1984), pp. 146.

62. *Ibid.*, p. 164.

63. Gerard Turnbull, “Canals, Coal and Regional Growth During the Industrial Revolution,” *Economic History Review* 40, no. 4 (1987): p. 552.

64. Flinn, *The History of the British Coal Industry: 1700-1830*, p. 188.

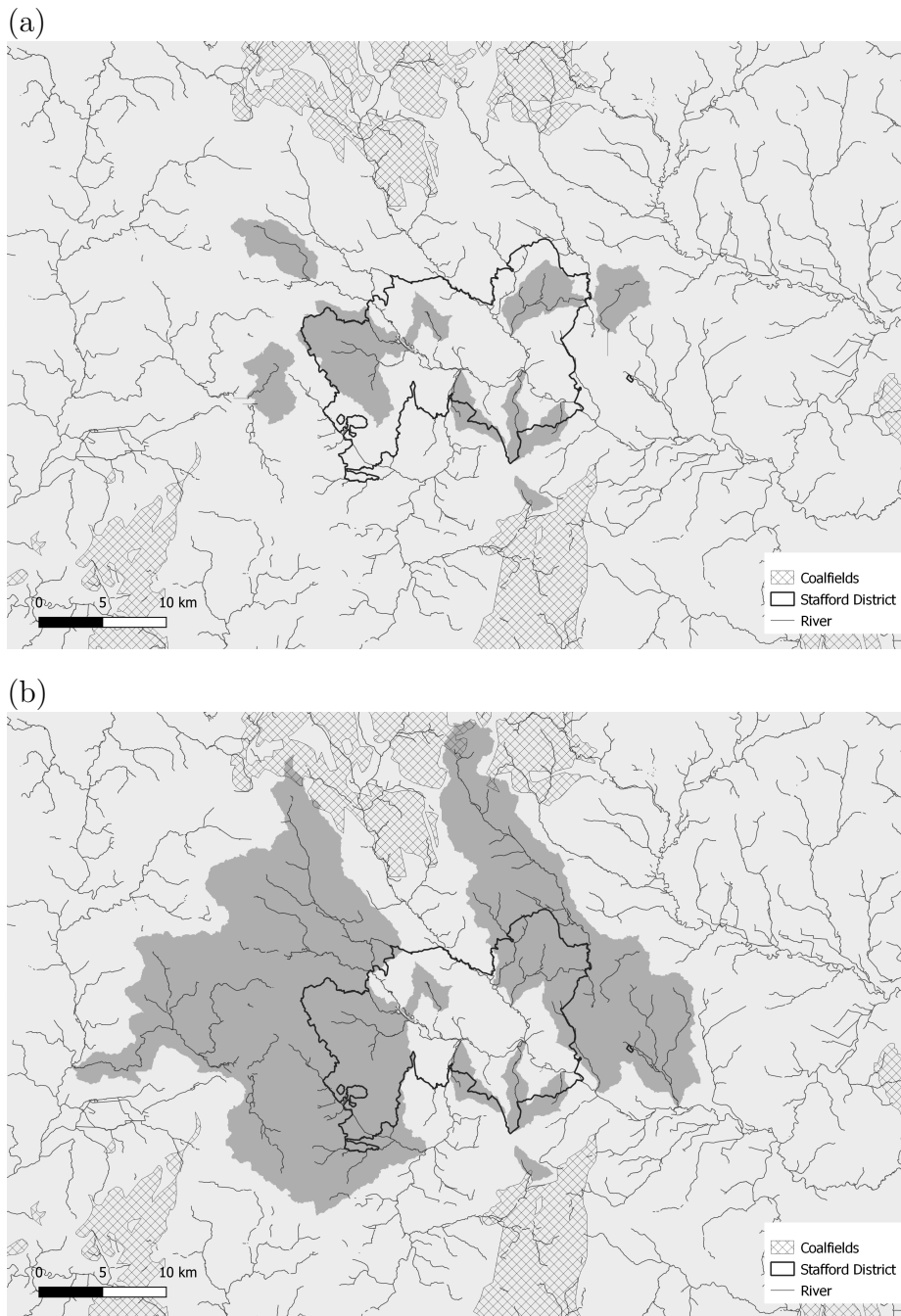


Figure 6.7: Stafford district hydrological map

as the shaded areas in figure 6.7 (a).⁶⁵ This definition allows for catchment areas to overlap, as the catchments of downstream confluences will encapsulate smaller catchments upstream. For example, figure 6.7 (b) illustrates catchments at the fortieth

65. As not all watercourses are named, catchments do not capture the very smallest drainage areas.



Figure 6.8: Severn & Trent catchment areas

percentile of the area distribution. Many of the earlier catchments are subsumed into the larger catchments at this level. Note that while Stafford itself is not located on a coalfield, catchments at this level already begin to connect it to the North Staffordshire coalfield, reflecting the possibility of transporting coal along the waterways. To follow this process of agglomeration to its conclusion reveals that Stafford district is actually on a drainage divide. Its boundary encloses parts of the Severn catchment, which drains to the south, and parts of the Trent, which drains to the north, illustrated in figure 6.8. As the Trent basin contains more coal, I assign Stafford district to the Trent catchment for the purposes of measuring coal access.

I repeat this process for each catchment and registration district. First, I calculate the total coalfield-area contained in each hydrological catchment. For each registration district, I follow the above procedure and assign the catchment with the maximum coal-area of all the catchments to which the district is connected by intersection. I consider this the appropriate geographical scale at which to assess exogenous variation in the accessibility of coal. It reflects both the historical experience of developing coal markets through water transport and the topographical reality,

with a clear causal connection through coal prices. It differs from a measure of direct coal prices, however, insofar as prices reflect demand as well as supply and may not therefore be entirely exogenous to industrialisation. I then estimate the effect of this measure of coal access on industrial employment in a first-stage regression of the following form

$$x_i = \delta_0 + \delta_1 z_i + \boldsymbol{\delta} \mathbf{X} + \epsilon_i, \quad (6.1)$$

where x_i is the per capita rate of industrial employment in district i , z_i is the measure of coal access described above, and \mathbf{X} is a vector of other control variables. Industrial employment is defined in detail in the data appendix, but it broadly encapsulates HISCO groups 7, 8, and 9.⁶⁶ It is closely related to the concept of secondary sector employment but includes miners and transport workers, for whom coal was evidently also important.

To anticipate the possibility that other geological and topological variables may be correlated with coal access and schools, I include mean temperature, mean rainfall, and the natural logarithm of distance to the nearest coastline as controls. Coastal distance is not likely related to the distribution of coal deposits, but it is related to the hydrological system; many coastal rivers have relatively small catchments compared to the large inland basins. It will be worth considering coastal proximity as a geographical factor independent of this relationship. I also control for the ratio of farmers to agricultural labourers to capture variation in the distribution of land-ownership, which may be related to the productivity of agricultural land and has been proposed as a factor affecting the supply of education.⁶⁷ I include the district Church of England index of attendance from Snell and Ell, who argue remote hilly parishes yielded lower tithes and were consequently neglected by Lambeth Palace, leaving a

66. March H. D. van Leeuwen, Ineke Maas, and Andrew Miles, *HISCO: Historical International Standards Classification of Occupations* (Leuven: Leuven University Press, 2002).

67. R. Gray and G. Clark, "Geography Is Not Destiny: Geography, Institutions and Literacy in England, 1837-1863," *Oxford Economic Papers* 66, no. 4 (2014): 1042–1069.

vacuum filled by religious dissent.⁶⁸ As supported schools were provided on a denominational basis, religion is a possible confounding variable related to geography. As in the earlier regression, I include a dummy variable for Wales and controls for the natural logarithm of the distance to London and to Edinburgh. I also control for the logarithm of distance to the nearest settlement with a population greater than 5,000 in the late 17th century poll tax to capture the possible effect of pre-industrial economic development. I include the number of train stations in a district as a measure of possible infrastructure investment associated with coal fields. Using this approach, I then use the predicted value of x_i , the exogenous variation in industrial employment induced by access to coal deposits, to predict a second-stage regression,

$$y_i = \beta_0 + \beta_1 \hat{x}_i + \boldsymbol{\beta}\mathbf{X} + \mu_i, \quad (6.2)$$

where y_i is the school enrolment rate of five-year-old children in a district and \hat{x}_i is the predicted value of industrial employment per capita from 6.1. I also include the ten-year-old enrolment rate as an independent variable in some specifications to capture substitution effects, following a logic described above.

The results are given in table 6.2. Industrial employment is predicted to increase age-five enrolment across all specifications. The first three columns give the OLS results. A one-percentage point increase in industrial employment predicts an approximately 0.36 percentage-point increase in five-year-old enrolment in column (1), the simplest OLS regression. Adding controls in specification (2) reduces the absolute size of the effect slightly, although it remains large. Now a one-percentage point increase in industrial employment predicts an approximately 0.32 percentage-point increase in age-five enrolment. Column (3) includes ten-year-old enrolment to capture the effect of industrial employment on age-five-enrolment beyond what is predicted by age-ten enrolment. The effect grows in absolute size, with an increase of one

68. Snell and Ell, *Rival Jerusalems: The Geography of Victorian Religion*, pp. 79-80.

Table 6.2: The demand for early enrolment and industrial employment

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS: 5 y.o. enrolment	OLS: 5 y.o. enrolment	OLS: 5 y.o. enrolment	IV: 5 y.o. enrolment	IV: 5 y.o. enrolment	IV: 5 y.o. enrolment
Industrial	0.36*** (0.07)	0.32*** (0.06)	0.54*** (0.05)	0.53*** (0.11)	0.72*** (0.19)	0.73*** (0.17)
Rural Ineq. (ln)		-0.033*** (0.01)	-0.010* (0.01)		-0.030*** (0.01)	-0.0078 (0.01)
Temp. (c)		0.0074 (0.02)	-0.014 (0.01)		-0.022 (0.02)	-0.029 (0.02)
Rain (mm)		0.000037 (0.00)	-0.0000015 (0.00)		0.000028 (0.00)	-0.0000075 (0.00)
Dist. Coast (ln)		0.012*** (0.00)	0.012*** (0.00)		0.0064 (0.00)	0.0090** (0.00)
Elevation (m)		-0.00039*** (0.00)	-0.00034*** (0.00)		-0.00063*** (0.00)	-0.00045*** (0.00)
Wales		-0.19*** (0.03)	-0.13*** (0.02)		-0.17*** (0.03)	-0.11*** (0.02)
Dist. London (ln)		0.045*** (0.00)	0.036*** (0.00)		0.041*** (0.00)	0.033*** (0.00)
Dist. Edinburgh (ln)		0.028 (0.02)	0.12*** (0.02)		0.056** (0.02)	0.13*** (0.02)
1700 Urban Dist. (ln)		-0.000063 (0.00)	0.0054 (0.00)		0.0063 (0.01)	0.0087** (0.00)
Railway		0.0036** (0.00)	0.00085 (0.00)		0.00077 (0.00)	-0.00060 (0.00)
C. of E.		0.042 (0.03)	-0.026 (0.02)		0.12** (0.05)	0.0068 (0.04)
10 y.o. student			0.62*** (0.03)			0.65*** (0.04)
Constant	0.42*** (0.01)	-0.49*** (0.15)	-1.05*** (0.11)	0.39*** (0.02)	-0.40** (0.16)	-1.04*** (0.13)
First Stage F				247.5	74.4	78.2
R2	0.066	0.43	0.66	0.051	0.39	0.65
Observations	616	609	609	616	609	609

Conley standard errors in parentheses. Oleva-Pflueger effective F-stat reported.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

industrial worker per capita predicting a 0.54 percentage-point increase in age-five enrolment.

Columns (4) to (6) give the instrumental variables (IV) results from the two-stage least squares regression described above. The estimated coefficients remain

significant, positive, and broadly consistent with the OLS coefficients. In the first column, a one-point increase in industrial employment predicts a 0.53–percentage point increase in age-five enrolment. Adding controls increases the absolute size of the effect to a 0.72 points, and controlling for age-ten enrolment to capture substitution effects leaves the coefficient largely unchanged.⁷

To put the predicted effect in column (6) in perspective, moving from the tenth percentile of industrial employment per capita (0.32) to the ninetieth percentile (0.62) is predicted to increase the age-five enrolment rate by 22 percentage points. To summarize, the evidence demonstrates that expanded industrial employment caused a significant rise in early-years school attendance.

Unfortunately, the methodology adopted above is not able to separately identify the effects of men’s, women’s, and children’s industrial employment on age-five enrolment. Crucially, the identifying assumptions for instrumental variables techniques include the ‘exclusion restriction’. In this case, this assumption implies that coal cannot affect age-five enrolment except through its effect on total industrial employment, the main explanatory variable, conditional on the included controls. Taking married women’s industrial employment as the explanatory variable would clearly violate this assumption, as coal also affects men’s and children’s industrial employment. Additionally, the level of industrial employment is likely strongly correlated among men, women, and children, likely elevating the variance of estimates if measures of these groups’ employment are included simultaneously in the regression.

