

Scottish Education Policy: Why Statistics Matter

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[1. Introduction]

Slide 1¹

Twenty years ago, in a lecture for the Scottish Educational Research Association, I optimistically suggested that the imminent Scottish Parliament would offer many new opportunities for policy research.²

A rationale for that hope might be found in a paper from a decade before that by, amongst others, David Raffe,

in honour of whom this lecture today is taking place.

‘The public practice of scepticism’, wrote Raffe with Peter Burnhill, Andrew McPherson and Nils Tomes, ‘is part of the scientific method’.³

Scientific scepticism was the governing principle of the Centre for Educational Sociology.

Under the leadership of McPherson and Raffe, the Centre became the home of some of Scotland’s most internationally distinguished contributions to educational research in the second half of the twentieth century.

Since public scepticism was also what the new parliament might be expected to provide,

¹ The Powerpoint slides are at the end of these notes.

² Paterson, L. (1998), ‘Educational research and Scottish democracy’, *Scottish Educational Review*, 30, 93-109.

³ p. 210 in Burnhill, P., McPherson, A., Raffe, D. and Tomes, N. (1987), ‘Constructing a public account of an education system’, In G. Walford (ed.), *Doing Sociology of Education*, Lewes: Falmer, pp. 207-29

the harmony around the need for shared data might have been thought to have been an obvious prerequisite for the effective operation of the new Scottish democracy.

And yet, two decades on, the OECD could say that the evidence simply does not exist to evaluate the biggest educational reform that the Parliament has produced, Curriculum for Excellence.⁴

The Royal Society of Edinburgh said likewise that ‘it [i]s very regrettable that C[urriculum] f[or] E[xcellence] was introduced without adequate consideration having been given to the provision of baseline data’.⁵

This lecture is not directly about the Parliament, but it is about the survey tradition.

It is, moreover, about surveys that seek understanding and explanation, rather than routine monitoring.

There are three main survey series from which we will be looking at illustrations today:

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Surveys by the Scottish Council for Research in Education.

Surveys by the Centre for Educational Sociology.

And surveys of primary pupils.

I’m going to ask how Scottish educational surveys evolved into a sustained statistical attention to

the ways in which education was developing

⁴ pp. 18 and 14 of OECD (2015), *Improving Schools in Scotland: An OECD Perspective*, Paris: OECD.

⁵ p. 4 in Royal Society of Edinburgh (2017), *A Research Strategy for Scottish Education: Comments from the RSE Education Committee*, Advice Paper 17-11, Edinburgh: Royal Society of Edinburgh.

and to the accountability of the country's rulers for its operation.

I'll start with a summary technical description of what these surveys were, and then illustrate how they might be used to provide the public scepticism which David Raffe and his colleagues advocated three decades ago.

Then I'll finish by drawing some general conclusions about why statistical surveys matter.

[2. Surveys]

[2.1 Origins: Scottish Council for Research in Education]

The story of Scottish surveys is itself almost the story of Scottish education in the twentieth century,

because the surveys related to the two points of educational transition that have changed most – entering and leaving secondary school.

All the surveys started with policy and remained closely tied to policy.

In order to be able to provide valid comment on policy, they had also to be well-informed academically.

They had to be well-designed and well-analysed to take advantage of the growing international understanding of statistical surveys,

and to take advantage of the growth of computing capacity which made these new understandings practicable.

Surveys had to offer the capacity to understand academically what was going on – historically, sociologically, culturally.

But the surveys also had to eschew academic fashion, because of the hostility to statistical measurement that nearly over-whelmed the social sciences in the UK from the 1970s onwards.

All of this has made education surveys controversial, and controversy – as well as these other recurrent themes – was present from the start,

in the surveys carried out by the nascent Scottish Council for Research in Education, universally known by its acronym SCRE.

SCRE had its origins in the political controversies of the aftermath of the First World War.⁶

The Education (Scotland) Act of 1918 allowed for the setting up of an Advisory Council on Education in Scotland.

The governing Scottish Education Department suppressed the incipient radicalism of that official Council in 1921 over the issue of secondary education for all.

It was in that context that SCRE was created as an autonomous source of research and ideas independent of government.⁷

It was founded in 1928 under the auspices of the teachers' professional association, the EIS, and the directors of education in the 38 locally elected Education Authorities.

SCRE then became the main source of authoritative research on Scottish education, especially in its pioneering surveys of school children, of which the first was in 1932:

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[2.1 1932 survey]

The 1932 survey was carried out as part of the international interest at the time in the nature of intelligence, and also in how measures of intelligence that were valid and reliable might be used to allocate pupils fairly to different courses at secondary school.

On a single day in June 1932, almost every 11-year-old in Scotland was tested - 87,498 pupils in total.

⁶ For sources, see p. 87 in Paterson, L. (2003), *Scottish Education in the Twentieth Century*, Edinburgh: University Press.

⁷ Lawn, M. and Deary, I. J. (2015), 'Inventing a Scottish school of educational research, 1920-1950', in R. D. Anderson, M. Freeman and L. Paterson (eds), *The Edinburgh History of Education in Scotland*, Edinburgh: University Press, pp. 326-345.

The tests were carried out and marked by teachers.⁸

[2.3 1947 survey]

The 1932 survey was never designed as the beginning of a series, but that is in effect what it eventually became.

SCRE repeated the national testing of all 11-year-olds in 1947, mainly in response to debates about declining intelligence.⁹

The inspiration of this survey was Godfrey Thomson, professor of education at Edinburgh University and director of the Moray House training college.

The field-force was, again, volunteers, mainly teachers and trainee teachers.

The survey found a rise in intelligence, the opposite of what the eugenic concerns had predicted.

Edmund Ramsden has recently seen this as one of the two survey origins of the gradual replacement of psychological with sociological explanations of educational progress,

the other being a Britain-wide survey of children born in 1946.¹⁰

The 1947 survey became a pioneer by its subsequent development into a longitudinal sociological survey.

Approximately 1,200 of the sample members were followed up annually to 1963, when they were 27.

Godfrey Thomson called this representative group ‘Scotland in miniature’.¹¹

⁸ p. 334 in Lawn and Deary (2015): ‘this was a remarkable logistical feat, undertaken by a neophyte Council with its new network of voluntary support from the teachers and local authorities’.

⁹ pp. 16-39 in Deary, I. J., Whalley, L. J. and Starr, J. M. (2009), *A Lifetime of Intelligence*, Washington, D.C.: American Psychological Association; Ramsden, E. (2014), ‘Surveying the meritocracy: The problems of intelligence and mobility in the studies of the Population Investigation Committee’, *Studies in History and Philosophy of Biological and Biomedical Sciences*, 47, pp. 130-41.

¹⁰ p. 134 in Ramsden (2014).

¹¹ Thomson quoted on p. 19 of Maxwell, J. (1969), *Sixteen Years On*, London: University Press.

We'll look at some examples from that follow-up later.

We'll also look at data from the very long-term follow-up of these surveys by Ian Deary and colleagues during the past couple of decades.

[2.4 1962 survey]

The final SCRE survey in this series belongs to the next part of the story – school leavers.

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This survey covered all pupils who attempted at least one Higher Grade examination in 1962 in what had been called the School Leaving Certificate.¹²

Though the title of the research was 'assessment for higher education', there was an important implication for secondary schools, recognising that, as they became more diverse, the purposes of their senior years could no longer be assumed to be to prepare students for university.

[2.5 Scottish School Leavers' Surveys]

That was an important survey in itself, though very much of its time.

It's valuable still to have such a record of how the old selective system related to university on the eve not only of the expansion of higher education but also of the ending of selection for secondary school.

In truth, though, the most important historical legacy of the 1962 survey is that it inspired the series of school leavers' surveys which were established by Andrew McPherson when he set up the Centre for Educational Sociology at Edinburgh University in 1972,

like SCRE universally known by its acronym, CES.

The first such surveys were in 1971 and 1973, of leavers from 1970 and 1972.

¹² Powell, J. (1973), *Selection for University in Scotland*, London: University Press.

A leavers' survey then took place nearly every two years from 1977 to 2005.

- i. From 1979, the survey covered all levels of attainment.
- ii. After 1985, there was also a longitudinal component, following-up people who were in school fourth year in a particular year until they were 19 and, in some of these surveys, to ages 22 or 24.
- iii. These surveys varied somewhat in their design, but they were all random, and all based on postal questionnaires (though also latterly linked to data on examination attainment).
- iv. The sampling fractions ranged from under one in ten to four in ten.
- v. The sampling was often complex, involving difficult liaison with the SED and the education authorities.

David Raffe and his CES colleagues – in the paper I mentioned earlier¹³ – noted that the leavers'-survey series was being developed at a time when social science in Britain was turning away from the use of large-scale surveys of this kind.

That critique of surveys was taking two main forms:

- i. that research which uses surveys tends to take the problems of governments as given;
- ii. and that surveys 'incompletely represent the understandings of respondents' because they assume 'researcher and subject inhabit separate ... worlds'.

The leavers'-survey series sought to offer a response to these criticisms.

The main context of the CES surveys was indeed made up of the dominant policy concerns of the time:

- i. the development of comprehensive secondary schooling;
- ii. the growth of unemployment among school leavers;
- iii. the expansion of higher education;

¹³ p. 209 in Burnhill et al (1987).

- iv. the sometimes radically different approach to education provoked by the Conservative government of the 1980s and 1990s.

Behind all that were social and economic changes that were of profound significance for education:

- i. the collapse of manufacturing industry;
- ii. the expansion of services;
- iii. the decreasing deference towards authority;
- iv. the spreading secularism of Scottish society;
- v. the largest revolution of all, the transformation of the position of girls and women in their educational experiences and prospects.

All of these policy concerns and social changes were reflected through the surveys, as we'll see shortly.

Some led to sharp conflict between the CES and the government,

and yet the survey was jointly funded by the Scottish Education Department and various other organisations – notably the ESRC – for nearly two decades.

When it was eventually taken away from CES in the early 1990s, it nevertheless survived as a public resource until it came to an end about a decade ago.

One explanation of the decision to end the series was declining response rates, which are a particular problem where a survey is longitudinal.¹⁴

Gone are the days when the SCRE could still have a follow-up rate of 91% after seventeen annual sweeps.

¹⁴ p. 707 in Howieson, C. and Croxford, L. (2017), 'To know ourselves? Research, data and policy making in the Scottish education system', *Journal of Education and Work*, 30, pp. 700-11.

So the school leavers' survey took government's problems as given only in the sense that these problems were also matters of general social change.

The CES also, however, sought to broaden debate.

It pioneered in the 1970s a programme of 'collaborative research', where teachers, educational officers, and other researchers could get access to the data.

Being involved in developing this collaborative programme was one of the earliest contributions which David Raffe made when he joined CES in 1975.

The ESRC made the CES into a research centre in the late 1980s, but that did not prevent joint funding from such organisations as local government and the Manpower Services Commission as well as from the SED.

[2.6 SSLS etc not the only series]

The surveys that started in 1962, and in some respects in 1947 or even in 1932, are only the most notable.

There have always been ad-hoc surveys, specially commissioned as part of a research project.

And there has also been one other long-running series, on primary-school attainment.

These moved on from concern with selection for secondary school to assessing primary attainment per se.

The surveys of 1932 and 1947 might be thought of as part of a primary-school series, since they surveyed pupils aged 11, but they had little to say about primary schools.

The first surveys to study primary school in its own right were in 1953 and 1963, and were run by SCRE.

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The 1953 survey studied all 10-year-olds, the 1963 a clustered, random sample of about 6%.¹⁵

There was then a gap in surveys relating to primary schools until the 1980s, after which a regular series was established until two years ago.

The Assessment of Achievement Programme lasted from the early 1980s until 2004, assessing mainly mathematics, English language and science.

Its methods were not transparent in the 1980s, which was a source of political controversy when the surveys were reported as showing a decline in pupils' attainment, as we will see.¹⁶

The response to the methodological questions was much technical development.

For example there was closer attention to stratifying the sample schools with respect to the socio-economic status of their pupils,

and the tests used in the surveys were tied more closely to the school curriculum.¹⁷

After 2004, these surveys were replaced by the Scottish Survey of Achievement which paid full attention to

- i. the design of the sample,
- ii. to the design of the tests,
- iii. and to proper statistical analysis.

¹⁵ Scottish Council for Research in Education (1968), *Rising Standards in Scottish Primary Schools, 1953-1963*, London: Universty Press.

¹⁶ McPherson, A. (1989), 'Assessment of Achievement – twists in the numbers game', *Times Education Supplement Scotland*, 21 April; Parliamentary question by Henry McLeish, MP, to Michael Forsyth, MP, Under-Secretary of State at the Scottish Office, Hansard, 22 May 1989, col. 403, <https://publications.parliament.uk/pa/cm198889/cmhansrd/1989-05-22/Writtens-5.html> [accessed 27 February 2018].

¹⁷ p. 50 in Simpson, M. (2006), *Assessment* Edinburgh: Dunedin Acadmic Press. See, for example, the methodological appendixes in Scottish Executive (2002), *First Survey of Social Subjects Enquiry Skills*, Edinburgh, and Scottish Executive (2003), *Sixth Survey of Science*, Edinburgh.

- iv. It allowed a comparison of teachers' judgements of their pupils' achievements with these pupils' performance in well-designed tests.

The Survey of Achievement, in turn, was replaced by the Scottish Survey of Literacy and Numeracy in 2011, which lasted till 2016.

This survey, too, paid proper attention to design and methods.¹⁸

The Survey of Literacy and Numeracy has also now been brought to an end.

It is replaced by annual reports of teachers' judgements of the attainment of pupils.

Teachers are expected to draw upon the new standardised assessment of pupils when they are forming these judgements, but, unlike in the Survey of Achievement, no public data will be available to allow any comparison of teachers' judgements with independent assessments.

Furthermore, the Scottish government withdrew Scotland from the two international surveys of pupil attainment that cover the primary years:

one on mathematics and science, and the other on literacy.¹⁹

These surveys provided independent assurance of the validity of the internal surveys.

The only regular survey that remains is the three-yearly Programme for International Student Assessment, the PISA series.

¹⁸ But it differed from all the earlier surveys in one rather important respect – the sample size in each school. The Survey of Achievement used a well-designed cluster sample, so that the sample size per school was large enough to draw inferences about the effects of schools. The new Survey of Literacy and Numeracy did not use clustering, and so had only very small and therefore unreliable samples within each school. There were 2 pupils in each of P4 and P7 in around 2,150 primary schools, and 12 in S2 in around 425 secondary schools: see SSLN Project Management Board (2011), *Scottish Survey of Literacy and Numeracy (SSLN) 2011*, <http://www.gov.scot/Publications/2012/03/5285/downloads#res390588> [accessed 30 March 2012]

¹⁹ For example, Martin, M., Mullis, I. and Foy, P. (2008), *TIMSS 2007 International Mathematics Report*, Boston, MA: TIMSS & PIRLS International Study Center; Mullis, I., Martin, M., Kennedy, A. and Foy, P. (2007), *PIRLS 2006 International Report*, Boston, MA: TIMSS & PIRLS International Study Center.