To demonstrate, table 6.3 (a) repeats the same series of regressions as in table 6.2 but removes adult males aged twenty and above from the main explanatory variable and retains adult male employment separately as a control. The main explanatory variable thus includes women and children under twenty and serves to proxy for ‘household’ employment in industry. The interesting results are in the OLS specifications. In columns (2) and (3), both variables positively predict five-year-old enrol-

Table 6.3: The demand for early enrolment and women's and children's industrial employment

(a) Household labour versus adult male

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS: 5 y.o. enrolment	OLS: 5 y.o. enrolment	OLS: 5 y.o. enrolment	IV: 5 y.o. enrolment	IV: 5 y.o. enrolment	IV: 5 y.o. enrolment
Household Indust.	0.58*** (0.10)	0.28*** (0.10)	0.69*** (0.10)	0.98*** (0.20)	3.28 (3.07)	2.72 (2.00)
Adult Male Indust.		0.27 (0.17)	0.13 (0.14)		-2.36 (2.70)	-1.57 (1.69)
10 y.o. student			0.64*** (0.03)			0.87*** (0.23)
Inc. Controls		✓	✓		✓	✓
First Stage F				150.7	1.50	1.85
R2	0.074	0.42	0.66	0.039	.	0.25
Observations	616	609	609	616	609	609

(b) No mining or metals

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS: 5 y.o. enrolment	OLS: 5 y.o. enrolment	OLS: 5 y.o. enrolment	IV: 5 y.o. enrolment	IV: 5 y.o. enrolment	IV: 5 y.o. enrolment
Other Manuf.	0.47*** (0.08)	0.31*** (0.06)	0.52*** (0.05)	0.67*** (0.14)	0.57*** (0.17)	0.62*** (0.16)
Miners, Quarrymen, etc.		-0.085 (0.14)	0.25** (0.14)		0.089 (0.19)	0.32* (0.19)
Metal Processors		0.74 (0.90)	0.47 (0.63)		0.27 (1.07)	0.30 (0.89)
10 y.o. student			0.62*** (0.03)			0.64*** (0.04)
Inc. Controls		✓	✓		✓	✓
First Stage F				163.2	88.2	91.1
R2	0.096	0.43	0.65	0.079	0.41	0.65
Observations	616	609	609	616	609	609

Conley standard errors in parentheses. OLS-Pflueger effective F-stat reported.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

ment. However, whereas in column (2), adult male industrial employment predicts age-five enrolment about as much as household employment, in column (3) household industrial employment pulls ahead. Column (3) includes a control for ten-year-old enrolment and so captures a substitution effect; women's and children's industrial employment better explains residual school enrolment during early childhood, whereas

adult male industrial employment seems to be more related to overall school enrolment. Possibly, this difference is explained as an income effect from higher male earnings in the particular industries that employed adult males but few women and children.

The instrumental variables estimates are uninformative for the reason described above. Controlling for adult male industrial employment accounts for too much of the variation in household employment and renders the first-stage results insignificant. This is reflected in a steep drop in the first-stage F-statistic in columns (5) and (6). Nonetheless, the OLS results provide support to the notion that household labour supply better explains the substitution of age-five enrolment for age-ten enrolment than men's industrial employment, which is consistent with greater child-care demand.

Instrumental variables techniques are similarly unable to discriminate between the effects of different industries. For instance, easy access to coal likely also encouraged the establishment of mining and metal smelting, industries less likely to employ women and children. As above, table 6.3 (b) removes HISCO sub-groups 71, 'Miners, Quarrymen, Well-Drillers And Related Workers', and 72, 'Metal Processors', from the explanatory variable and includes them separately as control variables. The coefficients on the main explanatory variable are not significantly different from those in the original regression, suggesting the result is not driven by mining or metals. The predicted effect of mining is insignificant in column (2) and about half that of manufacturing in column (3), which reflects a substitution of early for late school in mining districts. While this effect is relatively small, it is still somewhat surprising because mining featured a very sharp gender division of labour arising from the legal prohibition against women's and children's employment underground and perhaps reflects the very intensive schedule of household, not market, labour in mining

households.⁶⁹ On the other hand, there is very little variation in the rate of mining employment and it is probably best not to extrapolate too far on the basis of this coefficient. For example, going from the tenth percentile of mining employment (0.00) to the ninetieth percentile (0.04) is predicted to only increase the age-five enrollment rate by 1 percentage point.

The predicted effect of metals employment is positive but has a very high variance. Crucially, this group does not include those who manufactured small metal goods, like buckles, nails, and the ‘toys’ of Birmingham, which were made by women and children but are classed under HISCO subgroup 83.⁷⁰ HISCO subgroup 72 involves heavy industrial metal processing at the forge and furnace. As discussed briefly above, while women and children were known to work at the forges, the bulk of labour in these industries was supplied by adult males, and there was regional variation in these labour patterns. For example, Alan Birch writes that the Dowlais Works in South Wales employed 900 children under the age of 18 and 200 adult women out of a total workforce of 5,000. The Dowlais Works used refined metal in its puddling system, which purportedly made more use of unskilled labour than the ordinary process using unrefined metal.⁷¹ This figure of 22 per cent may thus be taken to reflect the high range of women’s and children’s employment in heavy industrial metal works. A comparable figure for the cotton industry in 1833 was 74 per cent.⁷² While there is some positive effect for metals, the bulk of the demand for early education was surely driven by other industries definitely known to employ many women and children.

I turn now to consider the agricultural sector. The starting point will be Keith

69. Jane Humphries and Ryah Thomas, ““The Best Job in the World”: Breadwinning and the Capture of Household Labor in Nineteenth and Early Twentieth-Century British Coalmining,” *Feminist Economics* 29, no. 1 (2023): pp. 97–140.

70. Pinchbeck, *Women Workers and the Industrial Revolution, 1750-1850*, p. 271.

71. Birch, *Economic History of the British Iron and Steel Industry, 1784-1879: Essays in Industrial and Economic History with Special Reference to the Development of Technology*, p. 251.

72. H. M. Boot and J. H. Maindonald, “New Estimates of Age- and Sex-Specific Earnings and the Male-Female Earnings Gap in the British Cotton Industry, 1833-1906,” *Economic History Review* 61, no. 2 (2008): p. 383.

Snell's thesis that women's employment in the agrarian southeast became increasingly marginal from the middle of the eighteenth century owing to the consequences of enclosure, rising grain prices and regional specialization, and the adoption of the scythe over the sickle. In contrast, Snell holds that women continued to find work in pastoral regions.⁷³ A similar argument for the regional distribution of labour has been advanced for children, reflecting again complementarity between women's and children's labour.⁷⁴ This view has not gone unchallenged. Pamela Sharpe has argued that Snell's distinctions are overdrawn, exaggerating both the gender division of labour on farms and the scale of discontinuity over time.⁷⁵ Further, she has pointed out that Snell's data likely do not capture the wages or unemployment patterns of farm servants or day labourers.⁷⁶ Even in the western pastoral counties, women might be employed very intermittently. For example, Nicola Verdon has studied farm records from Gloucestershire that record women's peak employment during summer haymaking, following the pattern Snell identifies with the more agrarian eastern counties.⁷⁷ Helen Speechley has similarly identified farm records in Somerset indicating that female day labourers rarely engaged in pastoral tasks but rather were confined to weeding and stone-picking.⁷⁸ Isolated farm accounts, however, may not reflect wider trends. Joyce Burnette's quantitative analysis of 65 farms between 1740-1850 finds that women worked more days as day labourers in the south-west, the West Midlands,

73. Snell, *Annals of the Labouring Poor: Social Change and Agrarian England, 1660-1900*, pp. 15-66.

74. Peter Kirby, *Child Labour in Britain, 1750-1870* (London: Palgrave Macmillan, 2003), pp. 55-60.

75. Pamela Sharpe, "The Female Labour Market in English Agriculture During the Industrial Revolution: Expansion or Contraction?," in *Women's Work in Industrial England: Regional and Local Perspectives*, ed. Nigel Goose (Hatfield: Local Population Studies, 2007), pp. 51-75.

76. Pamela Sharpe, *Adapting to Capitalism: Working Women in the English Economy, 1700-1850* (London: Macmillan, 1996), pp. 73-8.

77. Nicola Verdon, "A Diminishing Force? Reassessing the Employment of Female Day Labourers in English Agriculture, C. 1790-1850," in *Women, Work, and Wages in England, 1600-1850*, ed. Penelope Lane, Neil Raven, and K. D. M. Snell (Woodbridge, Suffolk: Boydell Press, 2004), p. 202; see also Nicola Verdon, *Rural Women Workers in Nineteenth-Century England: Gender, Work and Wages* (Woodbridge, Suffolk: Boydell Press), ch. 6.

78. Helen Victoria Speechley, "Female and Child Agricultural Day Labourers in Somerset, C. 1685-1870" (Ph. D. Thesis, University of Exeter, 1999), p. 72.

and the north—areas with more pastoral farming—than in the south-east or home counties.⁷⁹ The effects of these differences in the demand for carer’s labour on early attendance will be considered using a similar method to that adopted for industry above.

Land has perhaps the highest transport costs of any factor of production. While other social and economic factors could of course push in an opposing direction, some agricultural activities would simply be closely associated with physical qualities of the land. As with coal, I therefore look for an exogenous source of variation in qualities affecting land suitability for arable farming. Heavy clay soils suffered from poor drainage but could be turned to arable with greater labour inputs; farmers were thus less likely to plant arable crops on these soils but there were no physical barriers to doing so.⁸⁰ Heavy clay soils were dispersed throughout England and Wales, often forming in river valleys, and could be found adjacent to other soil types in the same district.⁸¹ This is desirable from the point of view of identifying exogenous variation, as the presence of heavy clays is less likely to be related to unobserved regional effects. Using data reported to the Tithe Commission of 1838, I calculate the mean number of parishes reporting the presence of heavy clay soils in a district and use this as an instrumental variable for the logarithm of the ratio of arable to grassland acres (details in appendix).⁸² In urban districts, where very little arable or pastoral agriculture actually occurred, the ratio of arable to pastoral farming is difficult to interpret and likely misleading. I therefore restrict the sample to districts with a population density less than 200 people per km². For context, this is approximately

79. Joyce Burnette, “The Wages and Employment of Female Day-Labourers in English Agriculture, 1740-1850,” *Economic History Review* 57, no. 4 (2004): pp. 664–90.

80. Joan Thirsk, *Agricultural Regions and Agrarian History in England, 1500-1750* (Basingstoke: Macmillan, 1987), pp. 10-22; Robert C Allen, *Enclosure and the Yeoman* (Oxford: Clarendon Press, 1992), p. 32-3.

81. See examples in Joan Thirsk, ed., *The Agrarian History of England and Wales*, vol. 5 (Cambridge: Cambridge University Press, 1984), pp. 92-3, 321-3.

82. In this case, taking the logarithm of the ratio ensures that ratios less than one are weighted proportionally to ratios greater than one.

Table 6.4: The demand for early enrolment and arable versus pastoral agriculture

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS: 5 y.o. enrolment	OLS: 5 y.o. enrolment	OLS: 5 y.o. enrolment	IV: 5 y.o. enrolment	IV: 5 y.o. enrolment	IV: 5 y.o. enrolment
Arable:pasture (ln)	0.0085 (0.01)	-0.017** (0.01)	-0.013** (0.01)	-0.0046 (0.03)	0.00026 (0.03)	0.017 (0.02)
Rural Ineq. (ln)		-0.052*** (0.02)	-0.034*** (0.01)		-0.047*** (0.02)	-0.026* (0.01)
Temp. (c)		0.041* (0.03)	0.036 (0.02)		0.055** (0.03)	0.059*** (0.03)
Rain (mm)		-0.000012 (0.00)	-0.000059* (0.00)		-0.000014 (0.00)	-0.000062* (0.00)
Elevation (m)		0.000046 (0.00)	0.00027 (0.00)		0.00019 (0.00)	0.00052** (0.00)
Wales		-0.21*** (0.03)	-0.15*** (0.02)		-0.21*** (0.03)	-0.15*** (0.02)
Dist. London (ln)		0.0032 (0.01)	0.0032 (0.01)		0.017 (0.02)	0.026 (0.02)
Dist. Edinburgh (ln)		-0.067* (0.04)	0.024 (0.04)		-0.066 (0.04)	0.027 (0.04)
1700 Urban Dist. (ln)		-0.015* (0.01)	-0.010 (0.01)		-0.014* (0.01)	-0.0090 (0.01)
C. of E.		-0.024 (0.04)	-0.11*** (0.04)		-0.024 (0.04)	-0.11*** (0.03)
10 y.o. student			0.59*** (0.04)			0.61*** (0.04)
Constant	0.47*** (0.01)	0.62** (0.29)	-0.19 (0.25)	0.47*** (0.01)	0.30 (0.52)	-0.75* (0.42)
First Stage F				33.9	48.0	47.1
R2	0.0039	0.35	0.56	.	0.34	0.53
Observations	479	478	478	479	478	478

Conley standard errors in parentheses. OLS-IV effective F-stat reported.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

NOTE: Sample is restricted to districts with a population density less than 200 per km².

the density of the peri-urban district of Hayfield, next to Stockport, or Foleshill, a northern suburb of Coventry.

The results of the regression are presented in table 6.4. The reduced-form OLS results are given in column (1). Here a one-per cent change in the ratio of arable to pastoral acres predicts a 0.0085-percentage point increase in the five-year-old enrolment rate. Adding controls in column (2) changes the sign of the predicted effect,

which is now significant. Controlling for age-ten enrolment in column (3) weakens the predicted effect. Broadly, these results are in line with Snell's thesis, suggesting a greater demand for extra-familial child care in pastoral districts. In column (3), for example, a one-percent increase in the arable to pastoral ratio predicts a one percentage point decrease in age-five enrolment. Columns (4)-(6) report the IV estimates using heavy clays. The first-stage F-statistics indicate the instrument is relevant across specifications—the presence of heavy clays significantly predicts pastoral farming. The baseline regression in column (4) predicts a negative but small effect for arable agriculture. Adding controls in in column (5) again flips the sign of the coefficient, which is now marginally positive. Column (6) also yields a positive prediction, slightly larger than in column (5). As a whole, these estimates are fairly inconclusive. The change in sign between the OLS and IV estimates indicates the presence of important omitted variables; however, the IV estimates are not statistically significant. I take this to indicate that the effects of arable agriculture are not especially strong one way or the other. Relative to the predicted effect of manufacturing discussed above, any effect of differences in household labour supply in agriculture appear to be very weak.

Although much has been written about women's participation in agriculture, perhaps the more salient fact is girls' near-absence from farm wage books in both the pastoral west and the agrarian south-east. Burnette reports that girls provided an average of 1.5 per cent of all days worked across her sample of farms in 1850, whereas boys provided 18.6 and women 10.6 percent of days.⁸³ Given the maintained assumption that women's and children's labour were substitutes both at home and in the paid workforce, daughters in rural areas without other work available may have been tasked with child care, undermining the need to seek extra-familial care.

83. Joyce Burnette, "Child Day-Labourers in Agriculture: Evidence from Farm Accounts, 1740-1850," *Economic History Review* 65, no. 3 (2012): p.1095; Burnette, "The Wages and Employment of Female Day-Labourers in English Agriculture, 1740-1850," p. 682.

Moreover, any stark contrast between arable and pastoral farming in the demand for childcare as a result of greater household labour supply in the uplands may have been countered by the nature of pastoral labour itself. As Joan Thirsk emphasizes, uplands farmers were commonly bi-employed, reflecting a less intensive agricultural labour schedule throughout the year.⁸⁴ For their wives and daughters, perhaps dairying or tending to flocks on a smallholding, bi-employment historically took the form of spinning and other handicrafts that could be integrated into the run of other household tasks, including child care.⁸⁵ Spinning by hand was in decline from the mid-eighteenth century and all-but extinct by 1851, along with other handicrafts, resulting in a major decline in married women's potential earnings outside of the concentrated range of industries examined above.⁸⁶ Perhaps longstanding differences between upland and lowland household labour inputs were simply swept away in this wave of industrial dislocation, and the moderate pastoral labour schedule that formerly accommodated paid bi-employment now accommodated familial childcare. Even in the North, where women contributed the most labour-days in Burnette's sample, their share was around 30 per cent.⁸⁷ The decline of handicrafts in pastoral districts may represent the more important phenomenon for explaining patterns of child-care demand in pastoral regions.

Some handicrafts, however, survived into the nineteenth century. As a final case, I consider the effect of the straw-plait industry on demand for early education. The purpose is to test Joyce Burnette's hypothesis that handicrafts enabled married women to simultaneously provide child care, as these tasks could be picked up and put down to tend to children's care needs.⁸⁸ Although broadly plausible, I doubt that work and

84. Joan Thirsk, "Horn and Thorn in Staffordshire: The Economy of a Pastoral County," in *The Rural Economy of England* (London: Hambledon Press, 1984), pp. 163–83.

85. Hill, *Women, Work and Sexual Politics in Eighteenth-Century England*, pp. 30–6.

86. Jane Humphries and Jacob Weisdorf, "The Wages of Women in England, 1250–1850," *Journal of Economic History* 75, no. 2 (2015): 405–447.

87. Burnette, "The Wages and Employment of Female Day-Labourers in English Agriculture, 1740–1850," p. 681.

88. Burnette, *Gender, Work and Wages in Industrial Revolution Britain*, pp. 181–4.

child care could ever be perfectly complementary. Indeed, there is scattered evidence to suggest they were not. Henry Mayhew interviewed an outworking embroiderer in London who claimed that having to simultaneously care for her child cut her earnings by 20 per cent, and the effect of her divided attention on the care she gave her child cannot be quantified.⁸⁹ Trade-offs between paid and unpaid labour, however, clearly existed even where both activities occurred under the same roof. Straw plaiting provides another example. Straw plaiters worked almost exclusively from home, yet accusations of plaiters' moral failure and neglect of domestic duties came from all corners.⁹⁰ The degree to which handicrafts and child care were complementary, and the effect of this upon extra-familial provision of child care through schools, is an open question.

By any account, straw plaiting employed many women and children. Nigel Goose reports participation rates as high as 41 per cent for children aged 5 to 9 and 65 percent for children aged 10 to 14 in Hemel Hempstead.⁹¹ Thirty-two per cent of women aged over 15 and 26 per cent of married women were employed in straw plaiting in the leading straw districts. Crucially, these participation rates are higher than many textile districts in Lancashire.⁹² Despite these high household participation rates, Burnette's hypothesis would predict that families producing handicrafts would have a weaker demand for extra-familial childcare than districts where women and elder siblings worked away from the home.

Adopting a similar logic of targeting exogenous geographical variation in resources, I consider variation in the straw plaiting industry induced by underlying soil composition. Contemporary observers remarked on a connection between chalky soil and the

89. Henry Mayhew, *Labour and the London poor*, vol. 1, p. 363 qtd. in Alexander, *Women's Work in Nineteenth-Century London: A Study of the Years 1820-50*, pp. 39-40.

90. John G. Dony, *A History of the Straw Hat Industry* (Luton: Gibbs, Bamforth, & Co., 1942), pp. 70-2.

91. Goose, Honeyman, and Goose, "Child Employment Prospects in Nineteenth-Century Hertfordshire in Perspective: Varieties of Childhood?," pp. 178, 196.

92. Goose, "The Straw Plait and Hat Trades in Nineteenth-Century Hertfordshire," p. 106-9.

suitability of its straw for plaiting. In his treatise on Bedfordshire, Thomas Batchelor, for instance, remarked ‘Straw-plaiting was formerly confined to the chalky part of the county; but has been so much encouraged within the last few years, that it has spread rapidly over the whole southern district’.⁹³ Arthur Young wrote that ‘straw from stony and heavy land...will not do for plaiting’, and noted that soil which yielded quality grain would produce poor straw and vice versa.⁹⁴ J.C. Loudon observed that plaiters preferred ‘Weak wheat straw from chalky and white land, and such as grows under trees or near hedges’.⁹⁵ The importance of chalky soil for growing plaiting straw was repeated by many nineteenth century authors, but few gave a clear reason for the connection.⁹⁶ George Measom, in the second edition of his railway gazetteer, speculated that Hertfordshire’s advantage over Essex in straw plaiting arose from ‘The due proportion of silex in the straw, which gives strength without brittleness’.⁹⁷ Chalky soils have more recently been shown to reduce the availability of nitrogen and hinder plant growth,⁹⁸ but the opinions of agriculturalists cited above suggest a compensating physical change in the varieties of wheat grown in the presence of chalk, making them possibly more pliable and attractive for handicrafts. In general, however, chalk soils were light and well-drained, making them suited to arable farming if supplemented with regular manure, and this was their usual use.⁹⁹

Young suggests that straw-plaiters would pay between two and three pence per

93. Thomas Batchelor, *General View of the Agriculture of the County of Bedford* (London: Sherwood, Neely, / Jones, 1813), p. 594.

94. Arthur Young, *General View of the Agriculture of Hertfordshire* (London: Richard Phillips, 1804), pp. 223-4.

95. J. C. Loudon, *An Encyclopaedia of Agriculture* (London: Longman, Rees, Orme, Brown, / Green, 1831), p. 1131.

96. J. Vincent Elsdon, “The Agricultural Geology of Hertfordshire,” *Transactions of the Hertfordshire Natural History Society* 2 (1884): p. 156; J. Clutterbuck, “Agricultural Notes on Hertfordshire,” *Journal of the Royal Agricultural Society of England*, no. 25 (1864): pp. 314-5; J. L. Green, *The Rural Industries of England* (London: Marlborough & Co, 1894), p. 61.

97. George Measom, *The Official Illustrated Guide to the Great Northern Railway* (London: Griffin, Bohn, & Co., 1861), p. 27.

98. A. H. Bunting and J. Elston, “Water Relations of Crops and Grass on Chalk Soil,” *Scientific Horticulture* 18 (1966): 116-12.

99. Thirsk, *Agricultural Regions and Agrarian History in England, 1500-1750*, p. 13.

pound for such quality straw.¹⁰⁰ This is equivalent to approximately £18 to £28 per ton and is surely an overestimate. Young wrote in a time of elevated prices during the Napoleonic wars. Eland suggests a more normal range between £5 and £10 per ton.¹⁰¹ This implies lower transport costs than coal, which was valued at less than £1 per ton, but such transport costs are nonetheless relatively high.¹⁰² While straw manufacturers occasionally imported Tuscan leghorn, imported straw rarely made up more than 10 per cent of the raw material in the industry.¹⁰³ Further, the industry grew to maturity during the Napoleonic wars when such imports were prohibited, and the skills and commercial networks developed in this region in this period were relatively path-dependent.¹⁰⁴ The distribution of chalky soil therefore closely corresponded with the distribution of the straw-plaiting industry.

I perform an instrumental variable regression using the extent of chalky soil in a district, comparable to the technique used for the other two industries. The results are presented in table 6.5. Column (1) reports the baseline OLS model. Here a one-percentage point increase in straw plaiters per capita predicts a 0.19 percentage point decrease in age-five enrolment. Column (2) adds the standard set of controls plus wheat yields taken from the Tithe Commissioners reports. The testimonial evidence cited above suggests chalky soils may have been marginally less productive than other soils. To account for possible labour market impacts arising from this difference, I include this control. I also include the measure of arable agriculture from the previous regression, as regions suitable to straw-plait generally followed an arable culture. Including these controls flips the sign of the coefficient, which is now positive.

100. Young, *General View of the Agriculture of Hertfordshire*, pp. 223-4.

101. G. Eland, *In Bucks* (Aylesbury: G. T. de Fraine & Co, 1923), p. 96.

102. The price-weight ratio for coal is quoted from customs reports from 1754. The same list implies plaiting straw would have a comparable price-weight ratio to iron, but changes in the general price level between the two quoted prices would work against the hypothesis of relatively high transport costs for plaiting straw; see Ralph Davis, *The Rise of the English Shipping Industry* (London: Macmillan / Co., 1962), p. 177.

103. Dony, *A History of the Straw Hat Industry*, p. 62.

104. *Ibid.*, pp. 31-46.

As discussed above, arable regions were associated with fewer age-five enrolments, and after controlling for this, the positive relationship between household labour and plaiting emerges. Column (3) includes a control for ten-year-old enrolment, which increases the size of the coefficient. In this column, a one-percentage point increase in straw-plait employment predicts a 0.57 percentage-point increase in five-year-old enrolment.

Columns (4) to (6) report the instrumental variables estimates using the proportion of the district overlaying chalk deposits. Column (4) reports the baseline IV model. In this model, a one-percentage point increase in straw plait employment predicts a 3.20 percentage-point increase in early enrolment. Adding controls in column (5) increases the absolute size of the coefficient. Column (6) adds the control for age-ten enrolment and does little to qualitatively alter the main coefficient, as compared to column (5). The large discrepancy between these OLS and IV estimates is cause for some concern. Additionally, in columns (5) and (6), the first-stage F-statistics would indicate marginally weak instruments by conventional standards ($F < 10$).¹⁰⁵ This introduces two problems. Weak instruments will generally bias IV estimates towards OLS—in other words, the true estimate should be larger.¹⁰⁶ On the other hand, if the exclusion restriction is violated, weak instruments will amplify any bias this introduces. To clarify, this means that if chalky subsoil affects five-year-old enrolment through any channel other than straw plaiting, conditional on the included controls, the positive or negative bias resulting will be larger in the case of weak instruments. Given the very weak effects found in the earlier regression of early education on agricultural land-use and the extensive set of geographical controls, including the measure of arable farming itself, I doubt the exclusion restriction

105. The Oleva-Pflueger test additionally provides critical values at various levels of potential bias against which researchers can compare first-stage F-stats. These tests also suggest the instrument is marginally weak.

106. Joshua D. Angrist and Jörn-Steffen Pischke, *Mostly Harmless Econometrics: An Empiricist's Companion* (Princeton: Princeton University Press, 2009), pp. 205-8.

Table 6.5: The demand for early enrolment and straw plaiting

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS: 5 y.o. enrolment	OLS: 5 y.o. enrolment	OLS: 5 y.o. enrolment	IV: 5 y.o. enrolment	IV: 5 y.o. enrolment	IV: 5 y.o. enrolment
Straw Plait	-0.19 (0.16)	0.16 (0.18)	0.57*** (0.16)	3.20* (1.67)	5.62** (2.77)	5.06** (2.27)
Rural Ineq. (ln)		-0.026*** (0.01)	-0.0083 (0.01)		-0.028*** (0.01)	-0.0068 (0.01)
Temp. (c)		0.026 (0.02)	0.029** (0.02)		0.022 (0.02)	0.025 (0.02)
Rain (mm)		-0.000011 (0.00)	-0.000049* (0.00)		0.000037 (0.00)	-0.000018 (0.00)
Elevation (m)		-0.0000083 (0.00)	0.00024* (0.00)		-0.00026 (0.00)	0.000077 (0.00)
Wheat yield		0.0043 (0.00)	0.0060** (0.00)		0.0043 (0.00)	0.0064*** (0.00)
Arable:pasture (ln)		-0.013** (0.01)	-0.017*** (0.00)		-0.032*** (0.01)	-0.033*** (0.01)
Wales		-0.23*** (0.03)	-0.17*** (0.02)		-0.22*** (0.03)	-0.14*** (0.02)
Dist. London (ln)		0.034*** (0.00)	0.029*** (0.00)		0.044*** (0.01)	0.036*** (0.00)
Dist. Edinburgh (ln)		-0.023 (0.03)	0.017 (0.02)		-0.029 (0.03)	0.019 (0.02)
1700 Urban Dist. (ln)		-0.0097** (0.00)	-0.0094** (0.00)		-0.022*** (0.01)	-0.019*** (0.01)
10 y.o. student			0.51*** (0.04)			0.60*** (0.06)
Constant	0.48*** (0.01)	-0.0067 (0.14)	-0.53*** (0.14)	0.47*** (0.01)	0.056 (0.14)	-0.57*** (0.14)
First Stage F				25.5	8.73	9.21
R2	0.00065	0.37	0.54	.	.	0.20
Observations	616	609	609	616	609	609

Conley standard errors in parentheses. OLS-Pflueger effective F-stat reported.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

is meaningfully violated, but it is difficult to say with certainty.