This is an assessment of the attainment of 15-year-olds, and is conducted to a high technical standard by the OECD.²⁰

It now carries the entire responsibility for providing any public, objective assessment of Scottish pupils' achievements.

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In short, summing up the technical history of Scottish educational surveys, for the first time since the 1950s:

- i. there is no regular survey of Scottish primary pupils;
- ii. there is no regular survey of school leavers;
- iii. there is no survey means by which policy changes might be evaluated in detail;
- iv. and there is no way in which the richness of academic social surveys might be combined with the detail and rigour of official administrative data.

[3. Scottish Education in the Twentieth Century]

That technical description of the surveys shows no more than that they have existed.

To illustrate why such a survey tradition is important we have to look at what the surveys have told us.

So I aim now to show – for the main purpose of the lecture – that well-designed series of surveys can tell the story of a national education system.

I'll take four themes in the twentieth-century history of Scottish education to illustrate this explanatory claim,

²⁰ It includes a rich set of information about pupils' social circumstances as well as information on their teachers and their schools. During its decade and a half of existence, it has responded to criticism by refining its tests, its sampling, and its analysis; and its data are freely available for re-analysis.

themes which I have already mentioned in passing, since the surveys were all designed in part to address them.

They are:

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- i. secondary education for all, and then the operation of the resulting selective system;
- ii. comprehensive secondary education;
- iii. expansion of higher education;
- iv. attainment in primary school.

The examples which I'll be giving are merely illustrations of the history, and of the capacity of surveys to illuminate the history.

I'll present the illustrations in ways that hide the often complex statistical analysis that lies behind them.

However one technical point is important:

although I will not show standard errors and the like, I will comment only on differences that are unlikely to have occurred by chance.²¹

[3.1 Secondary education for all]

On the first theme, we need some preliminary background.

The selective system that was consolidated in the 1930s was officially in two streams:

- academic, leading to university or the professions,
- and the rest, leading to lower-status jobs or, for women, into motherhood and housework.

In Scotland, these courses were called senior secondary and junior secondary.

²¹ That is, statistically significant at least at the 5% level.

The 1932 and 1947 surveys originally helped to develop the system of allocation between these two kinds of course.²²

In truth, however, the institutional structure of the selective system was not as simple as was officially recognised.

The legacies of reforms between 1899 and the 1930s were complex, and it is the interaction of these histories with the fully developed selective system that allows the surveys to cast light on how secondary education for all actually operated.²³

A properly secondary sector did not emerge coherently until the last part of the nineteenth century.

Previously, what would later be called secondary education had been provided in parish schools, and across the whole country there were only around 60 schools providing full secondary education in any systematic way.

The main policy change that would culminate in the selective secondary system was in the first decade of the twentieth century

– like so much else, this liberal period laying the basis for the developed welfare state.

The core element of the change was that central government encouraged and funded the creation of nearly 200 new secondary schools to serve districts populated mainly by the lower middle class and the skilled working class.²⁴

These were called Higher Grade schools.

They mostly were free or charged only low fees.

²² p. 8 in Deary et al. (2009).

²³ For sources, see Paterson, L. (2015), 'Democracy or intellect? The Scottish educational dilemma of the twentieth century', in R. D. Anderson, M. Freeman, M. and L. Paterson (eds) (2015), *The Edinburgh History of Education in Scotland*, Edinburgh: University Press, pp. 226-45.

²⁴ pp. 229-51 in Anderson, R. D. (1983), *Education and Opportunity in Victorian Scotland*, Edinburgh: University Press. In 1912, the main sources of funding for Higher Grade schools were the SED (44%) and local rates (38%): see p. 242 in Anderson (1983).

That expansion came to an end in the 1920s when about two thirds of the former Higher Grade schools were recognised as full secondaries.

So that's two kinds of academic schools:

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Some new secondaries continued to be built.

That's a third kind:

Slide 9

The other Higher Grade schools provided only three-year courses, but they retained something of the academic ethos of their origins.

So that's two kinds of junior secondaries, shown here with the relative sizes of all five sectors in 1947:²⁵

Slide 10

Re-analysis of the 1947 survey gives us an understanding of how this selective system worked.

The re-analysis of the original data has been made possible by the work of Ian Deary and his colleagues, recovering the questionnaires from these surveys and converting their data into digital form.

Deary discovered that, fortunately, the 1947 survey archive retained the names of the schools which the pupils attended, and so it could be used to analyse the legacy of the earlier reforms.

This graph then shows the distribution of different social classes into the different kinds of school:

Slide 11²⁶

Blue is manual working-class, orange is intermediate (both non-manual and manual), and grey is professional.

²⁵ Table 2 in Paterson, L., Pattie, A. and Deary, I. (2011), 'Social class, gender and secondary education in Scotland in the 1950s', *Oxford Review of Education*, 37, pp. 383-401.

²⁶ Threshold for a difference in percentages to be statistically significant – approx.. 10%.

The oldest schools (the bar second from the right here) had far fewer manual working-class pupils than the population as a whole: 14% compared to 34% (in the bar at the right).

At the other end, the junior secondary schools had a higher working-class proportion (43%).

But the schools in the middle here that had been created by government in the first 2-3 decades of the century much better reflected the national pattern of social class.²⁷

These schools educated around one half of all pupils.

The 1947 survey thus lets us see that liberal reforms had very significantly widened opportunity.²⁸

The distinctiveness of these five sectors then had important legacies, which the follow-up of the 1947 survey lets us examine statistically.

Here are three illustrations.

[3.1.1 Illustration 1 of secondary education for all]

Slide 12²⁹

The next graph³⁰ shows the formal educational attainment by age 27 of people who had attended the various sectors:

Blue is no or minimal attainment.

²⁷ Manual working-class percentages: 28% in the first wave of Higher Grade schools, 32% in schools created in the 1920s, and 38% in the Higher Grade schools that had not become full secondaries.

²⁸ Suppose: the two newer senior-secondary sectors had contained a distribution of classes that was the same as the distribution in the old secondaries, and had been of the same overall size as in the table.

Then: decrease in access to senior secondary school:

Class III: 15% less; Class IV: 31% less; Class V: 56% less.

Overall for these three classes: 23% less.

²⁹ In the model (see next footnote), gradient across cols 1, 2 and 3-5 together were statistically significant.

³⁰ Table 2 in Paterson, L., Pattie, A. and Deary, I. (2010), 'Post-school education and social class destinations in Scotland in the 1950s', *Longitudinal and Life Course Studies*, 1, pp. 371-93.

Orange is craft and technical attainment.

Grey is higher education, including professional qualification.

There is a very clear gradient across the sectors, which – in fuller statistical analysis – was not explained by

- i. intelligence measured at age 11,
- ii. or by parental social class,
- iii. or by parental education,
- iv. or by sex.

But there was also a route into the professions from the schools in the middle here that had resulted from the liberal reforms earlier in the century

– about two thirds of all people who entered the professions.³¹

[3.1.2 Illustration 2 of secondary education for all]

A second illustration of how the 1947 survey illuminates historical understanding shows the particular value of the very long-term further follow-up which Ian Deary has led.

It concerns the re-interview of people from the original 1947 survey who were living in the Lothians in 2004-7 (and thus were aged around 70).

That enabled a life history to be collected from them, as well as having them sit the same test of intelligence as they had sat in 1947.

The interest here is whether attending schools with different histories had effects on respondents' social-class attainment throughout their working lives.

This assessment is independently of a wide range of statistical controls:

age-11 and age-70 measured intelligence,

³¹ See pp. 130-6 in Paterson (2003), *Scottish Education in the Twentieth Century*, Edinburgh: University Press. In the graph shown on the slide, 10 of the 15 people who entered a profession from junior secondary schools were nurses.

educational attainment,
origin social class,
parental education,
and sex.

Slide 13³²

The results are summarised in this graph³³, which shows:

the predicted value on a social-class scale,
controlling for all these things,
according to the type of school attended,
and also according to whether the respondent attended school in
Edinburgh:
red is Edinburgh; black is elsewhere.

The striking feature is that the socially segregated character of the city
had lasting effects.

The very low red bar on the left shows that attending a junior-secondary
in Edinburgh had especially poor long-term prospects.

The two pairs of bars towards the right show that attending a pre-
twentieth-century, public sector school in Edinburgh had even
more beneficial effects than attending an independent school.

The former Higher Grade schools in the city were rather less effective
than those elsewhere.

³² Model (see next footnote) showed statistically significant interaction of sector and place, especially involving junior secondaries and old education-authority senior secondaries in Edinburgh.

³³ Figure 1 in Paterson, L., Gow, A. and Deary, I. J. (2014), 'School reform and opportunity throughout the lifecourse: the Lothian Birth Cohort 1936', *School Effectiveness and School Improvement*, 25, pp. 105-125.

[3.1.3 Illustration 3 of secondary education for all]

A third illustration of the value of the 1947 survey is of the effects on religious differences.³⁴

The Scottish Catholic population remained disproportionately working class, and their measured intelligence remained below the average of the rest of the population.

But new secondary Catholic schools were created as a result of the 1918 Act:

Slide 14

This graph shows that crude attainment in the Catholic senior-secondary schools remained much lower than in the non-denominational schools.

Attainment here is derived from a summary of passes in the Leaving Certificate.

A large part of the difference was explained by differences in measured intelligence:

Slide 15

Once the differences in the social class of pupils in Catholic schools is also taken into account there remains almost no difference at all;

Slide 16³⁵

So the 1947 survey has allowed us to see that the new school system which had been created by church and state had ended specifically educational invidious discrimination, in that the Catholic schools reflected intelligence and social class differences in much the same way as the non-denominational schools.

³⁴ Derived from Table 7 in Paterson, L., Calvin, C. and Deary, I. J. (2015), 'Education, employment and school religious denomination in Scotland in the 1950s', *Oxford Review of Education*, 41, pp. 26-46.

³⁵ In the second and third models, denomination was not statistically significant. See previous footnote.

But the selective system was not operating in a wholly meritocratic way.

The next graph uses the other early cohort survey which I mentioned – the survey of people born in 1946.³⁶

Slide 17³⁷

It compares the percentage in senior-secondary courses at various levels of measured intelligence, and according to a measure of social class:

Orange is middle class and blue is manual working class (a different definition of class from the 1947 survey).

The size of the different intelligence groups is shown below the labels.

For pupils with high measured intelligence, there is no class difference: they almost all entered academic courses.

But in the middle of the distribution of intelligence, the proportion on selective courses was twice as high among middle-class pupils as among working-class pupils.

[3.2 Comprehensive education]

Survey evidence of this kind also then contributed to policy change, through its influence on political attitudes in the 1950s.

Out of that came comprehensive secondary schooling, which is the second broad policy theme on which the Scottish survey series has cast important light.

This Scottish reform happened swiftly and relatively uncontroversially between 1965 and the late 1970s.³⁸

³⁶Derived from Table 2 in Douglas, J. W. B., Ross, J. M., Maxwell, S. M. M. and Walker, D. A. (1966). 'Differences in test score and in the gaining of selective places for Scottish children and those in England and Wales'. *British Journal of Educational Psychology*, 36, pp. 150–157.

³⁷ Threshold for a difference in percentages to be statistically significant – approx.. 10%

³⁸ McPherson, A. and Willms, J.D. (1987). 'Equalisation and improvement: some effects of comprehensive reorganisation in Scotland', *Sociology*, 21, pp. 509-39; Murphy, D., Croxford, L.

The new Scottish School Leavers' Survey was ideally placed to form the basis of an evaluation of the impact.

Three types of question may illustrate the range of ways in which these surveys were thus used.

[3.2.1 Illustration 1 of comprehensive education]

The first was to investigate the consequences that flowed directly from the simple ending of selection.

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This is a simplified version of a graph³⁹ by Andrew McPherson and Doug Willms in 1987,

showing the trajectory of attainment for a school leaver of average socio-economic status between the mid-1970s and the mid-1980s,

arranged according to school history at that time:

in blue, schools that had been junior secondaries in 1970 and had become full secondaries by the time the first cohort had left school;

in grey, senior secondaries that were becoming unselective;

and, in orange, schools that were comprehensive throughout.

The graph relates to communities where in 1974 the most able pupils were still being sent to selective schools.

The main conclusion is convergence, achieved by rising average attainment in the upgraded schools that had been junior secondaries and falls in average attainment in schools that had been senior secondaries.

A similar convergence was seen in schools serving communities where selection had ended by 1974 (on the right here):

Howieson, C. and Raffae, D. (eds) (2015), *Everyone's Future: Lessons from Fifty Years of Scottish Comprehensive Schooling*, London: Institute of Education Press.

³⁹ Extracted and simplified from Figure 3 in McPherson, A. and Willms, J.D. (1987). 'Equalisation and improvement: some effects of comprehensive reorganisation in Scotland', *Sociology*, 21, pp. 509-39.

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Because more pupils were affected by the rise than by the fall, McPherson and Willms found that

all social groups showed a rise in attainment,

but that the rise was greater for working-class pupils than for middle-class pupils.

McPherson and Willms also found from the surveys that girls had benefited more than boys, noting that this was not a deliberate aim of policy at the time.

Research by them and others also found from the same surveys that pupils in Catholic schools had benefited more than pupils in non-denominational schools.⁴⁰

[3.2.2 Illustration 2 of comprehensive education]

The second question which the survey series could address about the effects of comprehensive schooling related to the accompanying changes in curriculum and assessment.

The most important change was the introduction of Standard Grade in the 1980s, providing for the first time a properly planned curriculum for pupils of all kinds of ability in the mid-secondary years.

The key feature of this reform that allowed an evaluation was that it happened at different times in different schools.

This quasi-experimental feature allowed Adam Gamoran to use the survey series to tease out the effects of reform,

for example comparing schools that had implemented the reform with those that had not,

and comparing that comparison with the analogous difference before the reform was started.

⁴⁰ McPherson, A. and Willms, J. D. (1986), 'Certification, class conflict, religion, and community: a socio-historical explanation of the effectiveness of contemporary schools', in A. C. Kerckhoff (ed.) *Research in Sociology of Education and Socialization*, Greenwich, Connecticut: JAI Press, Vol. 6, pp. 227-302; Paterson, L. (2000), 'Salvation through education? The changing social status of Scottish Catholics', in T. M. Devine (ed.), *Scotland's Shame? Bigotry, Sectarianism and Catholicism in Modern Scotland*, Edinburgh: Mainstream, pp. 145-57.

The scope for taking advantage of this natural experiment in implementing a reform was due to there being a survey series in which individual schools could be classified in ways that would be sociologically revealing.

Slide 20

These graphs⁴¹, from Gamoran's analysis, show that, between 1984 and 1990, the chances of studying English and Mathematics rose most for socially disadvantaged students (the blue bars).

Some effects of the new courses were happening through interaction of educational change with wider social changes, and again the transformation of the educational experience of girls is especially notable.

Slide 21⁴²

This graph⁴³, from analysis of the survey series by Linda Croxford, shows that the introduction of Standard Grade was accompanied by an increase in the proportion of girls who took some science – the solid lines, with the benefit being especially marked among working-class girls – the blue solid line.