As a lower-bound, an increase of 0.57 percentage-points in age-five enrolment for everyone percentage-point increase in straw plaiting seems plausible. Given the inherent uncertainties in the IV estimation, it would seem premature to interpret the coefficient in column (6) as an upper-bound estimate. Instead, I calculate a weak-

instrument robust confidence interval for this coefficient based on the Anderson-Rubin statistic. This approach avoids calculating standard errors, which are unreliable with weak instruments, and instead gathers up the set of coefficient estimates that are not rejected by a weak-IV-robust test, at a given confidence level.¹⁰⁷ This gives an interval of 1.61 to 14.79 at the 95-per cent confidence level. I therefore conclude that straw-plaiting had a positive effect on the demand for early education, and potentially a very large effect.

To put these elasticities into perspective relative to the amount of variation in the data, as I did for industrial employment and agriculture, is complicated by the 460 districts that simply had no straw plaiters. The industry was concentrated in the South Midlands. Among all districts, the mean number of straw plaiters per capita is 0.0025, which is low due to the many districts without plaiters, and the standard deviation is 0.166. Additionally, the industry had been more widespread during the Napoleonic wars, after which it contracted to a smaller area in Hertfordshire and Bedfordshire, leaving many isolated straw-plaiters who clung to the handicraft and likely sold into a very limited local market.¹⁰⁸ Fully 70 districts had only one plaiter, 28 districts had two, 14 had three, and 5 districts had only four. Districts such as these would seem to give a poor sense of the ordinary variation in the number of plaiters. For this reason, I simply evaluate the predicted effect of going from having no straw plaiters to having the employment rate of St. Albans, 0.064, or approximately four standard deviations. Using the more conservative OLS estimate, this would predict an higher age-five enrolment rate by about 3.6 percentage points. Using the larger IV estimate gives an increased enrolment rate by 32.3 percentage points.

Insofar as straw plaiting is illustrative of wider domestic industries, this suggests Burnette's hypothesis is possibly incorrect, although the IV estimates may not be

107. Isaiah Andrews, *Weak Instruments and What to Do About Them*, July 2018, <https://www.nber.org/lecture/2018-methods-lecture-isaiah-andrews-weak-instruments-and-what-do-about-them>.

108. Dony, *A History of the Straw Hat Industry*, pp. 31-46; Pinchbeck, *Women Workers and the Industrial Revolution, 1750-1850*, pp. 216-8.

totally reliable. More detailed studies of other handicrafts would shed valuable light on the degree to which handicrafts were complementary with child care.

6.4 Early childhood human capital in context

Geographical analysis thus supports the notion that early enrolment was responsive to household labour supply. In particular, where industries existed in which women and children were more likely to work, young children were more likely to be in school. Geographical analysis also suggests that early enrolment was complementary to other forms of human capital accumulation at the regional level.

An earlier chapter presented evidence that learning to read at younger ages was more efficient, in the sense that it took fewer years to learn than beginning at a later age. This finding is consistent with emphasis in the new human capital literature on ‘sensitive periods’ in brain development and their importance to the learning process. These theories also emphasise ‘dynamic complementarity’ in human capital acquisition across different stages of the life-course.¹⁰⁹ Early learning, in effect, constructs a scaffolding upon which later learning builds; put more precisely, the stock of human capital acquired during earlier life increases the productivity of present human capital investment. I close the discussion of regional variations by highlighting complementarities between early school enrolment and later human capital accumulation.

The method is essentially a ‘horse race’-type regression of various indicators of human capital on both five-year-old enrolment and ten-year-old enrolment, both in logarithmic form as before. The coefficients on either educational measure are therefore interpreted as the marginal effect of a one percentage point increase in five- or ten-year-old enrolment, holding fixed the enrolment rate at the respective other age. Additionally, I report Conley standard errors in all regressions to address possible spatial autocorrelation. These results can not strictly be interpreted as causal, although

109. Cunha and Heckman, “The Technology of Skill Formation.”

a possible causal mechanism and explanation is often provided as part of the interpretation of results. Rather, the point is to stress how early enrolment was rarely the end of the line and how early education fit within wider regional institutions fostering the acquisition of human capital.

For each human-capital measure, I first report a simple regression specification that includes only age-ten and age-five enrolment rates. As purely an indication of the coexistence of different indicators of human capital at the regional level, these simple specifications may be preferred. Anticipating results to provide an illustration, I find that age-five enrolment strongly predicts Sunday school enrolment. It may be that both age-five enrolment and Sunday school enrolment are jointly determined by local labour markets, particularly the prevalence of child labour.¹¹⁰ In this case, age-five enrolment can not meaningfully be said to cause Sunday school enrolment. Nonetheless, in some districts Sunday schools were so prevalent that almost all working-class children would have attended for some period of time, and early enrolment at day school and continued attendance at Sunday school throughout later childhood should be considered complementary inputs to the production of final human capital in such settings.¹¹¹ Controlling for the prevalence of child labour, in this case, would undermine the strength of this observed relationship. On the other hand, it may be that an introduction to reading at a young age through early enrolment at a day school facilitated children's learning at Sunday schools through the effect of 'dynamic complementarity'. In this case, there would be a causal component to the relationship. Without credibly exogenous variation in early enrolment, it is not possible to recover this second, causal effect from the wider correlation. Nonetheless, the relationship between different kinds of school experience, early or late, and other

110. Snell, "The Sunday-School Movement in England and Wales: Child Labour, Denominational Control and Working-Class Culture."

111. Field, "Occupational Structure, Dissent, and Educational Commitment: Lancashire, 1841," p. 272; Laqueur, *Religion and Respectability: Sunday Schools and Working Class Culture 1780-1850*, p. 89.

indicators of human capital remains of interest.

For each outcome, I also report a regression which includes controls for the ratio of farmers to agricultural labourers, a dummy variable for Wales, distance to London, distance to Edinburgh, distance to nearest seventeenth-century urban centre, and the Church of England index of attendance. This set of controls is intended to capture a non-comprehensive set of long-standing regional and cultural differences related to human capital for reasons already described. I do not include the set of geographical controls from earlier regressions because the logic of using geographical endowments as instrumental variables no longer applies.

Five-year-old enrolment and ten-year-old enrolment were related to qualitatively different educational outcomes. In an unpublished article, I argue that the measure of literacy adopted by the Registrar General, and historians subsequently, i.e., the proportions of brides and grooms who sign their name on marriage documents, will not capture the effect of schools that taught reading but not writing. Among such schools were those catering to young children, in part because using a pen and ink required manual dexterity that their pupils had not yet developed. In contrast, I demonstrate that age heaping, people's tendency to round their reported ages to multiples of five, is a good proxy for both reading and writing ability.¹¹² Columns (1) and (2) of table 6.6 (a) report the results of the horse race for age heaping among men, while the same columns in part (b) report the results among women. The outcome variable is the complement of the 'ABCC' index, a measure developed by A'Hearn, Baten, and Crayen, which is interpreted as the proportion of the adult population reporting an age ending in five or zero in excess of what would be predicted assuming a smooth age distribution, and it is calculated from the 1881 census to capture variation among the cohort who were children in 1851.¹¹³ A one point increase five-year-old enrolment

112. Louis Henderson, 'The expansion of basic education during "deskilling" technological change in England and Wales, c. 1780-1830', forthcoming.

113. A'Hearn, Crayen, and Baten, "Quantifying Quantitative Literacy: Age Heaping and the History of Human Capital."

Table 6.6: Educational outcomes complementary to early enrolment

(a) Males

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS: Age Heaping	OLS: Age Heaping	OLS: No Signature	OLS: No Signature	OLS: Sunday Sch.	OLS: Sunday Sch.	Poisson: Lit. Society	Poisson: Lit. Society
5 y.o. student	-0.025*** (0.01)	-0.022*** (0.01)	0.0050 (0.04)	0.0078 (0.04)	1.80*** (0.45)	2.44*** (0.38)	0.90 (1.92)	1.54 (1.02)
10 y.o. student	-0.0075 (0.01)	-0.010 (0.01)	-0.40*** (0.04)	-0.34*** (0.04)	-2.12*** (0.44)	-1.51*** (0.41)	0.15 (0.93)	-0.76 (1.23)
Inc. Controls		✓		✓		✓		✓
R ²	0.074	0.11	0.25	0.28	0.071	0.38		
Observations	602	598	540	538	619	612	619	612

(b) Females

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS: Age Heaping	OLS: Age Heaping	OLS: No Signature	OLS: No Signature	OLS: Sunday Sch.	OLS: Sunday Sch.	Poisson: Lit. Society	Poisson: Lit. Society
5 y.o. student	-0.022*** (0.00)	-0.019*** (0.01)	0.27*** (0.05)	0.23*** (0.05)	2.12*** (0.45)	2.64*** (0.39)	3.42** (1.42)	2.77*** (0.99)
10 y.o. student	0.0099* (0.01)	0.012** (0.01)	-0.49*** (0.04)	-0.50*** (0.05)	-2.29*** (0.44)	-1.73*** (0.43)	0.43 (1.65)	0.055 (1.94)
Inc. Controls		✓		✓		✓		✓
R ²	0.037	0.097	0.20	0.41	0.090	0.36		
Observations	602	598	540	538	619	612	619	612

Conley standard errors in parentheses. Included controls are farmer to agricultural labourer ratio, a dummy for Wales, logarithm of distance to London, logarithm of distance to Edinburgh, logarithm of distance to Early Modern urban centre, and the Church of England index of attendance.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

predicts a decrease in the amount of age heaping among both men and women, and there is little change in the coefficients after including the controls. A proportional increase in ten-year-old enrolment, in contrast, predicts a slight increase in age heaping among men and a slight increase in age heaping among women.

Signatures on marriage documents present nearly a mirror image. In table 6.6, columns (3) and (4), the outcome measure in part (a) is the proportion of grooms who do not sign their marriage documents and of brides in part (b), both measured for weddings occurring in 1871. A one percentage point increase in five-year-old enrolment predicts that more men (although their coefficients are insignificant) and women will fail to sign their names, making a mark instead. In contrast, greater ten-year-old enrolment predicts more signatures of both grooms and brides.

The discrepancy is most likely related to qualitative differences in the types of schools across districts. Some of this variation was illustrated by surveys undertaken by the statistical societies of London, Bristol, and Manchester in the 1830s and 1840s, which contain some of the richest detail on school quality and content of any source. These were summarized in table 5.1 in an earlier chapter. Districts differed in both the prevalence of different kinds of schools and of the gender composition of scholars attending those schools. Further, schools differed in the content of instruction, with dame schools and Sunday schools far less likely to teach writing.¹¹⁴ To give an illustrative comparison, in Bury, Lancashire, 20 per cent of day-school pupils were under-fives and 34 per cent attended dame schools. Fully 69 per cent of dame school pupils were girls, compared to only 33 per cent of pupils in subsidised day schools. None of the dame schools in Bury taught writing, but all taught reading.¹¹⁵ In the rural county of Rutland, 16 per cent of day-school pupils were under-fives and 23 per cent attended dame schools. Fifty-nine per cent of dame school pupils were girls,

114. Louis Henderson, 'The expansion of basic education during "deskilling" technological change in England and Wales, c. 1780-1830', forthcoming.

115. Manchester Statistical Society, *Report of a Committee of the Manchester Statistical Society, on the State of Education in the Borough of Bury, Lancashire, 1835*, pp. 17-20.

compared to 42 per cent of pupils in subsidised day schools. Again, no dame schools in Rutland taught writing, but all taught reading.¹¹⁶ Across these two examples, children in Bury were more likely to enter day schools that did not teach writing, and this difference was stronger for girls. Plausibly, qualitative differences such as these were related to regional differences in enrolment age throughout England and Wales and may explain the contrasting results for age-heaping and signatures.

This point is reinforced by columns (5) and (6) of Table 6.6, in which the outcome is the logarithm of male Sunday scholars in part (a) and of female Sunday scholars in part (b). In both cases, the results suggest districts with greater five-year-old enrolment were likely to also have had greater Sunday school enrolment, while those districts with greater ten-year-old enrolment had less, and the relationship appears to have been stronger for girls. Again, Bury provides an illustrative example, where for every day scholar there were approximately 1.7 Sunday scholars, 27 per cent of whom were also enrolled in day schools during the week and 55 per cent of whom were girls.¹¹⁷ In Rutland, in contrast, for every day scholar there were only 1.08 Sunday scholars, 60 percent of whom were enrolled in day schools during the week and 48 percent of whom were girls. Rutland thus had relatively fewer Sunday scholars, relatively fewer children for whom Sunday school was the only school they attended, and relatively fewer female Sunday scholars.¹¹⁸ As a result, Sunday schools in Rutland did not supplement day-school provision to the same extent as in Bury. The net effect on total school attendance, both during the week and on Sundays, was for relatively more children per capita to attend school in Bury (0.37) than in Rutland (0.22) at the time of the survey (see table 5.1), although more children in Rutland attended subsidised day schools.¹¹⁹ As was explicitly recognized by teachers and officials at the time, when

116. "State of Education in the County of Rutland," pp. 307-10.

117. Manchester Statistical Society, *State of Education in the Borough of Bury*, pp. 25.

118. "State of Education in the County of Rutland," pp. 315.

119. Per capita rates are calculated relative to the reported population in the census of 1831. As the survey was conducted in Bury in 1835 and in Rutland in 1838, the comparison is not exact. However, as Rutland had three additional years of enrolment and population growth, the error would work

children left day school early they often continued for many years to attend reading lessons, both secular and religious in content, at Sunday schools.¹²⁰ According to Laqueur, moreover, the quality of this instruction was relatively high. Sunday-school teachers were particularly enthusiastic volunteers and achieved pupil-teacher ratios ranging from 14.5 to one to as low as 5 to 1 in some non-conformist schools.¹²¹ The regression results suggest that children in these districts were also more likely to enrol in day school in early childhood, which chapter five demonstrated also had relatively low pupil-teacher ratios. Early enrolment and Sunday school attendance can thus be conceived as complementary components in the production of final human capital.