⁴¹ Figure 1 in Gamoran, A. (1996), *Improving Opportunities for Disadvantaged Students: Changes in S4 Examination Results, 1984-1990*, CES Briefing, No. 6. See also Gamoran, A. (1995), 'Curriculum standardisation and equality of opportunity in Scottish secondary education, 1984-1990', *Sociology of Education*, 69, pp. 1-21.

⁴² Standard errors of probabilities generally about 0.02, and so threshold for a difference in percentages to be statistically significant is approx. 4%.

⁴³ Derived from Table 4 in Croxford, L. (1994), 'Equal opportunities in the secondary school curriculum in Scotland', *British Educational Research Journal*, 20, pp. 371-91.

[3.2.3 Illustration 3 of comprehensive education]

A third question about the effects of comprehensive schooling which the survey series was able to address related to experiences beyond schooling, but outside university.

This was David Raffe's most influential contribution in the 1980s, addressing the bleak prospects which low-attaining school leavers faced then.

Slide 22⁴⁴

This graph⁴⁵ is typical of Raffe's work, showing the change in the chance of being employed that was associated with even marginal changes in school attainment:

The first pair of bars shows the effect of one extra pass at A-C.

The second pair shows the effect of completing a course (the best way to interpret an award of D or E).

Black is boys and red is girls.

The final pair of bars is the effect in the opposite direction of a rise in local unemployment.

Even gaining a certificate of completing the course could have enough of a positive effect to counteract the effects of a 1% increase in local unemployment.

Local unemployment could also have a perversely positive effect at a time of expanding schooling.

When local unemployment rose, so also was there a rising tendency for people to stay on beyond the minimum leaving age.

Slide 23

⁴⁴ All shown differences associated with attainment or local labour market are significant.

⁴⁵ Derived from Table 9.3 in Raffe, D. (1984), 'School attainment and the labour market', in D. Raffe (ed.), *Fourteen to Eighteen*, Aberdeen: University Press, pp. 174-93.

This graph⁴⁶ shows the rising average staying-on rate in the 1980s and the staying-on rate in schools in the upper-quartile of staying on (adjusting for attainment, socio-economic status, sex and a few other things).

Slide 24

The added broken line here then also shows that local unemployment could push up the staying on rate nearly to the top quartile.

Reaching these conclusions depended on having

not only a survey series

but also surveys that could link to information about schools and about local labour markets.

The series also showed, however, that staying on was not merely a matter of economic determinism.

Schools were becoming more enjoyable and satisfying, as illustrated on this graph:⁴⁷

Slide 25

It shows some selected reasons which pupils gave for staying on beyond the minimum, at a time when staying-on rates were rising.

Enjoyment (grey) and educational opportunities (orange) rose even while the obviously main reason – getting better qualifications – remained high.

⁴⁶ Derived from pp. 11-15 in Paterson, L. and Raffe, D. (1995), 'Staying on' in full time education in Scotland, 1985-1991', *Oxford Review of Education*, 21, pp. 3-23. 5 percentage points was the inter-quartile range of local unemployment rates.

⁴⁷ Selected from Table VII in Paterson, L. and Raffe, D. (1995), 'Staying on' in full time education in Scotland, 1985-1991', *Oxford Review of Education*, 21, pp. 3-23.

So the existence of a series of surveys that was sensitive enough to measure differences among schools enabled the advent and development of Scottish comprehensive schooling to be studied with great subtlety.

[3.3 Expansion of higher education]

The value of a survey series is illustrated further by our third theme in recent Scottish educational history – the expansion of higher education.

Again, the main point is that, through such a series, the interests of policy makers can be served by research that nevertheless is free to be critical.

[3.3.1 Illustration 1 of higher education]

The survey series explained, first, that educational expansion was self-generating.

Because the parents of leavers in the 1980s and after had been educated in the expanding system of selective schools and then the comprehensive schools,

the expansion of higher education was an almost inevitable consequence of these earlier policy changes.

Slide 26

This graph⁴⁸ shows the rising levels of parental education:

Blue is where both parents left at the minimum age. It was shrinking. The others were expanding.

Slide 27

⁴⁸ From Table 3.2 in Burnhill, P., Garner, G. and McPherson, A. (1988), 'Social change, school attainment and entry to higher education, 1976-1986', in D. Raffe (ed.), *Education and the Youth Labour Market*, Lewes: Falmer, pp. 66-99.

This next graph⁴⁹ shows the crucial point

- that these rising levels converted at a more or less constant rate into passing 3 or more Highers, which was taken at the time to be an indicator of the capacity to benefit from higher education.

Although that research by Burnhill, Garner and McPherson was published in 1988, the trend continued at least to the end of the century:

Slide 28

A survey series is necessary to detect this.

As with the reasons why pupils stayed on beyond the minimum leaving age, the series also allowed the tracking over time of changing attitudes.

A component of this was the rising aspirations of young women, and the crucial decade was the 1970s, as illustrated in this next graph:⁵⁰

Slide 29

Black here is women who aimed to have a career, in the sense of intending to work full-time for at least some of their life.

In the space of just one decade, the expectations of young women were transformed.

[3.3.2 Illustration 2 of higher education]

The survey series could also show, however, that the expansion and the ending of the distinction between technological colleges and universities in 1992 did not end inequality of access.

⁴⁹ From Table 3.2 in Burnhill, P., Garner, G. and McPherson, A. (1988), 'Social change, school attainment and entry to higher education, 1976-1986', in D. Raffe (ed.), *Education and the Youth Labour Market*, Lewes: Falmer, pp. 66-99.

⁵⁰ Adapted from Figure III in Burnhill, P. and McPherson, A. (1983), 'The Scottish university and undergraduate expectations, 1971-1981', *Higher Education Quarterly*, 37, pp. 253-70.

Here the work of Cristina Iannelli and her associates has been central, latterly as part of the Applied Quantitative Methods Network.

Slide 30

This graph⁵¹ compares the estimated probability of entering higher education by two types of school leaver with very contrasting social characteristics:

one with professional parents who stayed on in school to age 17;

the other with working-class parents who left school at age 15.

Though inequality remained wide, it did narrow during the period of expansion.

However, the surveys also allow us to see that the new opportunities for the disadvantaged group were mainly not in the highest-status institutions, as this second version of the graph shows:

Slide 31

Yellow is the ancient universities, and grey is the 1960s universities.

The working-class opportunities were almost entirely not in them,

but, rather, in the former technological colleges that had become the new universities of the 1990s, which are in orange here,

and in the mainly non-degree courses in local further-education colleges, in blue.

[3.3.3 Illustration 3 of higher education]

The survey series has also enabled Iannelli and her colleagues to investigate the importance of choice of subject as a mechanism by which inequality of entering university came about.

Opportunities depend on choosing high-status subjects at school, and high-status subjects are more likely to be chosen by students with well-educated, middle-class parents.

⁵¹ From Table 7 in Iannelli, C., Gamoran, A. and Paterson, L. (2011), 'Expansion through diversion in Scottish higher education, 1987-2001', *Oxford Review of Education*, 37, pp. 717-41.

Slide 32

These are called by the Russell Group universities ‘facilitating subjects’, and remain the academic core that would have been recognised as characterising the highest-status selective secondary-school courses three quarters of a century or more ago.⁵²

This graph⁵³, from Iannelli and Markus Klein, shows that there is a social-class gradient in taking these subjects at school, and that the gradient did not change during the expansion of the 1990s.

Iannelli and Klein then also showed that subject choice explains most of the social-class gap in the probability of entering higher education.

[3.4 Attainment in primary and early secondary]

The final illustration of the use of well-designed social surveys to contribute to our understanding of an education system relates to attainment in primary school and early secondary.

The quality of primary school was first addressed in SCRE surveys of 1953 and 1963.⁵⁴

The comparison over time showed rising attainment, as this graph⁵⁵ illustrates:

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⁵² pp. 69-79 in Gray, J., McPherson, A. and Raffae, D. (1983), *Reconstructions of Secondary Education*, London: Routledge and Kegan Paul; Paterson, L. (2011), ‘The reinvention of Scottish liberal education: secondary schooling, 1900-1939’, *Scottish Historical Review*, 90, pp. 96-130.

⁵³ Adapted from Figure 1 in Iannelli, C. and Klein, M. (2015), *Subject Choice and Inequalities in Access to Higher Education*, AQMeN Research Briefing 7; Iannelli, C., Smyth, E. and Klein, M. (2016), ‘Curriculum differentiation and social inequality in higher education entry in Scotland and Ireland’. *British Educational Research Journal*, 42, pp. 561-81.

⁵⁴ The report of the 1953 survey noted as one of its aims that valid educational tests ‘could also serve as criteria for the comparison of the efficiency of different methods of teaching’: p. 18 in Scottish Council for Research in Education (1963), *The Scottish Scholastic Survey 1953*, London: University Press.

⁵⁵ Table 4 (p. 57) in Scottish Council for Research in Education (1968), *Rising Standards in Scottish Primary Schools, 1953-1963*, London: University Press.

It shows the gains as the number of months of learning by which the average pupil aged 10 had advanced in the decade: for example, 3.9 in mechanical arithmetic.

There was then the gap in the surveys till the 1980s that I mentioned.

The disputes over the technical quality of the Assessment of Achievement Programme in its first decade allowed the belief to be maintained that standards were at least stable.

But then, from 2005, the more technically defensible Scottish Survey of Achievement began to show, at the end of primary and early secondary, at best a stagnation of attainment at a not very satisfactory level, and possibly slow falls.

Slide 34⁵⁶

This graph⁵⁷ shows the percentage of pupils in Primary 7 and Secondary 2 reaching the levels of attainment that they were supposed to reach in the then prevailing 5-14 curriculum, for 2005 and 2008-9.

Numeracy is on the left, reading on the right.

The proportions reaching the stipulated levels were around 50% in the later years (in red).

The validity of these conclusions of stagnation or decline was confirmed by the analogous trends in the Scottish results in the international series in which Scotland was still participating.⁵⁸

These concerns could still be set aside because the tests in the Survey of Achievement were not constrained to be wholly consistent from year to year.

But that was no longer a possible defence when that Survey was replaced in 2011 by the Survey of Literacy and Numeracy.

⁵⁶ Threshold for a difference in percentages to be statistically significant is approx. 3%

⁵⁷ Table F1 in *Numeracy Attainment Estimates* (2005); p. 46 in *2008 Scottish Survey of Achievement*; p. 7 in *Scottish Survey of Achievement 2009*.

⁵⁸ See, eg, p. 47 in Martin, M., Mullis, I. and Foy, P. (2008), *TIMSS 2007 International Mathematics Report*, Boston, MA: TIMSS & PIRLS International Study Center; p. 44 in Mullis, I., Martin, M., Kennedy, A. and Foy, P. (2007), *PIRLS 2006 International Report*, Boston, MA: TIMSS & PIRLS International Study Center.

It consistently showed a decline in attainment and no fall in the social inequality of attainment.

Slide 35⁵⁹

This graph illustrates its results for writing at Primary 7 (least deprived to most deprived).⁶⁰

This survey used tests that explicitly allow valid comparison over time, but in other respects it was less satisfactory than the Survey of Achievement.

For example, it did not allow any assessment of the validity of the judgements which teachers make of individual pupils' attainment.

The Survey of Achievement did allow that, and showed that teachers err towards optimism, as shown in this graph.⁶¹

Slide 36

It shows:

In the red bars, the proportion of Primary 7 pupils attaining level D according to objective tests.

In the black bars, teachers' judgements of these same pupils.

The discrepancy is large, especially in science.

The problem now is not only that the Survey of Literacy and Numeracy did not collect information on these judgements, but that it, too, is being discontinued,

⁵⁹ Threshold for statistical significance for 2012 minus 2016 within deprivation category – approx.. 5%.
Threshold for statistical significance for least deprived minus most deprived – approx.. 5%.

⁶⁰ Adapted from Tables 4.3 in Scottish Government (2017), *Scottish Survey of Literacy and Numeracy (SSLN) 2016 – Literacy*.

⁶¹ pp. 3 and 6 in Scottish Government (2009), *Scottish Survey of Achievement 2009: Reading and Writing*; pp. 4 and 88 in Scottish Government (2008), *2008 Scottish Survey of Achievement: Mathematics and Core Skills*; Tables B1, B3 and B4 in Scottish Government (2007), *Scottish Survey of Achievement: 2007 Science, Science Literacy and Core Skills*. See also Munro, L. and Johnson, S. (2008). 'Exploring the validity of teachers' judgements of pupils' attainments'. Paper presented at the annual conference of the International Association for Educational Assessment, Cambridge, September.

to be replaced by a system that depends entirely on teachers' judgements.⁶²

[4. General Principles about what is needed from Educational Surveys]

Of course, I haven't told anything like the whole story of Scottish education in the past century.

But what I hope to have illustrated is the potential of survey series to do that.

And absolutely none of the story that I have just illustrated could have been told in this way if we had had the situation that we face today.

That capacity to remember reliably and therefore to understand is why surveys are important.

Let me then draw out some general principles about why surveys matter and what conditions they have to satisfy if they are to matter significantly.

I'm going to do this under two broad headings:

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[4.1 Design]

[4.1.1 Series]

The first point is about the value of a series.

To be useful educationally, surveys usually⁶³ have to be part of a series, since policy is an intervention in time and since social change happens through time:

⁶² For example, Scottish Government (2017), *Achievement of Curriculum for Excellence (CfE) Levels 2016/17*.

⁶³ A one-off survey can sometimes be effective, an example being the survey which was done by the Scottish Council for Research in Education to document the extent of corporal punishment in the late-1970s. But it had its effect largely because opinion was already moving firmly against any such chastisement at all, so that no tracking of trends was of any use to campaigners. Pollock, G. J., Thorpe,

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One advantage of a series is that it records data from periods before a policy was even thought about, and so can provide an adequate baseline.

We have seen that in all the examples we have considered today.

That also, incidentally, is why the OECD could conclude in 2015 that the evaluation of Curriculum for Excellence was not possible, despite the existence of the Survey of Literacy and Numeracy and the Survey of Achievement.

The disruption between 2009 and 2011 when one replaced the other just at the moment when the new curriculum was officially inaugurated disrupted the time series so severely that no valid comparison was possible.

That interruption prevented anything like the research which Adam Gamoran did on Standard Grade using the series of surveys of school leavers.

[4.1.2 Longitudinal]

Since individual learning and change also happen through time, educational surveys, to be most useful, also should be longitudinal at the level of the individual,

what is usually referred to as a cohort study:

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That principle was perceived by SCRE almost from the start, with its pioneering annual follow-up of the 1947 survey to 1963.

The importance of longitudinal data was explained then by David Glass, who was professor of sociology at the London School of Economics, and who was on the committee which oversaw this extension:

W. G. and Freshwater, S. (1977), *Pupils' Attitude to School Rules and Punishments*, Edinburgh: Scottish Council for Research in Education.

‘Any ad hoc study which assumed that the “environment” of a child was that observed at the point of investigation would be in danger of yielding highly misleading results.’⁶⁴

Ian Deary’s further follow-up when the survey members were aged over 70 allowed the tracing of school effects on social mobility throughout most of a working life.

A similar principle was gradually incorporated into the school leavers’ series after the mid-1980s,

allowing, for example, David Raffe’s investigation of the experience of young people entering the labour market directly from school.

But, valuable though cohort studies are for understanding individual change,

they can be used to study policy change or social change only if they, too, are part of a series.

Thus Growing Up in Scotland is an excellent example of a high-quality cohort study that still flourishes.⁶⁵

But it is of little use in trying to assess the effects of the Curriculum for Excellence on late primary and early secondary,

because there was no preceding cohort study before that policy started.⁶⁶

⁶⁴ Quoted on p. 135 in Ramsden (2014). See also p. 62 in SCRE (1958), *Educational and Other Aspects of the 1947 Scottish Mental Survey*, London: University Press.

⁶⁵ See, eg, <https://growingupinScotland.org.uk/about-gus/study-design-and-methodology/>. Also: Anderson, S., Bradshaw, P., Cunningham-Burley, S., Hayes, F., Jamieson, L., MacGregor, A., Marryat, L. and Wasoff, F. (2007), *Growing Up in Scotland: A Study Following the Lives of Scotland’s Children*, Edinburgh: Scottish Executive. At sweep 6 (2011, aged around 6), Growing Up in Scotland had a response rate of 70% of the original sample at sweep 1. At sweep 8 (2014, aged around 9), the response rate was 60%.

⁶⁶ The GUS cohort 1 was born 2004-5, and so was in primary school approximately 2009-2017. There was no way of knowing which children might have been taught by methods that pre-dated Curriculum for Excellence before it was officially extended across Scotland in 2010. The GUS child cohort was born 2002-3, and was interviewed only up to 2008-9, thus providing no information about ages beyond 6.

[4.1.3 Institutions]

Still on design, surveys have to be linked to educational institutions since education takes place inside institutions:

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That is most obviously true if we want to understand the effects of policy, since policy nearly always has to work through schools, colleges and universities.

Thus the CES research on the effects of comprehensive schools, or on the effects of Standard Grade, depended on being able to link students to the potentially distinctive experience of particular schools.

Institutional linkage is important also if we want to understand social change,

since institutions come to embody traditions,

the legacies of which may be analysed only if we recognise that

students learn from institutional practices that are often quite stable,

as well as from deliberate interventions by policy makers.

That was how we could understand the legacy into the 1950s of school origins in the early part of the twentieth century.

[4.2 Nature of impact]

The second set of points is about the nature of the various kinds of impact which the surveys have had – impact that is not only on policy but also on public debate and academic debate.

Mere monitoring is not enough: the surveys have to include the potential for explanation.

We saw that right at the beginning,

with what Ramsden called the shift to environmental explanations of educational progress.

For that to be possible, the social environment has to be well-measured,

but there also have to be ways of distinguishing between explanations internal to the student – notably their measured intelligence and educational attainment – and explanations that require attention also to the student’s social circumstances:

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The only regular survey now in place in Scotland that would satisfy these minimal requirements would be the three-yearly PISA study, but in other respects it provides no explanations of much use to understanding policy:

it provides no information on school leavers,

no information on teachers’ own judgements of their pupils,

and no way of linking the data to any other sources:

to SQA data

or data from the new standardised assessments

or census data on the neighbourhood of schools

or data on the varied ways in which schools might interpret national curricular advice.

The capacity of surveys to evaluate reforms depended not only on the time-series element, but also on the nature of the measurement.

For example, the series always allowed a distinction to be drawn between family social circumstances and the social characteristics of neighbourhoods.

They thus never suffered from the problems of all the current official monitoring measures which record social circumstances only through a deprivation index of neighbourhoods.

Let me illustrate the problems by the current official targets for widening access to university.

These are all expressed in terms of neighbourhood deprivation – for example, that 20% of entrants to university ought to come from the 20% most deprived neighbourhoods.⁶⁷

The problem is that the 20% most deprived neighbourhoods have lots of non-deprived people, and that lots of deprived people don't live in these neighbourhoods, as is shown in this graph using data from Growing Up in Scotland:⁶⁸

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Two thirds of children who live in a family where no adult has a higher-education qualification live outside the 20% most deprived neighbourhoods.

One quarter of children living in the most deprived neighbourhoods are not educationally deprived at all.

Only a survey of the quality of Growing Up in Scotland allows us to see these problems,

as would have all the series of surveys that we have been considering.

None of the official methods of monitoring participation allow this necessary subtlety of understanding.

(*****)

What lies behind this kind of analysis of the deficiencies of current official monitoring is no mere academic quibble.

⁶⁷ p. 67 in Commission on Widening Access (2016), *A Blueprint for Fairness: The Final Report of the Commission on Widening Access*, Edinburgh: Scottish Government; 'Widening access to higher education: ministerial statement', 30 May 2017, <https://beta.gov.scot/publications/widening-access-to-higher-education-ministerial-statement/> [accessed 6 March 2018]. Both of these statements about targets are specified in terms of entry to universities, as distinct from entry to higher-education courses at further-education colleges.

⁶⁸ Calculated from Growing Up in Scotland (2011 sweep). See also submission by the present author to 'National Improvement Framework: [Scottish Government] Consultation on measuring the attainment gap and milestones towards closing it', available at <https://tinyurl.com/ydddpt3n>.

Universities can get away with meeting the widening-participation targets by recruiting the educationally advantaged minority from the disadvantaged neighbourhoods.

Elizabeth Weedon has shown that, of the university students from the 20% most deprived neighbourhoods in 2014, as many 35% had a parent with a higher-education qualification.⁶⁹

Recruiting these students is not widening participation in any sociologically meaningful way.

That is, to understand the complex interaction of family and community, and of both of these with schools, we need psychological as well as sociological theory:

about how people learn,

about how they are encouraged or constrained in their learning by people round about them,

and about how our institutions and communities counteract or reinforce the social constraints.

[5. Conclusion]

This then, finally, brings me back to the argument for a public account of an education system made thirty years ago by the CES writers Burnhill, McPherson, Raffe and Tomes.

They hoped that a survey series could be designed in a way that would allow people involved in education to participate in the design and analysis

and would thus overcome the risk that the mental world of the researcher would be different from those of the survey respondent and the policy maker.

⁶⁹ p. 10 in Weedon, E. (2016), *Intersectionality in Scottish Higher Education Institutions: Examining Socioeconomic Status and Protected Characteristics*, London: Equality Challenge Unit. Weedon used data from the Higher Education Statistics Agency on full-time, Scotland-domiciled, first-year undergraduates at Scottish Higher Education Institutions in academic year 2013-14.

They hoped also that a survey series could hold power to account.

The record of the series about which they were writing – as I have tried to illustrate – rather emphatically vindicates that last, democratic aim:

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As with the earlier surveys by SCRE, and also as with the surveys of primary pupils more recently, the statistical evidence provided by carefully analysed and continually improving surveys has repeatedly provided useful evidence about policy.

Let me reiterate some of these salient instances.

Only survey evidence could have shown that the selective system was not working fairly in the 1950s.

Only survey evidence could show that the curriculum of comprehensive schooling was widening access to the full breadth of knowledge.

Nothing but survey evidence was subtle enough to show the diversion into lower-status programmes that has lain at the heart of the expansion of higher education.

And, more recently, it required survey evidence to raise concerns about the standards which Scottish primary pupils are attaining.

That survey record could certainly be said to vindicate Godfrey Thomson's belief in 1936 that 'what is wanted is knowledge, classified, generalised, tested', in order 'to understand this changing world and to guide it aright'.⁷⁰

And then if we wonder whether the surveys have indeed adequately represented the concerns of the participants,

the answer is in the many ways in which the surveys have in fact presciently recorded social changes before they were visible to policy.

⁷⁰ p. 58 in Deary, I. J., Lawn, M., Brett, C. E. and Bartholomew, D. J. (2009), "'Intelligence and Civilisation": A Ludwig Mond lecture delivered at the University of Manchester on 23rd October 1936 by Godfrey H. Thomson. A reprinting with background and commentary', *Intelligence*, 37, pp. 48-61.

Perhaps the most striking in retrospect was the recording in 1981 of young women's rising educational aspirations during the 1970s, anticipating the revolution that was to come.

The inclination of low-attaining school leavers to use education in preference to being unemployed was detected by the surveys before government devised adequate training schemes and school curricula beyond age 16 to help them.

The choice of high-status school subjects by students from high-social-class families wanting to get into high-status universities is reflected in the surveys even though invisible to any official policy or advice or professional practices.

In short, surveys analysed debates that were already happening among citizens,

which is a reminder to academics not to take themselves too seriously:

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These surveys, long before we had a national parliament, thus provided the stage on which a debate was had about Scotland's educational future.

That was why the hope in the 1990s was that a parliament would form a natural supporter of this kind of evidence.

But nothing of the sort has come to pass.

There is now not one single indigenous survey series with which to hold our new rulers to account in education,

and not even an openness to methodological discussion of the kinds of evidence that would be needed.

There is a philistinism and a closing of minds to science that are the very antithesis of proper accountability.

What I have sought to show tonight – even though only through examples – is that

the Scottish tradition of survey research in education has a scientific rigour and a social responsiveness that still hold the prospect of the kind of public account that David Raffe and colleagues in CES hoped for thirty years ago, when they praised the public scepticism of the scientific method.

That was the original ideal, too, which inspired those autonomous civic organisations that set up SCRE in the face of government indifference nearly a century ago.

And the great thing about science, unlike ephemeral political fashions, is that the scientific method never dies.

Scottish Education Policy: why statistics matter

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Scottish education survey series

Surveys of various ages by the Scottish Council for Research in Education

Surveys of school leavers mainly by the Centre for Educational Sociology

Surveys of primary-school pupils

Surveys by the Scottish Council for Research in Education, and follow-up

Survey	Dates	Coverage
Scottish Mental Survey	1932	All 11-year-olds
Scottish Mental Survey	1947	All 11-year-olds
'Scotland in miniature'	1947-1963	Annual follow-up of sub-sample of 1947 survey
Long-term follow-up of Scottish Mental Surveys (Deary et al.)	Mid-1990s to present	All traceable sample members

Surveys of school leavers

Survey	Dates	Coverage
Assessment for higher education (SCRE)	1962	All who had passed at least one Higher
Scottish School Leavers' Surveys (CES then ScotCen)	Mostly biennial 1971-2005	10%-40% samples of all leavers (except 1971, 1973, and part of 1977 when coverage was those who had passed at least one certificate examination)
Scottish Young People's Surveys (CES then ScotCen)	Mostly biennial 1985-2005	Longitudinal survey of age group, followed variously to ages 19-24

Surveys of primary-school attainment

Survey	Dates	Coverage
Scottish Scholastic Surveys (SCRE)	1953 and 1963	100% (1953) and 6% (1963) of 10-year-olds
Assessment of Achievement Programme	1983-2004	2% of Primary 4, Primary 7 and Secondary 2
Scottish Surveys of Achievement	2005-2009	7-20% of Primary 3, Primary 5, Primary 7 and Secondary 2
Scottish Surveys of Literacy and Numeracy	2011-2016	25% of Primary 4, Primary 7 and Secondary 2

The Scottish education survey series: summary

Surveys by the Scottish Council for Research in Education

1932, 1947 and follow up

Surveys of school leavers mainly by the Centre for Educational Sociology

1962, 1971-2005

Surveys of primary-school pupils

1953, 1963, 1984-2016

Themes in policy and social change from a century of Scottish education

Secondary education for all	1930s – 1960s
Comprehensive secondary education	1970s – 1980s
Expansion of higher education	1980s – present
Attainment in primary school	1950s – present

Origins of school sectors

Senior secondary: former Higher Grade

Old senior secondary

Origins of school sectors

Senior secondary founded after 1924

Senior secondary: former Higher Grade

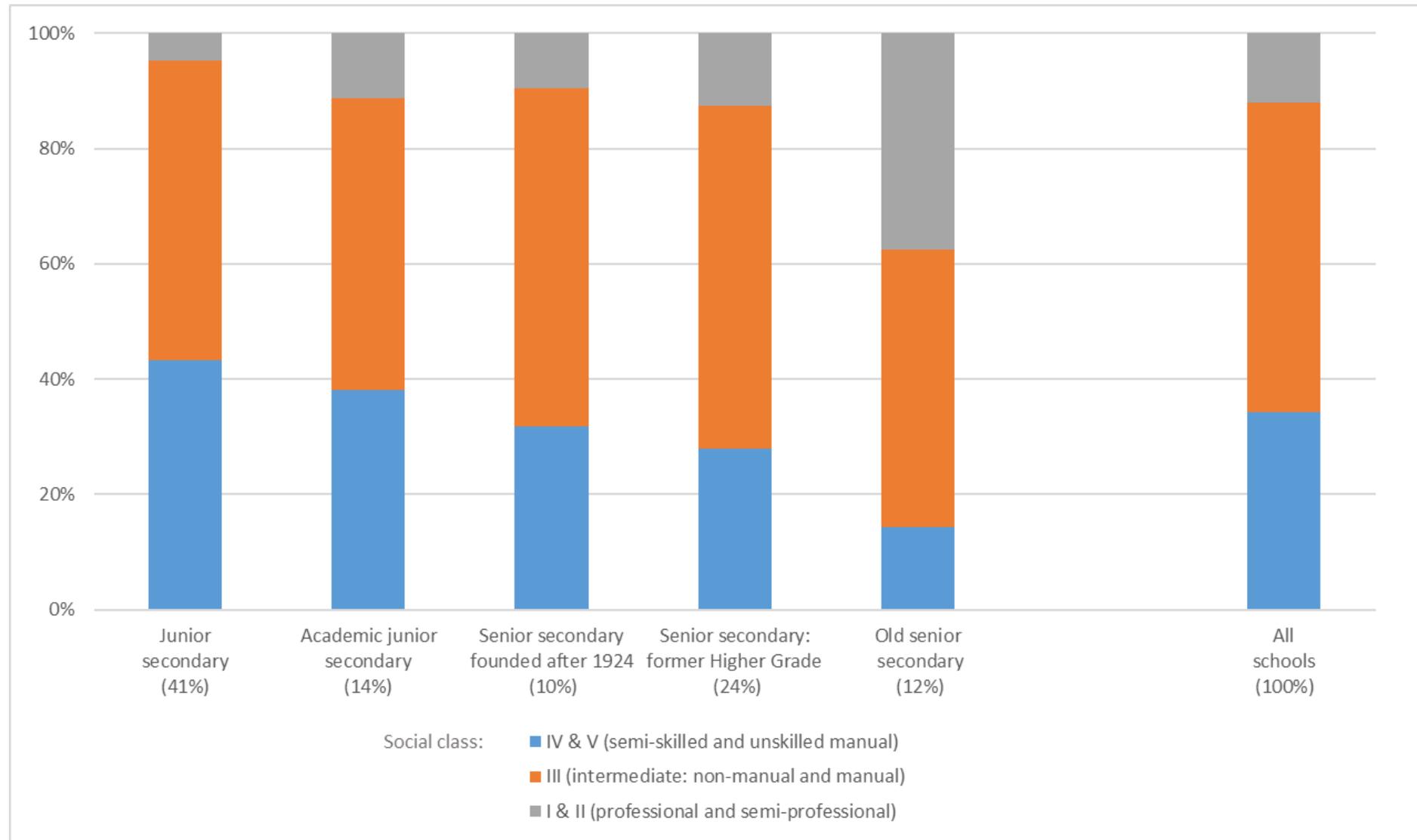
Old senior secondary

Origins and share of school sectors (entrants in 1947)