Taking columns (1)-(6) as a whole, then, the regression results suggest districts where early enrolment was predominant did not necessarily suffer human capital deficits. Roger Schofield claimed that signing the marriage register represented an intermediate stage of literacy between learning to read and learning to write largely because fewer grooms signed their names than claimed the ability to read in scattered surveys of adult males.¹²² It does not necessarily follow, however, that writing represented a more advanced stage than reading along some singular path to literacy, particularly if schools existed, such as the dame schools and Sunday schools, that never taught writing.¹²³ It may simply be that learning to write with a pen and ink was not a very common skill. Thus, as in the example of Bury, districts where early enrolment was more common may simply have channelled a larger number of children, girls in particular, into schools that did not teach writing, and this wider exposure to basic education was plausibly reflected in age-heaping statistics.

Columns (7) and (8) report the outcome of the horse race for membership in me-

against the conclusion in the text.

120. Joseph Fletcher, *Parliamentary Papers*, Reports of Commissioners 217, Reports from Assistant Hand-loom Weavers' Commissioners (London, 1840), p. 87; Wilderspin, *The Infant System*, p. 183.

121. Laqueur, *Religion and Respectability: Sunday Schools and Working Class Culture 1780-1850*, pp. 110-1.

122. Schofield, "The Measurement of Literacy in Pre-Industrial England," p. 324.

123. Henderson, 'Expansion of basic education'.

chanics institutes and literary societies. Again, males are counted in part (a) and females in part (b). I use a Poisson regression because many districts had no such societies and the overall mean of the distribution was close to zero. These data come from the ‘List of the literary and scientific institutions’ compiled as part of the 1851 census of education.¹²⁴ The category encapsulates institutions with a wide range of social constituencies, from gentlemen’s societies, possibly enjoying royal patronage, to ephemeral meetings of artisans on topics ranging across politics, science, and the arts, the most famous example of which was the London Corresponding Society.¹²⁵ The results suggest early enrolment was more strongly associated with greater male membership in such societies, and also with greater female membership. For women in particular, this is not because large numbers of women were participating in such societies. Across all districts, the mean number of females in these societies was 21, compared to 226 males. Rather, this likely reflects differences in the exclusivity of membership in such societies, many of which expressly barred female membership. As June Purvis demonstrates, women’s participation in mechanics institutes was part of a complex interaction of cultural attitudes and institutional arrangements. Movement to admit women came from women themselves and the male membership; the institutes’ governing bodies, some of which were relatively democratic and others closed, had to respond. The fees charged to women, the payment structure, whether annual or weekly, the services open to them, and whether classes and lectures were offered in evenings were further margins affecting women’s participation that institutes could alter.¹²⁶ It seems this result is pointing to qualitative differences in the kinds of literary and scientific societies that formed where early enrolment was also prevalent, although this would need to be explored through more detailed local studies.¹²⁷

124. *Parliamentary Papers*, p. 215.

125. Thompson, *The Making of the English Working Class*, pp. 17-25.

126. Purvis, *Hard Lessons: The Lives and Education of Working-Class Women in Nineteenth-Century England*, pp. 99-127.

127. Martyn Walker, “‘Encouragement of Sound Education Amongst the Industrial Classes’: Mechanics’ Institutes and Working-Class Membership, 1838-1881,” *Educational Studies* 39, no. 2 (2013):

Table 6.7: Early enrolment and occupational skill

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS: Hisco 84	OLS: Hisco 84	OLS: Hisclass 6	OLS: Hisclass 6	OLS: Hisclass 7	OLS: Hisclass 7
5 y.o. student	0.0091*** (0.00)	0.0074*** (0.00)	0.0094** (0.00)	0.011*** (0.00)	0.042*** (0.01)	0.038** (0.02)
10 y.o. student	-0.0033 (0.00)	-0.0041* (0.00)	0.0016 (0.00)	0.0012 (0.00)	-0.0027 (0.01)	-0.00091 (0.02)
Inc. Controls		✓		✓		✓
R ²	0.032	0.17	0.020	0.27	0.050	0.18
Observations	600	596	600	596	600	596

Conley standard errors in parentheses. Included controls are farmer to agricultural labourer ratio, a dummy for Wales, logarithm of distance to London, logarithm of distance to Edinburgh, logarithm of distance to Early Modern urban centre, and the Church of England index of attendance.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6.7 repeats the same horse-race exercise using measures of occupational skill. Occupational titles are classed using HISCO and ranked by skill using HISCLASS.¹²⁸ Columns (1) and (2) have as an outcome the per capita number of occupations in a district falling into HISCO sub-group 84, ‘Machinery fitters, machine assemblers and precision-instrument makers (except electrical)’. This category includes various mechanics, watch- and clock-makers, and engineers, corresponding quite neatly with the ‘tinkerers’ that Joel Mokyr has pointed to as instrumental for the progression of technical change in this era.¹²⁹ The prevalence of this group of highly-skilled workers is positively related to five-year-old and negatively related to ten-year-old enrolment. Column (3) has the per capita rate of occupations falling into HISCLASS category 6 as an outcome. This class captures medium-skilled, non-primary manual workers with supervisory responsibilities. In this specification, age-five enrolment is more strongly

pp. 142–55; Ian Inkster, “Science and the Mechanics’ Institutes, 1820-1850: The Case of Sheffield,” *Annals of Science* 32 (1975): pp. 451–74.

128. Leeuwen, Maas, and Miles, *HISCO: Historical International Standards Classification of Occupations*; Marco H. van Leeuwen and Ineke Maas, *Hisclass: A Historical Social Class Scheme* (Leuven: Leuven University Press, 2011).

129. Mokyr, *The Enlightened Economy: An Economic History of Britain 1700-1850*, pp. 116-7; Kelly, Mokyr, and O’ Gráda, “The Mechanics of the Industrial Revolution.”

associated with the prevalence of this group group. Columns (5) and (6) report the results for the per capita rate of occupations in a district falling into HISCLASS category 7. This category also captures medium-skilled, non-primary manual workers, although workers in this category have no supervisory responsibilities. A very similar pattern emerges for this group of workers. Age-five enrolment is positively correlated with the prevalence of skilled labour, while age-ten enrolment is predicted to marginally decrease the prevalence of skilled labour. Across the board, it appears that five-year-old enrolment was a better predictor of the presence of skilled occupations than ten-year-old enrolment.

Finally, I consider the relationship between early enrolment and ‘non-cognitive’ skills. Experimental studies carried out in the late twentieth century found that children exposed to high-quality care in early childhood were less likely to have been arrested, more likely to volunteer their time to charity and community organizations, less likely to have experienced teen pregnancy, more likely to be married and less likely to have divorced.¹³⁰ These effects were found in addition to effects on cognition, academic performance, and adult earnings, and in some cost-benefit analyses, these ‘social’ effects made up the majority of the program’s benefits.¹³¹ Economists have considered such outcomes as evidence that investment in children may produce ‘non-cognitive skills’ in addition to cognitive skills.¹³² Non-cognitive skills have subse-

130. These effects were strongest in the Perry Preschool Project but were found in other studies too. See Michael L. Anderson, “Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects,” *Journal of the American Statistical Association* 103, no. 484 (2008): pp. 1481–95; Schweinhart and Weikart, “The High/Scope Preschool Curriculum Comparison Study Through Age 23”; Chetty et al., “How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project STAR,” pp. 1613; Frances A. Campbell et al., “Adult Outcomes as a Function of an Early Childhood Educational Program: An Abecedarian Project Follow-Up,” *Developmental Psychology* 48, no. 4 (2012): pp. 1033–43; Daniel Schneider, “Lessons Learned from Non-Marriage Experiments,” *The Future of Children* 25, no. 2 (2015): pp. 155–78; James J. Heckman and Ganesh Karapakula, “Intergenerational and Intragenerational Externalities of the Perry Preschool Project,” in *NBER Working Papers*, vol. 25889 (Cambridge, Mass.: National Bureau of Economic Research, 2019), pp. 20-2.

131. James J. Heckman et al., “The Rate of Return to the HighScope Perry Preschool Program,” *Journal of Public Economics* 94, no. 94 (2010): pp. 114–28.

132. Almond and Currie, “Human Capital Development Before Age Five,” p. 1432; James J. Heckman and Tim Kautz, “Fostering and Measuring Skills: Interventions That Improve Character and

Table 6.8: Early enrolment and illegitimacy ratios

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	OLS: IR 1851	OLS: IR 1851	OLS: IR 1881	OLS: IR 1881	OLS: Δ IR 51-61	OLS: Δ IR 51-61	OLS: Δ IR 51-71	OLS: Δ IR 51-71	OLS: Δ IR 51-81	OLS: Δ IR 51-81
5 y.o. student	-3.28** (1.48)	-3.61*** (1.21)	-4.78*** (1.22)	-4.97*** (0.95)	-1.10* (0.66)	-0.53 (0.71)	-1.69** (0.81)	-1.32 (0.92)	-1.50* (0.90)	-1.36 (0.96)
10 y.o. student	-0.29 (1.40)	-1.95* (1.15)	0.94 (1.19)	-0.035 (1.03)	1.91*** (0.65)	1.90*** (0.70)	2.02** (0.85)	2.58*** (0.91)	1.23 (0.94)	1.91** (1.01)
Inc. Controls		✓		✓		✓		✓		✓
R ²	0.030	0.22	0.066	0.26	0.018	0.075	0.015	0.083	0.0073	0.061
Observations	618	612	618	612	618	612	618	612	618	612

Conley standard errors in parentheses. Included controls are farmer to agricultural labourer ratio, a dummy for Wales, logarithm of distance to London, logarithm of distance to Edinburgh, logarithm of distance to Early Modern urban centre, and the Church of England index of attendance.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

quently been measured more directly using psychometric tests, a method that is not available to historians. Moreover, many of the proxies used in earlier studies are also not available for nineteenth-century England and Wales on anything like a nationally representative scale. However, the earlier result with Sunday schools suggests this extensive form of time-volunteering, viewed from the perspective of teacher supply, was more strongly associated with early enrolment and perhaps reflects the accumulation of ‘non-cognitive’ skills. To push a bit further in this direction, I interpret district-level illegitimacy ratios as a crude proxy for other kinds of ‘non-cognitive’ skills, and table 6.8 reports the results of the horse-race exercise using this outcome.

Illegitimacy is the subject of an extensive historiography. The illegitimacy ratio, i.e., the ratio of illegitimate births to legitimate births, rose rapidly over the course of the eighteenth century, reaching a peak at the middle of the nineteenth century before falling rapidly.¹³³ The fall in illegitimacy thus preceded by a few decades the ‘fertility transition’, i.e., the sustained fall in marital fertility, which is usually dated to the 1870s.¹³⁴ There is no consensus view on the causes of the initial rise in illegitimacy or of its subsequent decline.¹³⁵ Broadly, however, historians’ arguments emphasise either cultural or economic causes. Cultural explanations highlight changing attitudes toward unmarried sex and the strength of community censure.¹³⁶ Demographic explanations highlight the interaction between couples’ economic fortunes, age at marriage,

Cognition,” in *NBER Working Papers*, vol. 19656 (Cambridge, Mass.: National Bureau of Economic Research, 2013).

133. Peter Laslett, “Introduction: Comparing Illegitimacy Over Time and Between Countries,” in *Bastardy and Its Comparative History*, ed. Karla Oveenoster and Richard M. Smith (London: Edward Arnold, 1980), pp. 12-26.

134. Edward Shorter, John Knodel, and Etienne Van De Walle, “The Decline of Non-Marital Fertility in Europe, 1880-1940,” *Population Studies* 25, no. 3 (1971): p. 378; Robert Woods, *The Demography of Victorian England and Wales* (Cambridge: Cambridge University Press, 2000), pp. 110-11.

135. For a review of the literature, see Alysa Levene, Thomas Nutt, and Samantha Williams, eds., *Illegitimacy in Britain, 1700-1920* (Houndmills, Basingstoke, Hampshire: Palgrave Macmillan, 2005), pp. 8-10.

136. Barry Reay, “Sexuality in Nineteenth-Century England: The Social Context of Illegitimacy in Rural Kent,” *Rural History* 1, no. 2 (1990): pp. 219-47.

and courtship.¹³⁷ Early marriage in response to higher earnings is thought to increase the intensity of courtship and consequently the size of the population at risk of failed courtship.¹³⁸ In another strand of the literature, failed courtship is precipitated by economic precarity.¹³⁹ As Emma Griffin points out, the economics of such models are awkwardly made to do two things at once: higher earnings should both increase the likelihood of courtship and reduce the likelihood of its failure.¹⁴⁰

A leading explanation for the decline in illegitimacy considers it as a subset of the fertility-limitation behaviour implied by the demographic transition.¹⁴¹ This is unsatisfactory for at least two reasons. First, as mentioned, illegitimacy ratios in England and Wales began to decline two decades before marital fertility, and this lag is not explained. Moreover, this experience was not universal, with some countries experiencing a sustained decline in marital fertility long before any decline in illegitimate fertility.¹⁴² Because fertility limitation was achieved through behavioural forms of contraception that had always been available to couples, i.e., abstinence and *coitus interruptus*, it is not clear why fertility limitation before marriage should have become more common in the second half of the nineteenth century.¹⁴³ Second, there is no consensus on the causes of the fertility transition itself so this concept can add little to explanations of declining illegitimacy.¹⁴⁴ Perhaps the fairest summary of this literature is to say that illegitimacy is a complex, multi-causal phenomenon.

137. Laslett, "Introduction: Comparing Illegitimacy Over Time and Between Countries."

138. Laslett, "Introduction: Comparing Illegitimacy Over Time and Between Countries," pp. 53-65; N.F.R. Crafts, "Illegitimacy in England and Wales in 1911," *Population Studies* 36, no. 2 (1982): pp. 327-31.

139. Wally Secombe, *Weathering the Storm: Working-Class Families from the Industrial Revolution to the Fertility Decline* (London: Verso, 1993), pp. 49-54; Tilly and Scott, *Women, Work, and Family*, pp. 97-8, 103.

140. Emma Griffin, "Sex, Illegitimacy and Social Change in Industrializing Britain," *Social History* 38, no. 2 (2013): p. 142-3.