Sector	Share of pupils (%)
Junior secondary	41
Academic junior secondary	14
Senior secondary founded after 1924	10
Senior secondary: former Higher Grade	24
Old senior secondary	12

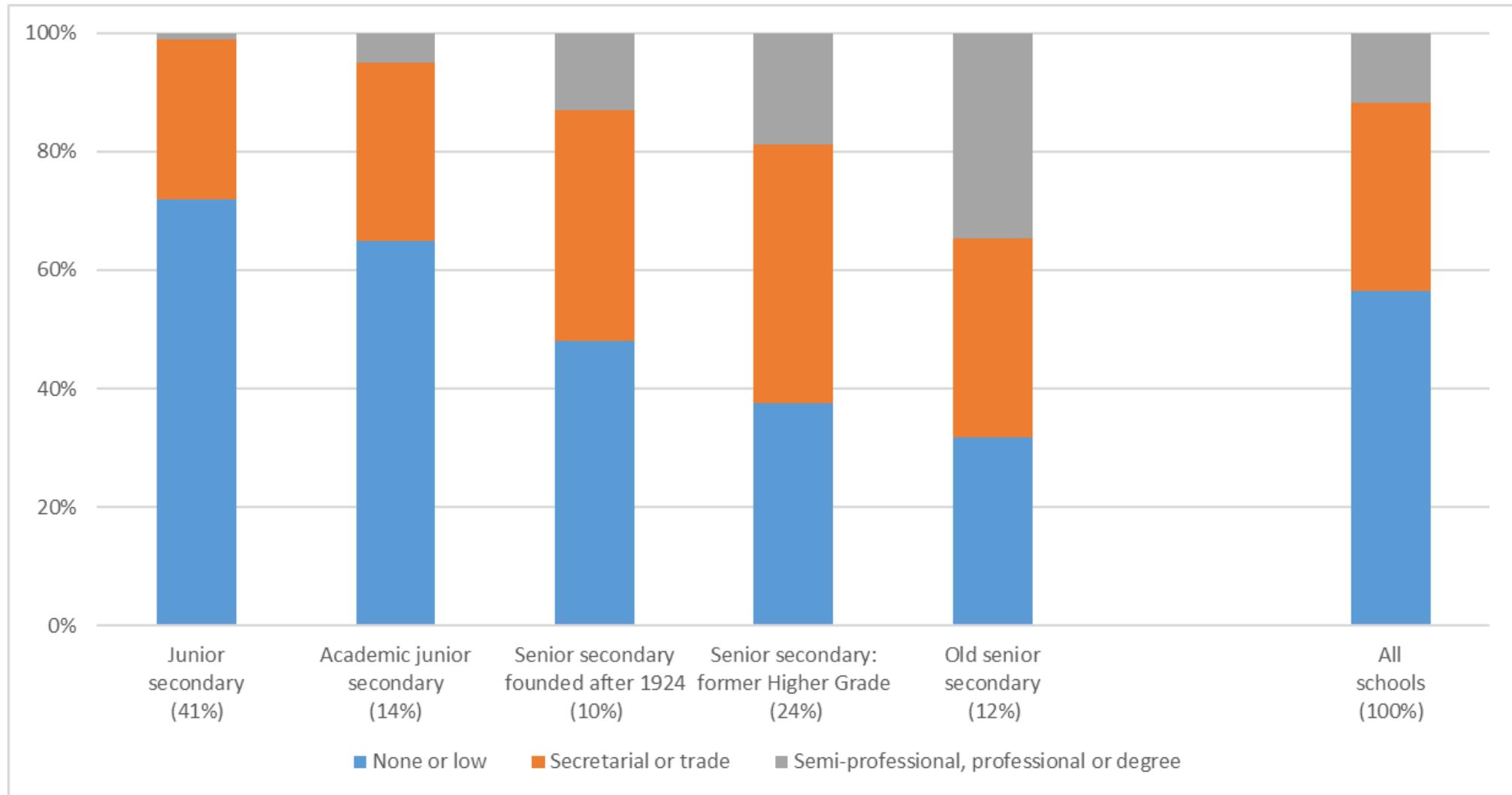
Source: Scottish Mental Survey (1947). Table 2 in Paterson, L., Pattie, A. and Deary, I. (2011), 'Social class, gender and secondary education in Scotland in the 1950s', *Oxford Review of Education*, 37, pp. 383-401.

Social-class composition of school sectors (1947)



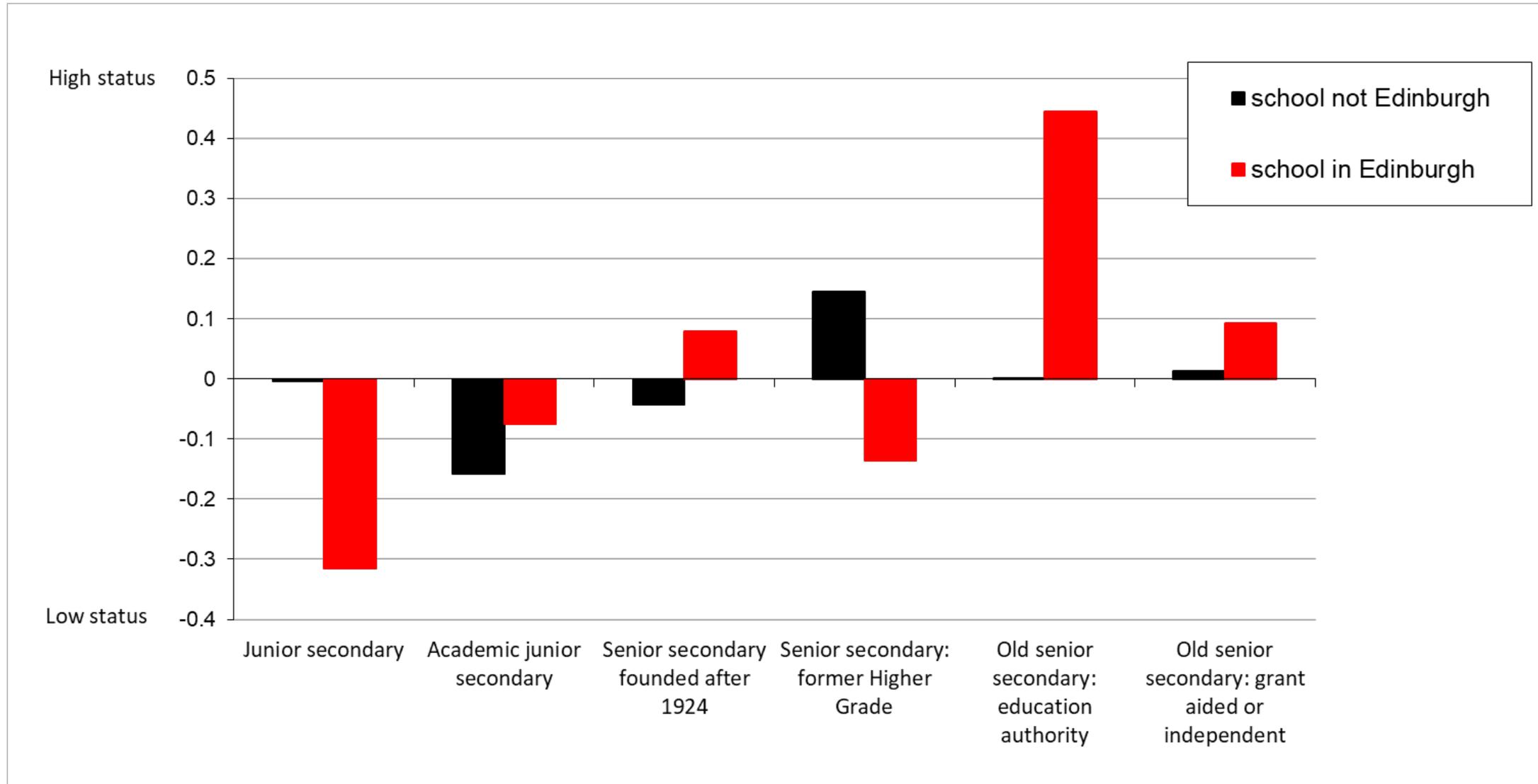
Source: Scottish Mental Survey (1947). Table 1 in Paterson, L., Pattie, A. and Deary, I. (2011), 'Social class, gender and secondary education in Scotland in the 1950s', *Oxford Review of Education*, 37, pp. 383-401.

Educational attainment up to age 27, by school sectors (1947-63)



Source: Scottish Mental Survey (1947-63). Table 2 in Paterson, L., Pattie, A. and Deary, I. (2010), 'Post-school education and social class destinations in Scotland in the 1950s', *Longitudinal and Life Course Studies*, 1, pp. 371-93.

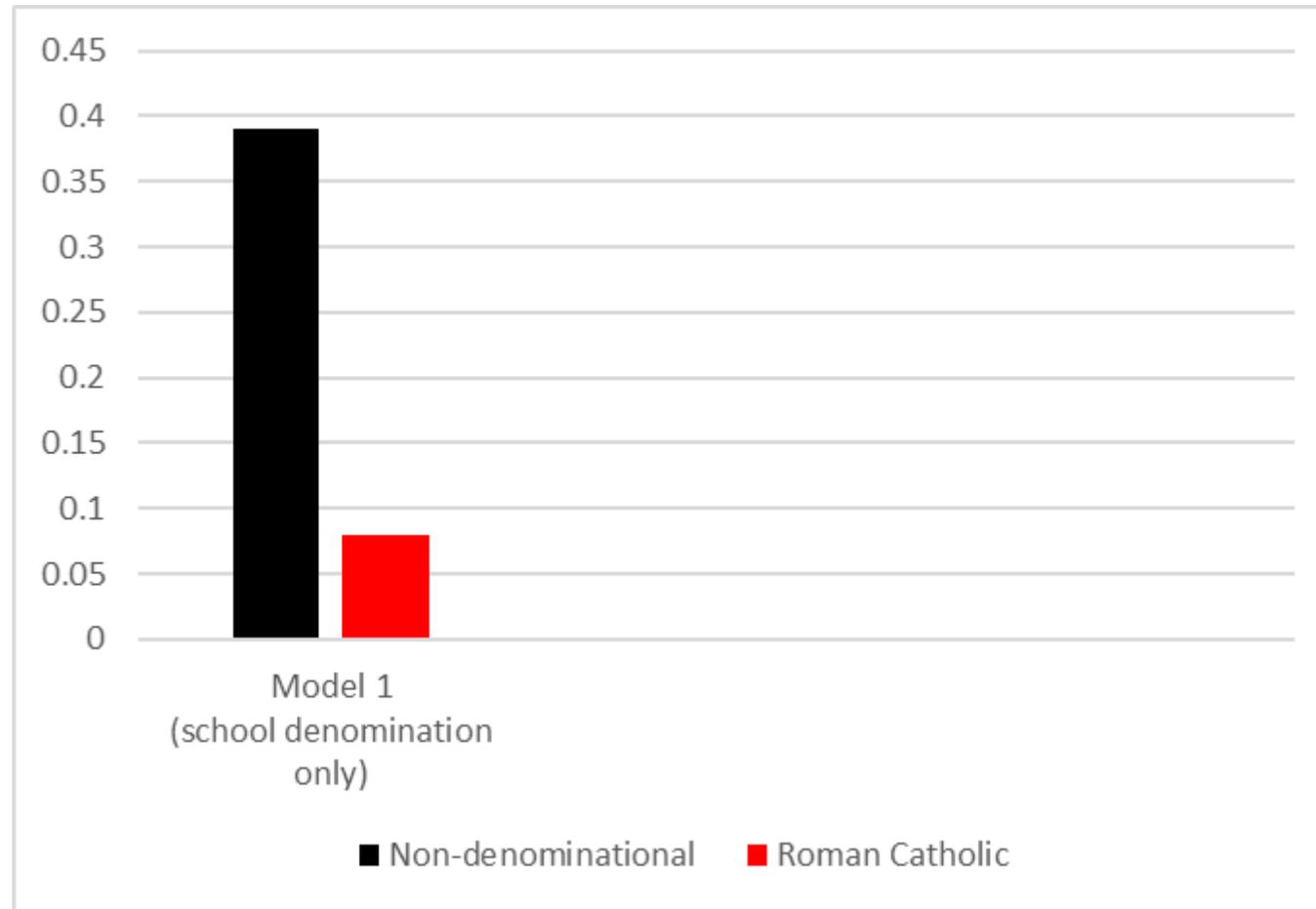
Highest social-class status attained up to 2004-7 among people born in 1936, by school attended



Source: Scottish Mental Survey (1947, followed up as the Lothian Birth Cohort, 2004-7). Figure 1 in Paterson, L., Gow, A. and Deary, I. J. (2014), 'School reform and opportunity throughout the lifecourse: the Lothian Birth Cohort 1936', *School Effectiveness and School Improvement*, 25, pp. 105-125.