141. Woods, *The Demography of Victorian England and Wales*, pp. 140-3; Shorter, Knodel, and Van De Walle, "The Decline of Non-Marital Fertility in Europe, 1880-1940," p. 382.

142. Shorter, Knodel, and Van De Walle, "The Decline of Non-Marital Fertility in Europe, 1880-1940," pp. 377-8.

143. *Ibid.*, pp. 392-3.

144. Timothy W. Guinnane, "The Historical Fertility Transition: A Guide for Economists," *Journal of Economic Literature* 49, no. 3 (2011): 589-614.

Tentatively, I advance the hypothesis that changes in the illegitimacy ratio at this time in part reflected individual responses to the risks associated with pre-marital sex.¹⁴⁵ In line with the emphasis of the new human capital literature on re-conceiving traits once thought to be innate, I propose that early education possibly altered individual responses to these risks by imparting non-cognitive skills.¹⁴⁶ I have in mind such ‘skills’ as the weighing of long-term costs against short-term rewards, so-called ‘time preference’, social and interpersonal negotiation skills, and concern for the well-being of others. Although attitudes towards illegitimacy undoubtedly varied, there were nonetheless significant reputational and financial costs to bearing children out of wedlock throughout the nineteenth century.¹⁴⁷ Apart from an interlude between 1834-44 during which this aspect of the old poor law was reformed and subsequently reinstated, fathers were legally obliged to pay maintenance of their illegitimate children.¹⁴⁸ Further, although not all illegitimate children were raised in female-headed households, they often were, and as Horrell, Humphries, and Weisdorf have emphasized, absent or unreliable fathers imposed significant costs on mothers and their offspring.¹⁴⁹ Non-cognitive skills may have altered how sexual partners perceived such costs and how they negotiated conflict arising from them.

The outcomes reported in table 6.8 suggest that early enrolment was associated with lower levels of illegitimacy and faster declines in the illegitimacy ratio over the

145. Economists have made similar arguments. See Greenwood, Guner, and Vandenbroucke, “Family Economics Writ Large,” pp. 1393-6.

146. For an important article in this literature making this point, see Cunha and Heckman, “The Technology of Skill Formation.”

147. Griffin, “Sex, Illegitimacy and Social Change in Industrializing Britain”; Leonore Davidoff et al., *The Family Story: Blood, Contract and Intimacy 1830-1960* (London: Longman, 1999), pp. 251-5.

148. Thomas Nutt, “Illegitimacy, Paternal Financial Responsibility, and the 1834 Poor Law Commission Report: The Myth of the Old Poor Law and the Making of the New,” *Economic History Review* 63, no. 2 (2010): pp. 335–61.

149. Horrell, Humphries, and Weisdorf, “Beyond the Male Breadwinner: Life-Cycle Living Standards of Intact and Disrupted English Working Families, 1260-1850”; Sara Horrell, Jane Humphries, and Hans-Joachim Voth, “Stature and Relative Deprivation: Fatherless Children in Early Industrial Britain,” *Continuity and Change* 13, no. 1 (1998): pp. 73–115; Jane Humphries, “Female-Headed Households in Early Industrial Britain: The Vanguard of the Proletariat?,” *Labour History Review* 63, no. 1 (1998): pp. 31–65.

second half of the nineteenth century. Age-ten enrolment, by contrast, was generally associated rising rates of illegitimacy. Columns (1) and (2) report the association between early enrolment and the illegitimacy ratio in 1851, with the addition of controls strengthening the predicted association in column (2). Columns (3) and (4) report the same association for 1881, after the demographic transition was underway. Early school attendance was even more strongly associated with lower illegitimacy in 1881, while the predicted marginal effect of age-ten enrolment was inconsistent and insignificant. Columns (5) and (6) report the relationship between the change in the illegitimacy ratio between 1851 and 1861 and age-five and age-ten enrolment. Age-five enrolment in 1851 predicts a reduction in the illegitimacy ratio in that district between 1851 and 1861, but the addition of controls in column (6) reduces the size of the effect, which becomes statistically insignificant. Columns (7) and (8) and columns (9) and (10) tell much the same story for the periods 1851-71 and 1851-81 respectively, although the strength of the association seems to have been growing over time. In contrast, the illegitimacy ratio seems to have been rising where age-ten enrolment was predominant.

The wider context in which early enrolment was embedded does not suggest the existence of significant human capital deficits. In fact, places where early enrolment predominated over later enrolment were associated with indicators of greater human capital in many cases. Although it is not possible to interpret these associations as causal, they are nonetheless compelling. It is hard to accept on this evidence that early enrolment was actively harmful for children in this period, as the literature has tended to suggest.¹⁵⁰ Rather, where early enrolment was common, children appear to have gone on to acquire general human capital, industrial skills, and non-cognitive skills. A tentative explanation for this finding is offered in the conclusion.

150. Rose, *The Intellectual Life of the British Working Classes*, p. 152; Mitch, *The Rise of Popular Literacy in Victorian England: The Influence of Private Choice and Public Policy*, pp. 142-6.

6.5 Conclusion

To return to the example of David Winstanley's school in Miles Platting, the geographical analysis above suggests his school attracted so many young children because Miles Platting was connected to Manchester's large cotton textile industry. A survey of the neighbourhood in 1837 counted 58 per cent of household heads employed as hand-loom weavers and reported evidence of low wages and persistent underemployment consistent with an overall decline in hand-loom weaving at this time.¹⁵¹ Faced with low male earnings, these households apparently deployed additional members' time to paid employment. Winstanley himself reported that 90 per cent of wives were employed at home winding bobbins, while the remaining 10 per cent worked in the factories. Their elder children, however, were more likely to work in the factories. Nineteen per cent of children not 'too young to work' worked in the factories and 41 per cent worked either at the hand-loom or winding bobbins.¹⁵² Time household members would otherwise have spent caring for young children was now spent earning a wage, and substitutes for their time were sought on the market. The service Winstanley offered bundled childcare with education in response, as his school came to accept younger children.¹⁵³ The geographical analysis suggests this pattern was general; schools likely faced similar demands throughout the industrial districts of England and Wales and responded in like manner.

In contrast, I was unable to identify any demand for early education in agriculture. While pastoral districts may at one time have been sites of elevated household labour force participation relative to arable, the loss of hand-spinning and other handicrafts represented a dramatic change of circumstances. By 1851, I am unable to identify

151. James Heywood, "Report of an Enquiry, Conducted from House to House, Into the State of 176 Families in Miles Platting, Within the Borough of Manchester, in 1837," *Journal of the Statistical Society of London* 1, no. 1 (1838): 34–6.

152. Winstanley, *Schoolmaster's notebook*, pp. 73–4.

153. *Ibid.*, p. 30.

any significant difference in the demand for early school attendance across agricultural regimes. Where handicrafts survived and continued to employ large numbers of women and children, as in straw plaiting at mid-century, I identify greater demand for early school enrolment, although the evidence is somewhat fragile.

Setting these findings within wider historical narratives suggests demand for early education likely rose steadily over the eighteenth and nineteenth centuries, which agrees with the trends in early enrolment identified in earlier chapters. Higher household wages in outworking relative to men's income could induce greater household labour supply and hence a greater demand for child care, as even domestic work was not perfectly compatible with child care. This provides an explanation for the pattern of younger school enrolment in London between 1760 and 1830 in chapter four. Although I was unable to find direct evidence of the effects of hand-spinning or hand-loom weaving on early enrolment, and further work is necessary to explore the extent to which these important industries were complementary to child care or not, if they were at all like straw plaiting, similar incentives likely operated here. Recent estimates suggest hand-spinning employed significant numbers of women and children. Craig Muldrew provides a large estimate of 1,500,000 women employed in spinning by 1770, or roughly 75 per cent of women older than 14, while Benjamin Schneider provides a lower estimate of around 800,000 employed by 1770.¹⁵⁴ As machine-spinning replaced hand-spinning, it also became more geographically concentrated in the northern industrial counties of Lancashire and West Yorkshire.¹⁵⁵ Likely, this spatial concentration accompanied an intensification of the demand for extra-familial childcare as work divorced from domestic settings, particularly after

154. Craig Muldrew, "'Th'ancient Distaff' and 'Whirling Spindle': Measuring the Contribution of Spinning to Household Earnings and the National Economy in England, 1550-1770," *Economic History Review* 65, no. 2 (2012): p. 520; Benjamin Schneider, "Technological Unemployment in the British Industrial Revolution: The Destruction of Hand Spinning," in *Oxford Economic and Social History Working Papers*, vol. 207 (Oxford: University of Oxford, 2023), p. 16.

155. Keith Sugden et al., "Adam Smith Revisited: The Relationship Between the English Woollen Manufacture and the Availability of Coal Before the Use of Steam Power," *Continuity and Change* 38 (2023): pp. 163-91.

the spinning jenny was adopted to the factory to accommodate growing numbers of spindles toward the end of the eighteenth century.¹⁵⁶ A later transition from the hand-loom to the power-loom may have had a similar effect of spatially concentrating work and creating greater demand for child care by relocating ‘household’ labour out of the home.¹⁵⁷ The previous chapter demonstrated that under-five enrolment was rapidly growing, particularly in Lancashire, in the mid 1830s. At the macroeconomic level, this was a period of accelerated capital deepening and wider diffusion of steam power.¹⁵⁸ Economic theory suggests that more capital-intensive production techniques incur greater disciplinary and supervisory effort, which historically involved bringing production into factories and workshops.¹⁵⁹ Even holdouts like Birmingham’s metal industry, once a ‘democracy of small producers’, and Coventry’s silk ribbon industry, despite experimentation with weavers’ cottages constructed around a common steam engine, yielded to large-scale production as the nineteenth century wore on.¹⁶⁰ The unwinding of domestic industry and the concentration of work in factories likely further ratcheted-up the demand for early education, where such factories existed, from about the second quarter of the nineteenth century. As demonstrated, industrial districts, particularly those dependent on coal, exhibited a strong demand for early school enrolment in the analysis.

At the same time, early education was integrated into complementary systems of

156. Maxine Berg, “On the Origins of Capitalist Hierarchy,” in *Power and Economic Institutions: Reinterpretations in Economic History*, ed. Bo Gustafsson (Aldershot: Edward Elgar, 1991), pp. 185-7; Peter Maw et al., “After the Great Inventions: Technological Change in UK Cotton Spinning, 1780-1835,” *Economic History Review* 75, no. 1 (2022): pp. 38-43; Honeyman, *Child Workers in England, 1780-1820: Parish Apprentices and the Making of the Early Industrial Labour Force*, p. 12.

157. John S. Lyons, “The Lancashire Cotton Industry and the Introduction of the Powerloom, 1815-1850” (Ph. D. Thesis, University of California, Berkeley, 1977), pp. 20-53.

158. C. H. Feinstein, “Capital Accumulation and the Industrial Revolution,” in *The Economic History of Britain Since 1700*, 1st ed., ed. Roderick Floud and Deirdre McCloskey, vol. 1 (Cambridge: Cambridge University Press, 1981), pp. 128-142; Crafts, “Steam as a General Purpose Technology: A Growth Accounting Perspective.”

159. Gregory Clark, “Factory Discipline,” *Journal of Economic History* 54, no. 1 (1994): pp. 128-63.

160. Maxine Berg, “Small Producer Capitalism in Eighteenth-Century England,” *Business History* 35, no. 1 (1993): pp. 17-39; J Prest, *The Industrial Revolution in Coventry* (Oxford, 1960), pp. 113-34.

social reproduction that appear to have fostered human capital accumulation more effectively than schools catering to older children. Although these effects can not be interpreted causally, one way to make sense of them is to consider the likely population affected by either kind of school. Both in theory and in practice, education subsidies can make inequality worse if households with more resources are better placed to take advantage of subsidised education.¹⁶¹ I have demonstrated above that older children tended to be enrolled in some kind of subsidised school (figure 6.3). Children from households with greater earnings were under less pressure to work and were thus better able to take advantage of these opportunities. In contrast, the argument I have advanced throughout the thesis suggests that early enrolment and the human capital it engendered was essentially an externality arising from poverty. Where the main earner's income was low and household labour supply consequently high, young children attended school as a form of child care. These constraints were more likely to affect poor children, and any unintended benefits were more likely to accrue to them as well. Thus areas where early enrolment was prevalent may have had what amounted to a more progressive system of human capital investment. This suggestion remains speculative, but it is at least consistent with the evidence from age-heaping and signatures above, which suggested early enrolment was associated with a shallow but more widespread distribution of human capital. From this wider base, children accumulated complementary skills, including possible non-cognitive skills, later in the life-cycle. Early education was thus a key component of social reproduction during the industrial revolution.

161. Cunha et al., "Interpreting the Evidence on Life Cycle Skill Formation," pp. 745-50.

Appendix: definition of included variables

Census Digitized version of the 1851 census for England and Wales available from Minnesota Population Center, *Integrated Public Use Microdata Series, International: Version 7.2 [dataset]*, Minneapolis, MN: IPUMS, 2019

Maps Historical registration district boundaries from Satchell, A., Kitson, P., Newton, G., Shaw-Taylor, L., Wrigley, E., *1851 England and Wales Census Parishes, Townships and Places. [data Collection]*, UK Data Service. SN: 852232

Five-year-old enrolment Proportion of five-year-old children returned as ‘scholars’ in a district.

HISCO The IPUMS digitized census dataset has pre-coded occupational returns to HISCO.

HISCLASS I convert HISCO codes to HISCLASS using the cross-walk provided in Marco H. van Leeuwen and Ineke Maas, *Hisclass: A Historical Social Class Scheme* (Leuven: Leuven University Press, 2011).

Industrial employment Sum of individuals returned as following an industrial occupation in a district divided by population. Industrial occupations defined as all occupations classified into HISCO groups 7, 8, and 9, collectively defined as ‘production and related workers, transport equipment operators and labourers’, minus HISCO sub-group 99, ‘workers not elsewhere classified’, which includes common labourers, but including HISCO code 99930, ‘factory workers’.

Miners, quarrymen, etc. Sum of individuals returned as following an occupation classified into HISCO sub-group 71 divided by population.

Metal processors Sum of individuals returned as following an occupation classified into HISCO sub-group 72 divided by population.

1851 population Sum of individuals within a registration district according to the census returns divided by population.

Rural inequality The ratio of farmers to agricultural labourers in occupational data has been understood as a proxy for rural inequality.¹⁶² I calculate this ratio from CAMPOP's occupational data for 1817. P.M. Kitson Shaw-Taylor L. and E.A. Wrigley, *1813-20 Parish Register Occupational Data for England and Wales*, 2006

Rain & temperature Mean rainfall data for 1862 and mean yearly temperature data for 1884 taken from Met Office; Hollis, D.; McCarthy, M.; Kendon, M.; Legg, T.; Simpson, I., *HadUK-Grid Gridded Climate Observations on a 1km Grid Over the UK, V1.0.2.1 (1862-2019)*, Centre for Environmental Data Analysis, 21 October 2020, 2020.

Distance to coast Logarithm of distance to nearest tidal water in meters.

Elevation Mean elevation of registration district from Ordnance Survey (GB), *OS Terrain 50 [ASC Geospatial Data]*, EDINA Digimap Ordnance Survey Service, 2020

Wales Dummy variable equal to one if a district belonged to a Welsh 1851 registration county.

Distance to London Natural logarithm of the distance between a registration district centroid and the Tower of London.

Distance to Edinburgh Natural logarithm of the distance between a registration district centroid and Holyrood Palace.

162. See Gray and Clark, "Geography Is Not Destiny: Geography, Institutions and Literacy in England, 1837-1863," p. 1045.

1700 Urban Distance The natural logarithm of distance from the district centroid to the nearest town with a population greater than 5,000 in the late seventeenth-century poll tax, digitized in Bennett, R. J., *Urban Population Database, 1801-1911. [data Collection]*, Robson, B., University of Manchester, Department of Geography. SN: 7154.

Number of railway stations The number of railway stations in a district is taken from Henneberg, J., Satchell, M., You, X., Shaw-Taylor, L., Wrigley, E. A., *1851 England, Wales and Scotland Railway Stations Shapefile*, UK Data Service. SN:852994, 2017

Church of England index of attendances The data underlying K. D. M. Snell and Paul S. Ell, *Rival Jerusalems: The Geography of Victorian Religion* (Cambridge: Cambridge UP, 2004) was generously shared by the authors.

Ten-year-old enrolment Proportion of ten-year-old children returned as ‘scholars’ in a district.

Coal fields The location of coal-containing rock strata is taken from British Geological Survey, *BGS Geology 625K [geospatial Data]*, 2020.

Hydrological catchments Spatial data on hydrological catchments from Kral, F., Fry, M., and Dixon, H., *Integrated Hydrological Units of the United Kingdom: Catchments*, NERC Environmental Information Data Centre, <https://doi.org/10.5285/10d419c8-8f65-4b85-a78a-3d6e0485fa1f>, 2015

Arable to pasture ratio This variable is derived from a digitized version of the tithe surveys, available at Kain, R. J. P., *Atlas of Agriculture in England and Wales, C.1840 [computer File]*, UK Data Service. SN: 1659, 1981. I first geocoded each parish using the digital map described above. Then I calculated the ratio of the number of arable acres to pastoral acres in each parish. I used

an inverse-distance interpolation algorithm to interpolate between parishes that did not make a return and took the average value for each registration district.

Heavy clays The tithe surveys ask about soil-type. I assign a value of 1 to parishes that describe ‘heavy clays’ and use the same inverse-distance interpolation algorithm as above to get the average incidence of heavy clays in a district.

Wheat yield I use the same inverse-distance interpolation algorithm as above to get the average reported wheat yield in a district.

Straw plait employment HISCO does not have a category specifically for straw plaiters, which it classifies under ‘other basketry weavers and brush makers’. Instead I rely on the I-CeM occupational coding scheme, in which straw plaiters are occupational group 645. This variable is the sum of straw plaiters divided by population.

Chalk overlap Location of chalk-containing subsoil taken from British Geological Survey, *BGS Geology 625K [geospatial Data]*, 2020

Age heaping I calculate $1 - ABCC$ for each registration district using the method described in Brian A’Hearn, Dorothee Crayen, and Jörg Baten, “Quantifying Quantitative Literacy: Age Heaping and the History of Human Capital,” *Journal of Economic History* 69, no. 3 (2009): 783–808. Taking the complement gives the proportion of the population who misreport their age.

Signatures Data on the proportion of brides and grooms who fail to sign the marriage register are available in W.B. Stephens, *Education, Literacy and Society, 1830-70: The Geography of Diversity in Provincial England* (Manchester: Manchester UP, 1987) at the registration-district level. He does not include most districts in Wales or London.

Sunday school enrolment Sunday school enrolment data from the 1851 census of education has been digitized by www.visionsofbritain.org.uk and generously shared, Southall, Humphrey, *Great Britain Historical GIS Project: Education*, University of Portsmouth, 2022.

Literary society The number of members of literary societies and mechanics' institutes taken from *Parliamentary Papers*, Command Paper 1692, Census of Great Britain, 1851 Education: Report and tables (London, 1852).

Illegitimacy ratios Illegitimacy ratios taken from Reid, A. M., Arulanantham, S. J., Day, J. D., Garrett, E. M., Jaadla, H., Lucas-Smith, M., *Populations Past: Atlas of Victorian and Edwardian Population*, 2018.

Chapter 7

Compulsion, comparisons, and conclusions

The 1870 Elementary Education Act introduced the principle of compulsory education to England and Wales, and although compulsion did not apply universally, it established much of the framework within which later compulsory schooling laws were developed.¹ Parliamentary debate surrounding school-entry and school-leaving ages enshrined in this law reveal much about prevailing attitudes towards the proper school-entry age. In the end, M.P.s empowered school boards to enforce compulsory school-entry from the age of five. This made Britain's educational policy an outlier among other nineteenth-century compulsory school acts, which more commonly adopted a school-entry age of six or seven, although the debate revealed that M.P.s largely intended to codify existing practice. The introduction of compulsory schooling was thus illustrative of how educational provision had developed in the preceding century and what had set Britain apart, placing it on a trajectory to enshrine compulsory early education in law. On the other hand, these acts, and particularly the Education Act of 1876, fundamentally altered how early childhood education was delivered in Britain, as dame and common schools became effectively illegal and the

1. David Mitch, "The Elementary Education Act of 1870: Landmark or Transition?," in *School Acts and the Rise of Mass Schooling: Education Policy in the Long Nineteenth Century*, ed. Johannes Westberg, Lukas Boser, and Ingrid Brühwiler (Cham, Switzerland: Palgrave Macmillan, 2019), pp. 301–24.

‘babies’ and infants departments of public schools instead catered to children of this age group.² The school acts thus cleared away earlier institutions for early childhood education in Britain but were shaped in response to many of the same underlying needs.

When William Forster, the architect of the 1870 act, introduced the bill in parliament he held no strong opinion on the statutory school-entry age and was prepared to accept amendments on this point.³ The Member for Lincolnshire South raised the first objection to the age clause, arguing that the proposed school-leaving age of 13 was too late because, at that age, ‘those earnings could not possibly be spared.’⁴ The issue of child labour and school-leaving age was, for many, the more pressing issue.⁵ Forster placated these concerns by tabling an amendment to allow local school boards discretion over compulsory school-entry and school-leaving age, within the limits set by the law, which they could adapt to local labour-market conditions and the prevalence of child labour.⁶ With this issue resolved, debate turned to the proposed school-entry age of five, which a group of M.P.s felt was ‘too tender’ an age for compulsion despite allowance for local discretion.⁷ Forster wavered and stated he was prepared to accept six, while another group of M.P.s argued that the experience of the infant schools had shown that young children could be advantageously enrolled at school and would be kept from greater harm at home, or as one M.P. uncharitably put it, the ‘gutter’.⁸ Others argued that early school-entry would be necessary to make up for an early school-leaving age if children were to learn anything to a sufficient

2. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 203-5; Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 42-4.

3. Szeleter, “The Origins of Full-Time Compulsory Education at Five,” pp. 19-20.

4. United Kingdom, *Hansard Parliamentary Debates*, vol. 203, 3rd (1870), col. 54.

5. Béatrice Robic, “‘Where Are the Children?’: The Long Decline of Child Labour in England and Wales (1870-1914)” (Ph. D. Thesis, Université Sorbonne, 2022), p. 459.

6. United Kingdom, *Hansard Parliamentary Debates*, col. 56.

7. *Ibid.*

8. *Ibid.*, cols. 57-8.

standard.⁹ Debate was shut down by Benjamin Disraeli, Leader of the Opposition, who ‘hoped the Committee would not divide’ over the issue and gave his support to the Government proposal. The amendment to change the school-entry age was dropped, after a relatively short debate in the Commons.¹⁰

Debate continued two weeks later in the Lords, where many of the same arguments were restated. The Marquess of Salisbury, for instance, argued:

it was the height of absurdity to require children five years old to go to school. For himself he should never dream of educating a child of that age. It might be desirable to keep them out of mischief; but he begged his noble Friend to alter the limit of age from five to seven years.¹¹

The Earl of Shaftesbury, in response, gave the fullest consideration to the issue and introduced an amendment. Shaftesbury, who was involved in factory reform and president of the London Ragged School Union, had apparently given much thought to the issue of working-class education.¹² He began by stating that the question of selecting a compulsory school-entry and school-leaving age was ‘tentative and experimental’ so their goal should be ‘to take from it all that might be alarming’.¹³ He proposed a school-entry age of four and a school-leaving age of ten, explaining:

Now, in the London ragged schools there was a vast number of children not much more than two years old. They were not subjected to teaching, but they were brought by older children, were taught habits of order and regularity, and went through some few motions of physical exercise. Now, if the little girls of six years of age were taken to school, who, when the

9. United Kingdom, *Hansard Parliamentary Debates*, col. 58.

10. *Ibid.*, col. 59.

11. *Ibid.*, col. 1187.

12. Schupf, “Education for the Neglected: Ragged Schools in Nineteenth-Century England,” p. 166.

13. United Kingdom, *Hansard Parliamentary Debates*, col. 1187.

mother went out charing—and go she must in many cases—would take care of the younger ones?¹⁴

In other words, Shaftesbury justified earlier school enrollment by considering the need to balance labour supply against child care faced by many households. He continued, arguing that earlier compulsory enrollment at school would protect children from ‘The neglect, the dirt, and danger in which these little things passed their lives’ and from having to work at too young an age, usually within the home and outside the purview of the Factory Acts.¹⁵ Children of ten, he said, could begin to earn a wage on the labour market, and parents could not be asked to forgo these earnings. His proposed amendment, he argued, ‘would be the means, while securing the education which was required, of leaving them [families] the services of their children’.¹⁶ The amendment was ultimately negatived, although the Lords who spoke on it in response objected primarily to the earlier school-leaving age and the general principle of compulsion in education, not the proposed school-entry age of four.¹⁷

As R. Szezter argues, given Forster’s initial indecisiveness, ‘the starting age of 5 was acquiesced in largely as an accidental result of the exigencies of Parliamentary procedure and of general unconcern, particularly Disraeli’s’.¹⁸ Among those who were concerned, for instance, the Earl of Shaftesbury, an earlier school-entry age seemed more suited to working-class patterns of school enrollment and consequently less likely to raise popular opposition. Shaftesbury understood that parents used schools as a form of child care, and early education allowed carers to work. If elder siblings were compelled to attend school, their care would be lost to the household, and mothers would struggle to both provide child care and contribute to household budgets. The solution, as he saw it, was to provide places for very young children. Earlier chapters

14. United Kingdom, *Hansard Parliamentary Debates*, col. 1187.

15. *Ibid.*

16. *Ibid.*, col. 1188.

17. *Ibid.*, cols. 1188-90.

18. Szezter, “The Origins of Full-Time Compulsory Education at Five,” p. 21.

Table 7.1: Compulsory school-entry age in various jurisdictions

State	Date	Age	Details
Austria	1774	6	Compulsory education, not necessarily at school
Prussia	1794	6	-
Swiss Confederacy	1803-32	7	Vaud and Solothurn Cantons
Netherlands	1900	7	-
Denmark	1814	6 or 7	-
France	1882	6	-
Sweden	1842	9	School-entry age poorly defined in the act
Sweden	1882	7	School-entry age more clearly defined
Italy	1859	6	-
Canada	1871-83	7	Ontario, B.C., N.S.
Canada	1877	8	P.E.I.
Canada	1905	6 or 7	N.B.
United States	1880-1920	7	AR, DE, FL, IA, KY, LA, MS, NM, RI, WI, WY
United States	1880-1919	8	Al, AZ, CA, CO, CT, DC, GA, ID, IL, IN, KS, MD, MA, MI, MN, MO, MT, NE, NV, NH, NJ, NY, NC, OH, OK, OR, PA, SC, TN, TX, VT, VA, WV
United States	1880	9	ME
United States	1883-90	10	ND, SD, UT
Argentina	1884	6	-
New Zealand	1887	7	-

Source: Johannes Westberg, Lukas Boser, and Ingrid Brühwiler, eds., *School Acts and the Rise of Mass Schooling: Education Policy in the Long Nineteenth Century* (Cham, Switzerland: Palgrave Macmillan, 2019), pp. 17, 75-6, 108, 125, 156, 206, 231; *Allgemeines Landrecht für die Preußischen Staaten*, 1794, para. 43,

https://opiniojuris.de/quelle/1623#Zwoelfter_Titel._Von_niedern_und_hoehern_Schulen

Philip Oreopoulos, “Canadian Compulsory School Laws and Their Impact on Educational Attainment and Future Earnings,” in *Analytical Studies Branch Research Papers*, vol. 11F0019 No. 251 (Ottawa: Statistics Canada, 2005), pp. 7-12; Karen Clay, Jeff Lingwall, and Melvin Stephens Jr., “Laws, Educational Outcomes, and Returns to Schooling: Evidence from the First Wave of US State Compulsory Attendance Laws,” *Labour Economics* 68 (2021): n.p., data appendix; Stanley L. Engerman, Kenneth L. Sokoloff, and Elisa V. Mariscal, “The Evolution of Schooling: 1800-1925,” in *Economic Development in the Americas Since 1500: Endowments and Institutions* (Cambridge: Cambridge University Press, 2012), pp. 121–167, p. 137; New Zealand National Commission for Unesco, *Compulsory Education in New Zealand*, 2nd (Paris: United Nations, 1972), p. 22.

have demonstrated that working-class households had in fact worked out this same solution much earlier. When school boards adopted compulsory laws, they ‘virtually

all' followed the proposed school-entry age of five because no one involved found it objectionable.¹⁹ This settlement, however, made Britain's policy an international outlier. Other early compulsory school acts had more commonly resolved upon school-entry at six, seven, or eight (table 7.1). As late as 1961, Britain's policy was an outlier among 168 countries surveyed by UNESCO.²⁰

Britain's school-entry policy was unusual, even relative to countries with which it had significant political and cultural ties. New Zealand's Education Act of 1877, for instance, contained many identical provisions to Britain's act, including the system of national grants to local school boards in whom the power to impose compulsion was vested, yet it differed in having a school-entry age of seven.²¹ Other states' school-entry policies may have been decided for a variety of ideological, social, or economic reasons, but Britain's policy was essentially pragmatic. Working-class families had, for at least a century, relied on schools to deliver both care and education during early childhood. More detailed studies of other individual countries may reveal differences in economic and cultural contexts that led them to adopt later school-entry.