Average attainment in Leaving Certificate, 1951-3, by school denomination
(pupils in senior-secondary schools only)

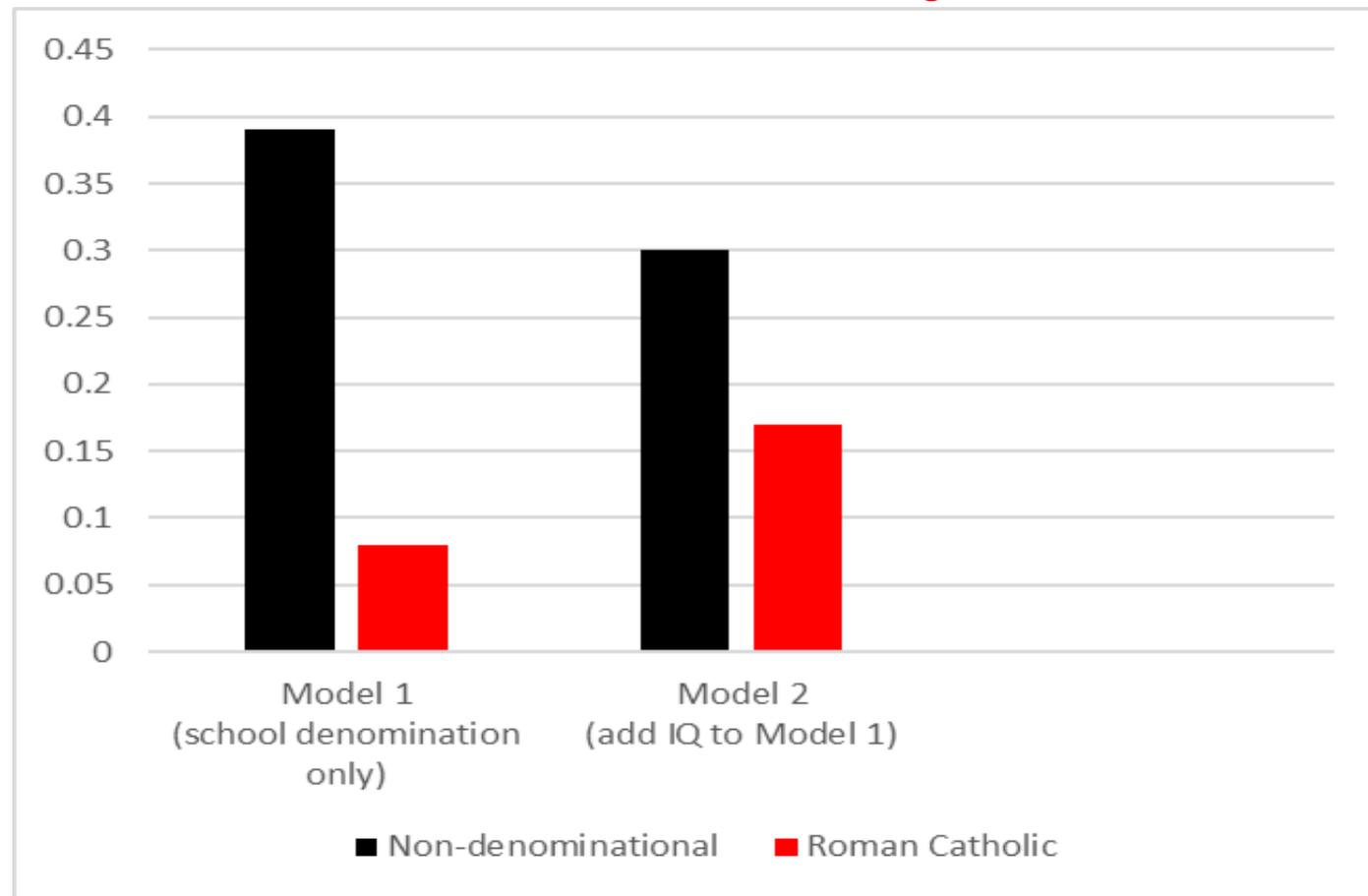
Unadjusted difference



Standardised scale: Higher pass approx. 0.8; Lower pass approx. 0.4.

Average attainment in Leaving Certificate, 1951-3, by school denomination
(pupils in senior-secondary schools only)

Control for IQ measured at age 11

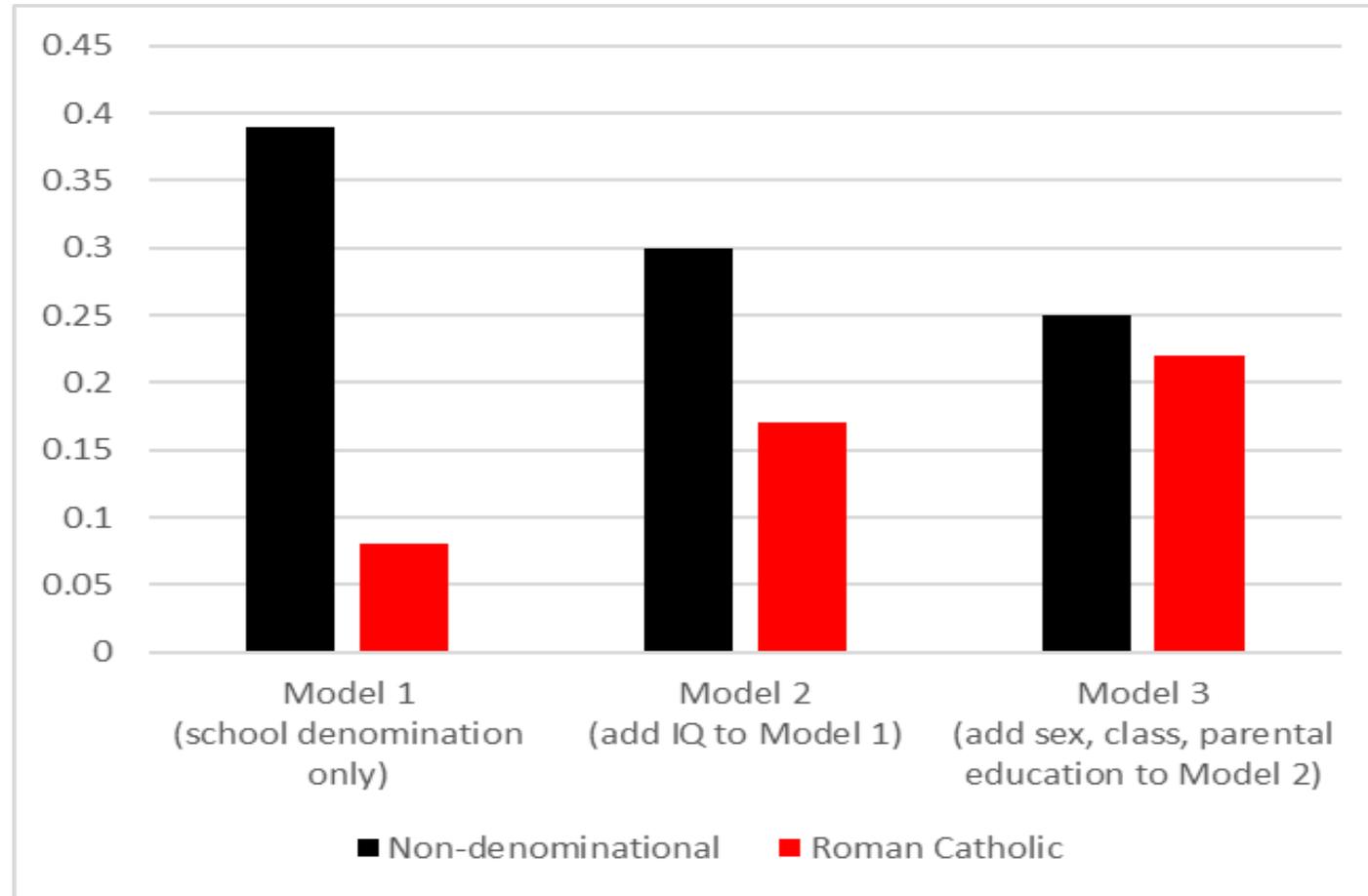


Standardised scale: Higher pass approx. 0.8; Lower pass approx. 0.4.

Source: Scottish Mental Survey (1947-53). Derived from Table 7 in Paterson, L., Calvin, C. and Deary, I. J. (2015), 'Education, employment and school religious denomination in Scotland in the 1950s', *Oxford Review of Education*, 41, pp. 26-46.

Average attainment in Leaving Certificate, 1951-3, by school denomination
(pupils in senior-secondary schools only)

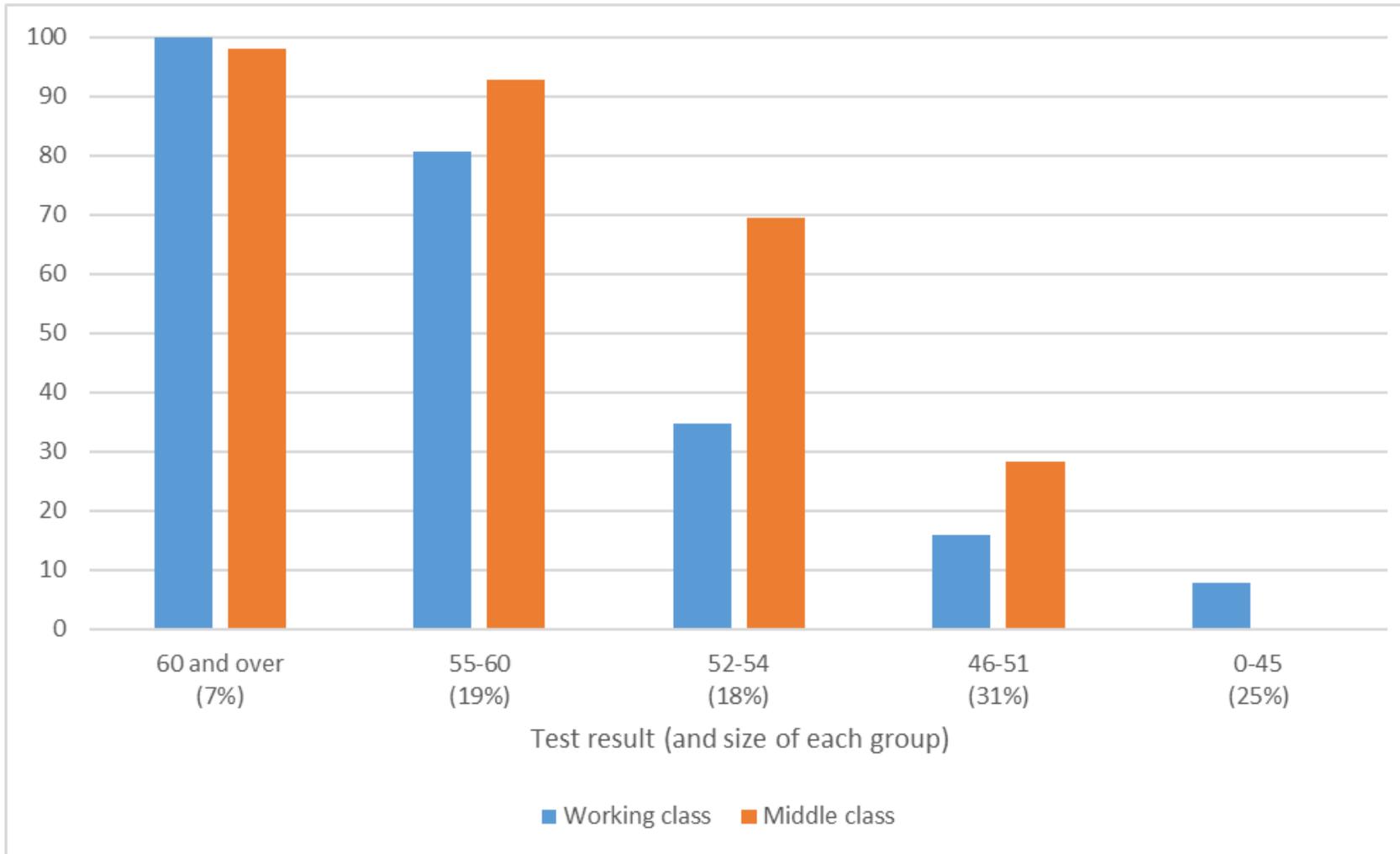
Control also for sex, class and parental education



Standardised scale: Higher pass approx. 0.8; Lower pass approx. 0.4.

Source: Scottish Mental Survey (1947-53). Derived from Table 7 in Paterson, L., Calvin, C. and Deary, I. J. (2015), 'Education, employment and school religious denomination in Scotland in the 1950s', *Oxford Review of Education*, 41, pp. 26-46.

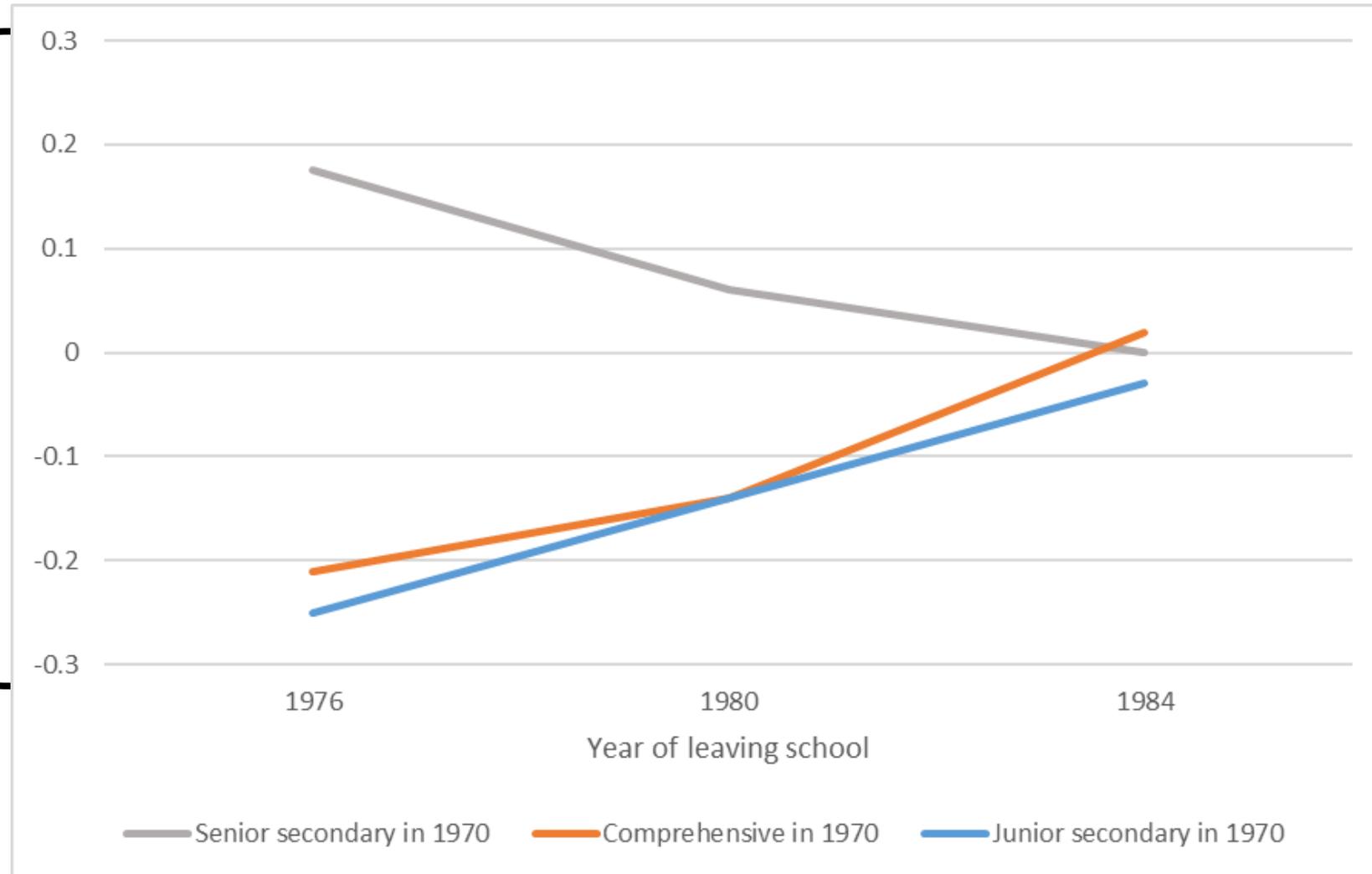
Percentage on senior-secondary courses, 1957-8, by social class and test of attainment and intelligence at age 11



Source: Scottish sample in National Survey of Health and Development (1946-57). Derived from Table 2 in Douglas, J. W. B., Ross, J. M., Maxwell, S. M. M. and Walker, D. A. (1966), 'Differences in test score and in the gaining of selective places for Scottish children and those in England and Wales', *British Journal of Educational Psychology*, 36, pp. 150-157.