While dame schools had long provided this service in Britain, however, a further reform in 1876, Sandon's Law, in effect rendered them illegal.²² The act strengthened language around compulsion and mandated that children attend 'certified efficient' schools.²³ Both in law and in practice, this excluded dame schools. The 1876 Elementary Education Act provided the following definition:

The term "certified efficient school" in this Act means a public elementary school, and any workhouse school certified to be efficient by the Local Government Board, and any public or state-aided elementary school

19. Szreter, "The Origins of Full-Time Compulsory Education at Five," p. 23.

20. UNESCO, *Basic Facts and Figures 1961*, (Paris, 1962), p. 180 qtd. in *ibid.*, p. 16.

21. New Zealand National Commission for Unesco, *Compulsory Education in New Zealand*, 2nd (Paris: United Nations, 1972), pp. 20-4.

22. Gardner, *The Lost Elementary Schools of Victorian England*, pp. 204-7.

23. Curtis and Boulwood, *An Introductory History of English Education Since 1800*, p. 77; Gardner, *The Lost Elementary Schools of Victorian England*, p. 204.

in Scotland, and any national school in Ireland, and also any elementary school which is not conducted for private profit, and is open at all reasonable times to the inspection of Her Majesty's Inspectors, and requires the like attendance from its scholars as is required in a public elementary school, and keeps such registers of those attendances as may be for the time being required by the Education Department, and is certified by the Education Department to be an efficient school.²⁴

This definition expressly excluded private schools while carving out space for endowed and charity schools.²⁵ In fact, in debates, one M.P. raised the possibility of striking 'not conducted for private profit', which would have allowed private schools, including, in theory, dame schools, to be certified 'efficient' if they met a certain standard of quality.²⁶ Sandon replied that 'it would be impossible to undertake the inspection of all private venture schools', a problem of long standing, and the section passed without further comment.²⁷

Dame schools largely ceased operating in the ensuing decades.²⁸ This can be observed by subtracting the number of children under five known to be enrolled in an inspected school from the total number of children aged under five returned as 'scholars' in the enumerators' books and tracking the pattern over time (table 7.2). Schools in receipt of a government grant were inspected yearly, and while various schools did not receive grants, among this group it was predominantly the dame schools who catered to children under five. While under-fives in inspected schools were likely attending infant classes, the remainder of students counted in the census and not accounted for by the inspectors were likely attending a dame school of some kind. The census asked

24. Elementary Education Act, 1876, 39 & 40 Vict. 1, c. 79

25. Gardner, *The Lost Elementary Schools of Victorian England*, p. 231.

26. United Kingdom, *Hansard Parliamentary Debates*, vol. 230, 3rd (1876), col. 1514.

27. *Ibid.*

28. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, p. 42.

household heads to describe their children's occupation as 'scholar' if they were 'daily attending school' or receiving instruction at home, and the instructions were comparable in census years between 1861 and 1881.²⁹ In contrast, the data from inspected schools reflect the number of children aged under five and present at their school's yearly inspection, which could occur at different dates throughout the year. Although the two datasets are therefore not strictly comparable, the trend is nonetheless clear. Around the middle of the nineteenth century, the proportion of students under five who could be accounted for through attendance at inspected schools was small, less than a third, but the number of under-fives in inspected schools grew in the 1860s and 1870s, implying the residual enrolled in dame schools shrank.³⁰ However, this was only a reallocation between schools. Over this same period, the under-five enrollment rate at all schools did not increase. The demand for early education thus appears to have remained fairly constant through the introduction of compulsory education, the change being essentially a qualitative shift away from dame schools.

In a sense, then, compulsory schooling inaugurated a new system of early childhood education in Britain. The infant and babies classes provided care for young children, much as the dames had, but the experience was qualitatively different. Despite a growing acceptance of progressive pedagogical methods through the influence of the middle-class kindergarten movement, Whitbread emphasizes the difficulties of implementing object lessons and self-directed play in the prevailing conditions of the late nineteenth-century public school, where pupil-teacher ratios were still as high as 80 in some infant classes.³¹ The potential effect of these qualitative differences requires a separate, more detailed analysis not attempted here. Instead, I reflect back on what the earlier system had achieved and situate this within a wider theoretical

29. Higgs, *Making Sense of the Census: The Manuscript Returns for England and Wales, 1801-1901*, p. 83.

30. See also Robic, "Where are the children?," pp. 362-3.

31. Whitbread, *The Evolution of Nursery-Infant School: A History of Infant and Nursery Education in Britain, 1800-1970*, pp. 44-50.

Table 7.2: Changing provision for under-fives, 1861-1881

Year	Pop. <5	Census		C. of Council	
		Scholars <5	Enrol. Rate	Inspected <5	% Census
1860-1	2,606,113	440,696	17	123,144 ^a	28
1865-6				159,423 ^b	
1870-1	3,071,276	440,108 ^c	14	233,789 ^d	53
1875-6				363,397 ^e	
1880-1	3,525,177	576,627	16	402,123 ^f	70
1885-6				433,158 ^g	

Where not otherwise indicated, calculations are my own from Minnesota Population Center, IPUMS International: Version 7.4 [dataset] (Minneapolis, MN: IPUMS, 2023), <https://doi.org/10.18128/D020.V7.4>

a: *Report of the Committee of Council on Education, 1860-61* (London: Eyre / Spottiswoode, 1861), p. 3

b: *Report of the Committee of Council on Education, 1865-6* (London: Eyre / Spottiswoode, 1866), p. 1

c: The 1871 enumerators' books have not been digitized. This figure is therefore taken from published tables instead; *Census of England and Wales for the Year 1861: Population Tables: Ages, Civil Condition, Occupations, and Birth-Places of the People* (London: Eyre / Spottiswoode, 1863), xliii, xlvi.

d: *Report of the Committee of Council on Education, 1870-71* (London: Eyre / Spottiswoode, 1871), p. 1

e: *Report of the Committee of Council on Education, 1875-76* (London: Eyre / Spottiswoode, 1876), <https://hdl.handle.net/2027/mdp.39015076567802>, p. 242

f: I have been unable to obtain a copy of the 1880-81 report and have used 1881-82 instead; *Report of the Committee of Council on Education, 1881-82* (London: Eyre / Spottiswoode, 1882), <https://hdl.handle.net/2027/mdp.39015076567570>, p. 150

g: *Report of the Committee of Council on Education (England and Wales), 1885-6* (London: Eyre / Spottiswoode, 1886), p. 209

context.

Early childhood education in Britain in the preceding century had been, in effect, a positive externality arising from women's and children's increased labour supply. Lacking consensus or a strong theoretical justification for the age of enrollment, families in early modern Britain placed their children in school at a wide range of ages, although school entry generally occurred relatively late in childhood. For poor families dependent on a greater household labour supply, however, the crucial variable in the schooling decision was the demand for child care. I argue small private schools were well-placed to provide this care because their teaching methods, which appeared

crude and undercapitalized from the point of view of school inspectors, relied on individualized instruction and thus provided parents with a more reliable signal of the quality of child care. The spread of female literacy over the eighteenth century possibly contributed to this institutional development.³² However, growing demand for child care resulting from women's and children's labour-market participation is the central pillar of the story, which developed in a regionally distinct manner.

In particular, the development of cottage industry offered women and children opportunities to work for greater market earnings. The time they devoted to these activities subtracted from the time they would otherwise have spent caring for young children in the family. However, as Joyce Burnette argues, cottage industry was partially complementary to providing simultaneous child care, as children have intermittent needs and activities like spinning or knitting could be set down and picked up again at little cost.³³ Where industries were more heavily capitalized, however, these time costs were greater, and highly capitalized industries would likely have featured factory organization requiring women and children to work away from home.³⁴ I argue these developments raised the demand for early child care further. Thus, by 1851 regions that had developed relatively capital-intensive industries employing women and children were closely associated with early education, and I demonstrate these relationships are causal.

Early childhood education, however, was associated with greater, not weaker, rates of human capital accumulation. At a micro-level, I demonstrate that early learning was more efficient, as children who learned to read between the ages of four and six took less time to acquire basic proficiency in reading than children who began as students at an older age. At a regional level, early childhood education was a better predictor than ten-year-old school enrollment of numeracy, skill, and indicators of

32. Schofield, "Dimensions of Illiteracy, 1750-1850."

33. Burnette, *Gender, Work and Wages in Industrial Revolution Britain*, pp. 181-4.

34. Clark, "Factory Discipline"; Honeyman, *Child Workers in England, 1780-1820: Parish Apprentices and the Making of the Early Industrial Labour Force*, p. 12.

social cohesion, which I link to models of cognitive and non-cognitive skill associated with early childhood learning. This finding runs counter to much of the literature on human capital during early industrialisation, which usually emphasizes human-capital deficits in industrial districts caused by the high opportunity costs of child labour.³⁵

In human capital theory, the decision to neglect schooling would be based on the discounted return on human capital investment versus present costs, including the opportunity costs of foregone wages of child workers.³⁶ The incentives to pursue early childhood education, I argue, were very different, as the decision was effectively a short-term cost-minimizing strategy within households. This has a number of interesting theoretical implications. For example, Galor's *Unified growth theory*, which explains the emergence of sustained economic growth from a world of Malthusian stagnation, contains an awkward transition. Between the 'Malthusian' world, in which technological innovations introduce only a temporary improvement in well-being that is quickly diluted by population growth, and the 'modern' world, in which technology is increasing in the level of education, is the 'Post-Malthusian' world, the key features of which are a rapidly growing stock of technology, slowly rising per capita incomes, little human capital investment, and a rapidly growing population.³⁷ In this transitory phase of economic growth, the rate of technological development increases in the level of the population.³⁸

This 'transitional' positive relationship between population and growth is usually described as 'Smithian' if the mechanism is the growth of markets and an accelerated division of labour or 'Boserupian' if the mechanism is regional specialization, urban growth, and more sophisticated consumer tastes.³⁹ These mechanisms, I have argued,

35. Humphries, *Childhood and Child Labour in the British Industrial Revolution*, p. 364; Stephens, *Education, Literacy and Society, 1830-70: The Geography of Diversity in Provincial England*, p. 10.

36. Becker, "Investment in Human Capital: A Theoretical Analysis."

37. Galor, *Unified Growth Theory*, pp. 164-74.

38. *Ibid.*, p. 175-6.

39. Broadberry et al., *British Economic Growth 1270-1870*, pp. 270-6.

also likely affected the demand for child care through increased household labour supply. For instance, a Smithian division of labour possibly separated skilled from unskilled components of the labour process, opened labour market opportunities to women and children, and eroded male artisans' status and earnings, as ostensibly occurred in London.⁴⁰ Alternatively, if Boserupian urbanisation improved women's and children's access to labour markets, as it seemed to do in London and the textile districts, or if supplying the objects of growing consumer desire was a task outsourced to domestic manufacturers, this would strain time-budgets and lead many families to seek extra-familial care.⁴¹ My account brings human capital, the key component of 'modern' economic growth, back in to both 'Boserupian' and 'Smithian' growth models through the re-allocation of education into an earlier period of childhood in response to this increase child-care demand.

Historians have long written about children's experience of the industrial revolution as one of exploitation. Children worked long hours to contribute to the household budget, and those who stayed at home may have cared for younger siblings while their mothers worked. I argue that under the accident of this burden, these children nonetheless built up the human capital requisite for modern growth. Andrew Ure introduced his book, *The Philosophy of Manufactures*, with a short catalogue of automata whose deceptions were meant to contrast with the soaring heights of the technological marvels and great machinery around him. One of these was a self-playing harpsicord, whose trick Ure revealed to be a small infant hidden inside to operate the keys.⁴² Little noticed, an infant hid also inside Britain's early industrial economy, and perhaps did more than operate a few keys.

40. Ball and Sunderland, *An Economic History of London 1800-1914*, pp. 297-8.

41. Berg, "What Difference Did Women's Work Make to the Industrial Revolution?"; Erickson, "Married Women's Occupations in Eighteenth-Century London."

42. Andrew Ure, *The Philosophy of Manufactures, or an Exposition of the Scientific, Moral and Commercial Economy of the Factory System of Great Britain*, 2nd ed. (London: Charles Knight, 1836), p. 11, https://archive.org/details/bub_gb_BwfuesvdrXwC.

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