Average attainment, by three trajectories of school re-organisation, mid-1970s to mid-1980s: selective community in 1974

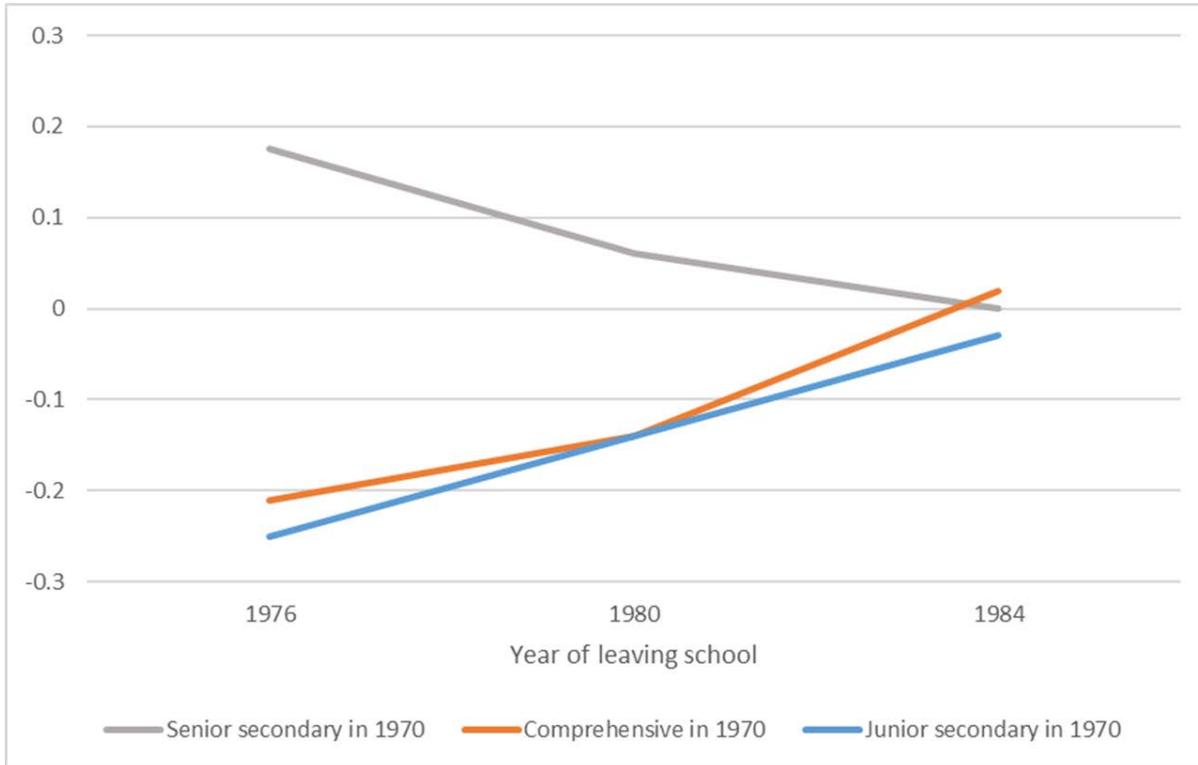
Scale of attainment:
0.1 = approx.
one O-grade
at A-C.



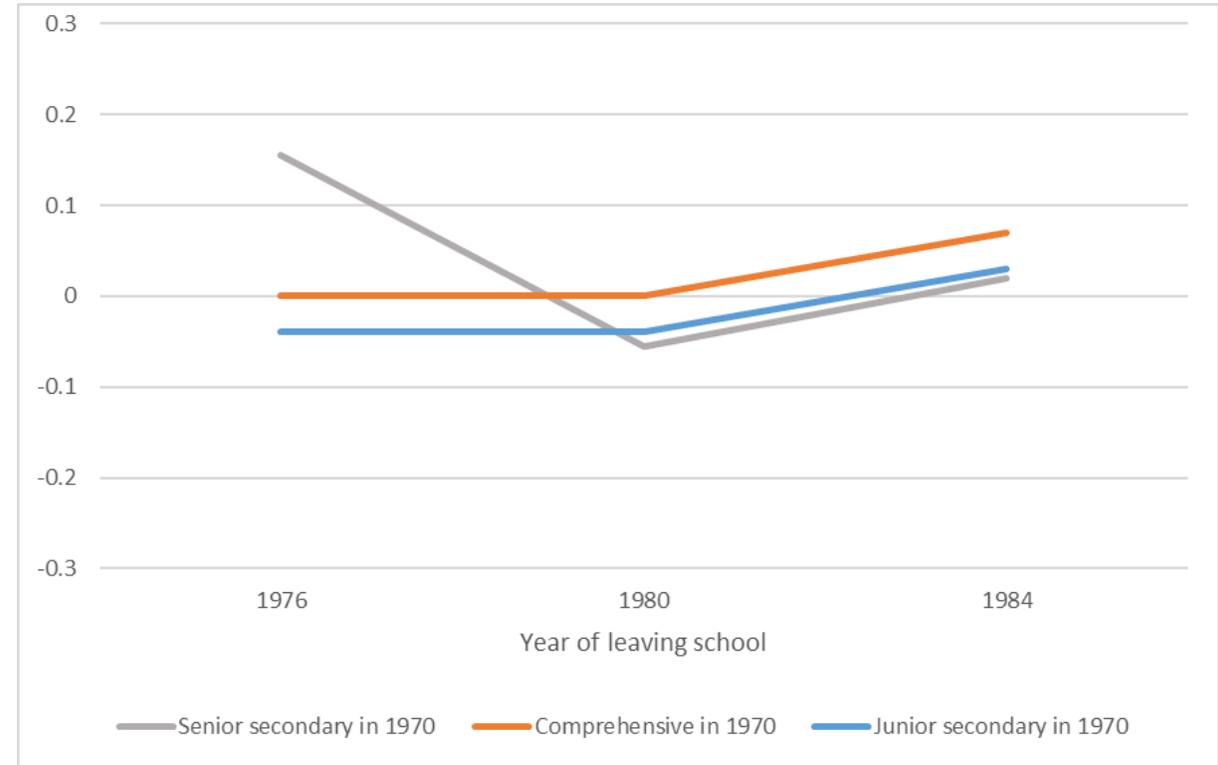
Source: Scottish School Leavers' Surveys (1977, 1981 and 1985). Extracted and simplified from Figure 3 in McPherson, A. and Willms, J.D. (1987), 'Equalisation and improvement: some effects of comprehensive reorganisation in Scotland', *Sociology*, 21, pp. 509-39.

Average attainment, by three trajectories of school re-organisation, mid-1970s to mid-1980s

Selective community in 1974



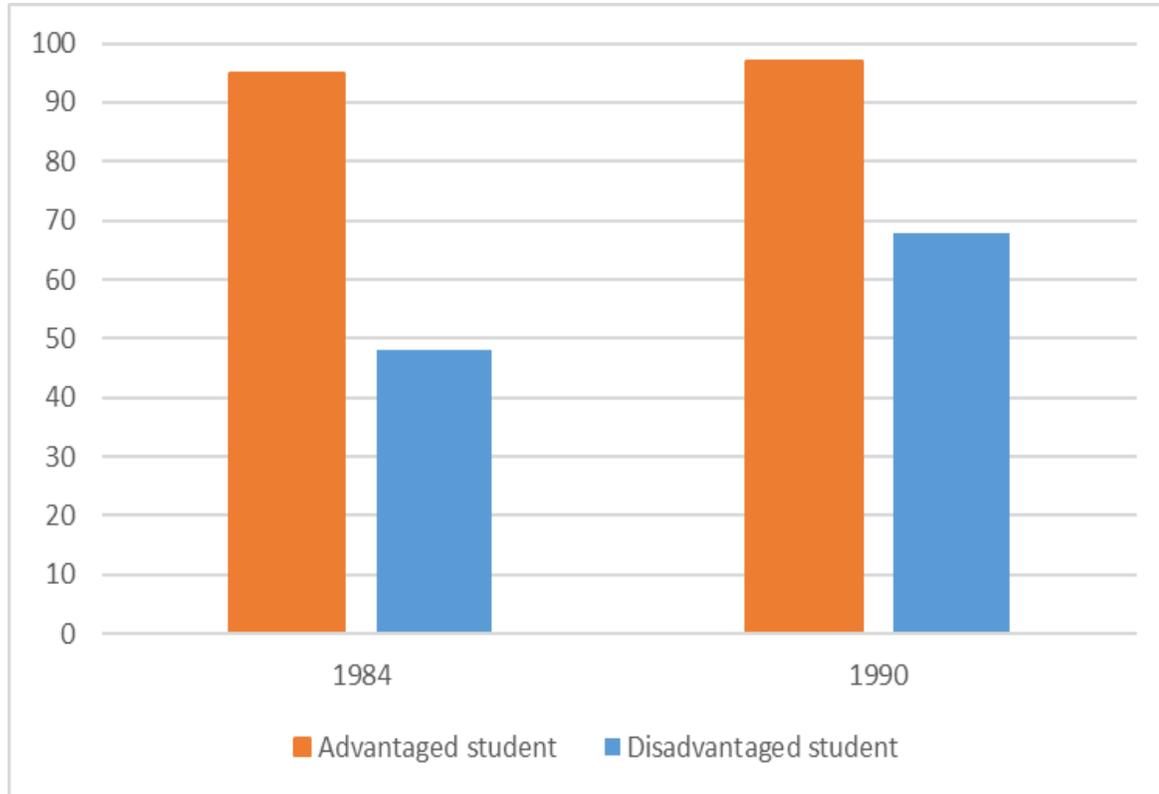
Unselective community by 1974



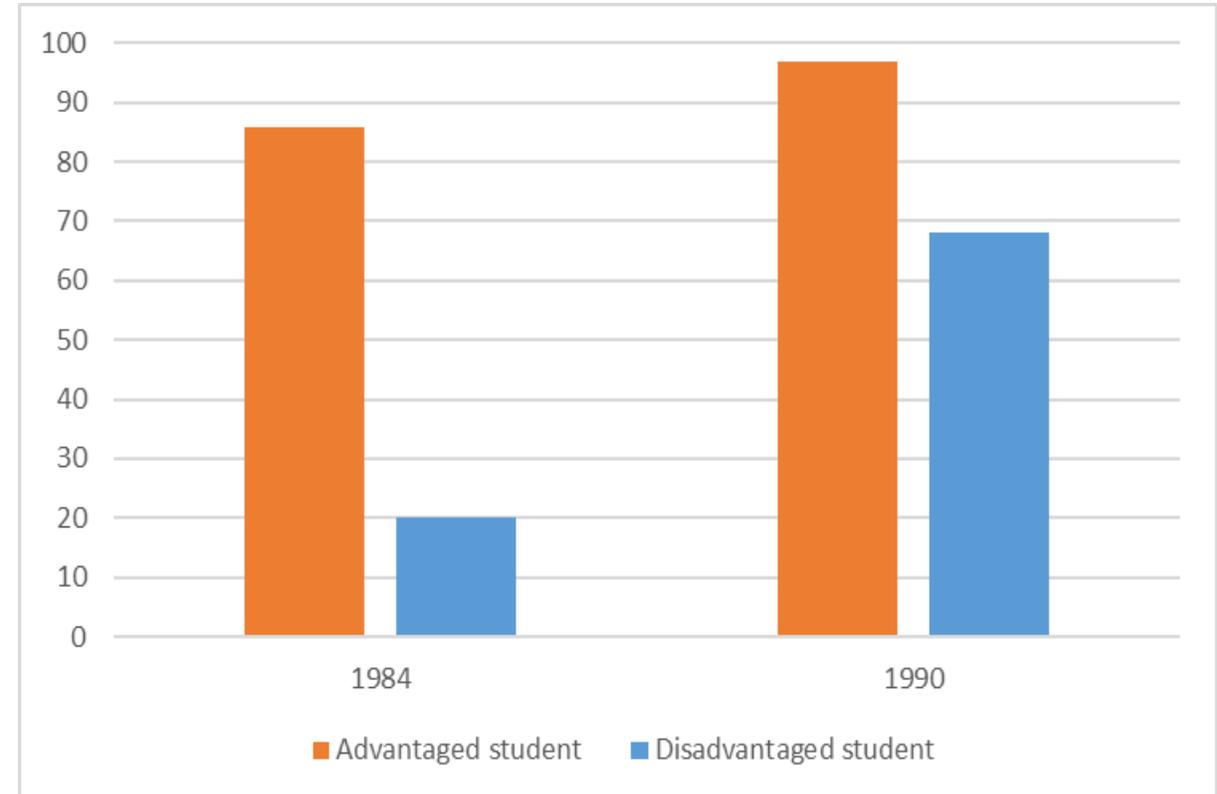
Source: Scottish School Leavers' Surveys (1977, 1981 and 1985). Extracted and simplified from Figure 3 in McPherson, A. and Willms, J.D. (1987), 'Equalisation and improvement: some effects of comprehensive reorganisation in Scotland', *Sociology*, 21, pp. 509-39.

Change in social inequality in taking Ordinary Grade or Standard Grade, 1984-1990

English



Mathematics (including Arithmetic)

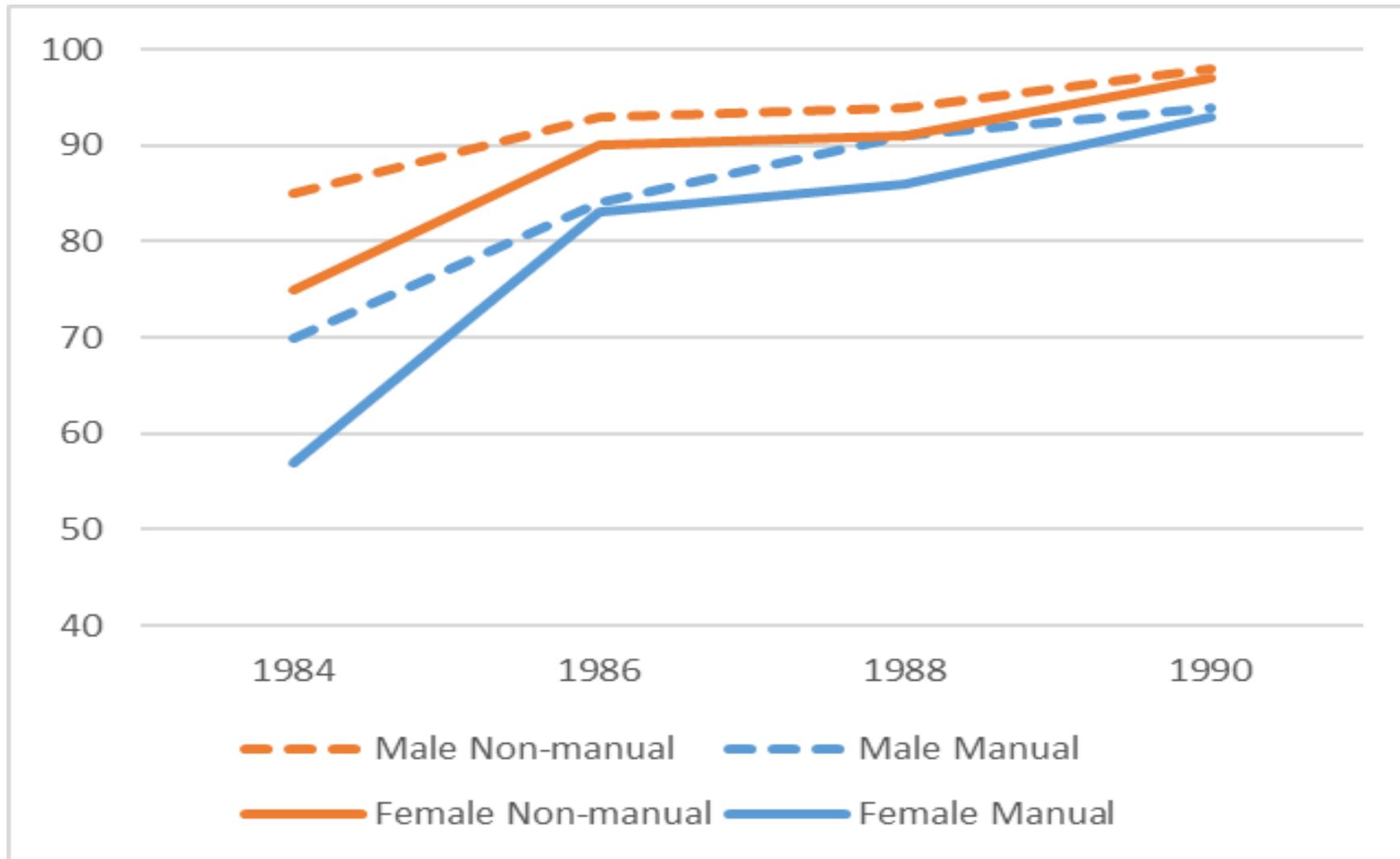


Advantage student: parents in professional occupations who left school at age 16 or older.

Disadvantage student: parents in unskilled occupations who left school before age 15.

Source: Scottish School Leavers' Surveys (1985-91). Figure 1 in Gamoran, A. (1996), *Improving Opportunities for Disadvantaged Students: Changes in S4 Examination Results, 1984-1990*, CES Briefing, No. 6. See also Gamoran, A. (1995), 'Curriculum standardisation and equality of opportunity in Scottish secondary education, 1984-1990', *Sociology of Education*, 69, pp. 1-21.

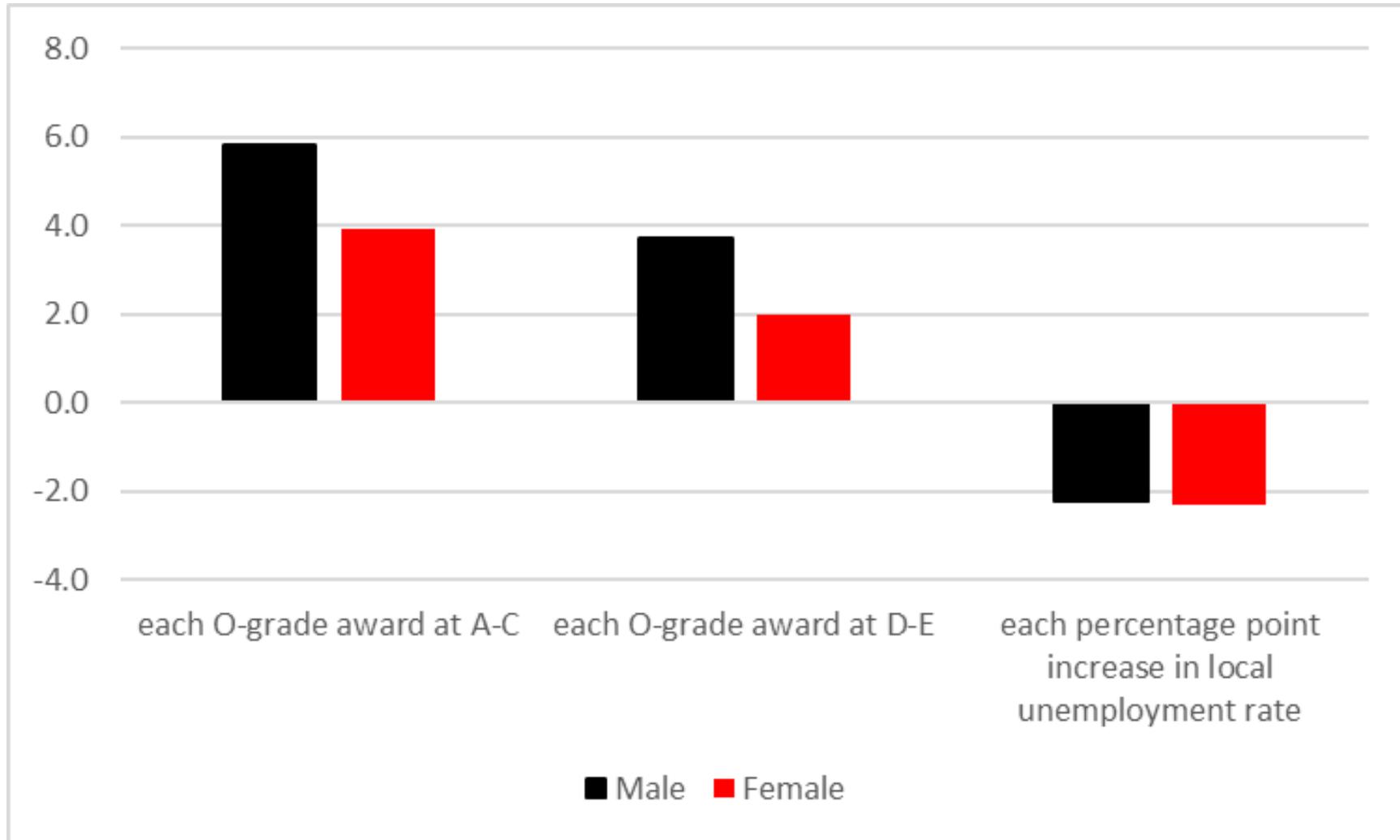
Percentage studying science in Secondary 4, by sex and social class, 1984-1990



(Origin not 0)

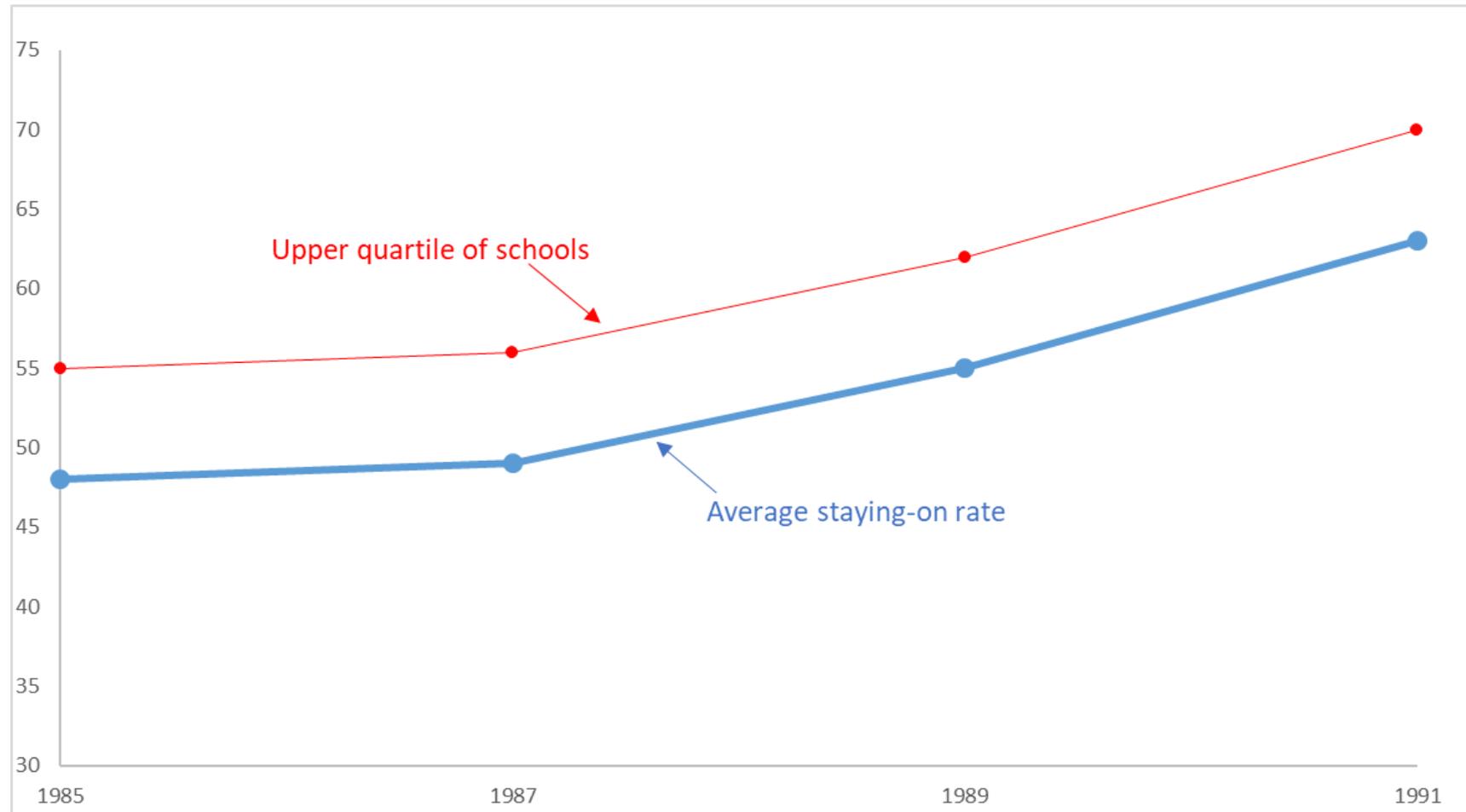
Source: Scottish School Leavers' Surveys (1985-91). Derived from Table 4 in Croxford, L. (1994), 'Equal opportunities in the secondary school curriculum in Scotland', *British Educational Research Journal*, 20, pp. 371-91.

Percentage point change in chances of employment in May 1981 associated with attainment and with local unemployment, among school leavers in summer 1980



Source: Scottish School Leavers' Survey (1981). Derived from Table 9.3 in Raffe, D. (1984), 'School attainment and the labour market', in D. Raffe (ed.), *Fourteen to Eighteen*, Aberdeen: University Press, pp. 174-93.

Rise in staying-on rates, and variation among schools, 1985-91

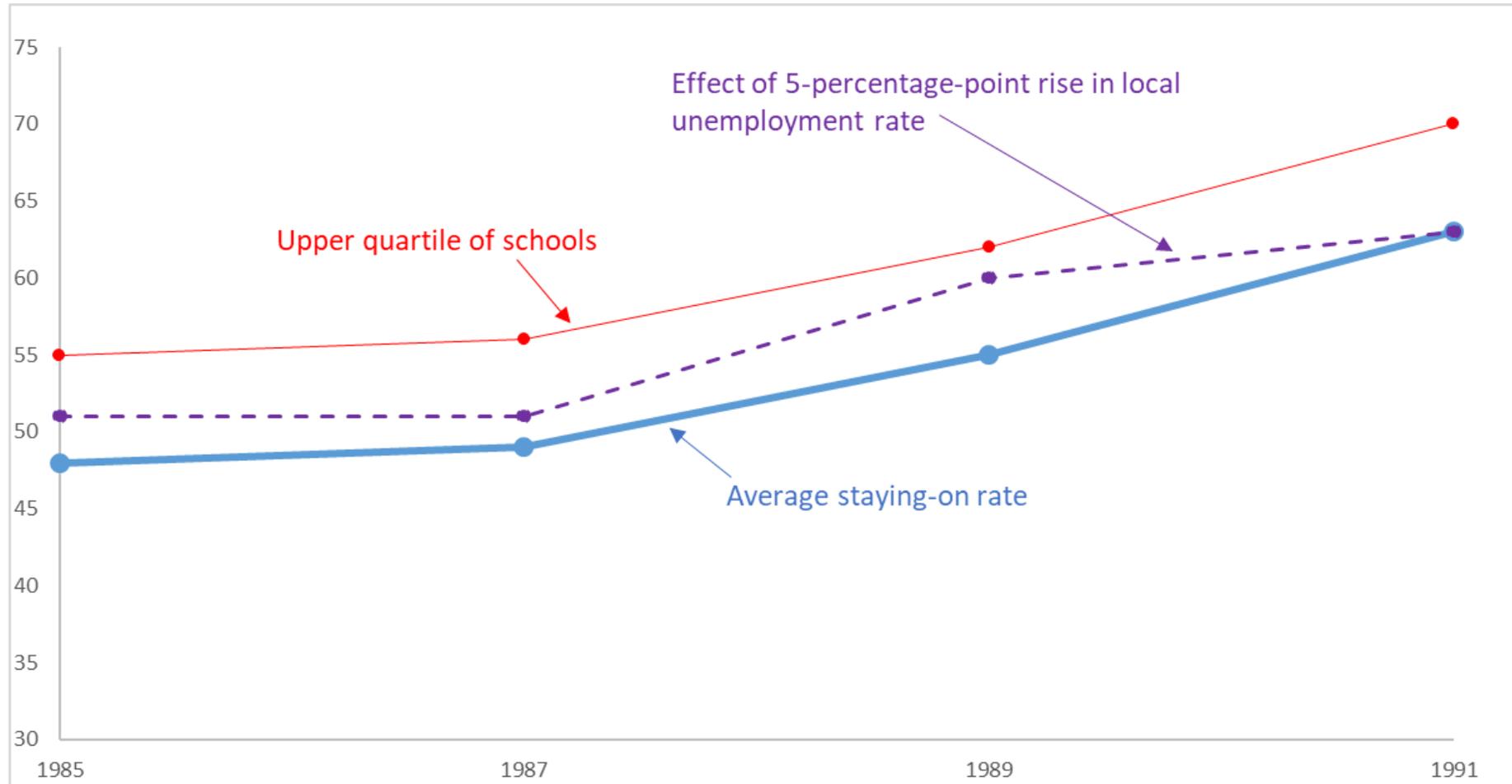


(Origin not 0)

Models include control for attainment, sex, parental education and parental social class.

Source: Scottish School Leavers' Surveys (1985-91). Derived from pp. 11-15 in Paterson, L. and Raffe, D. (1995), 'Staying on in full time education in Scotland, 1985 1991', *Oxford Review of Education*, 21, pp. 3-23.

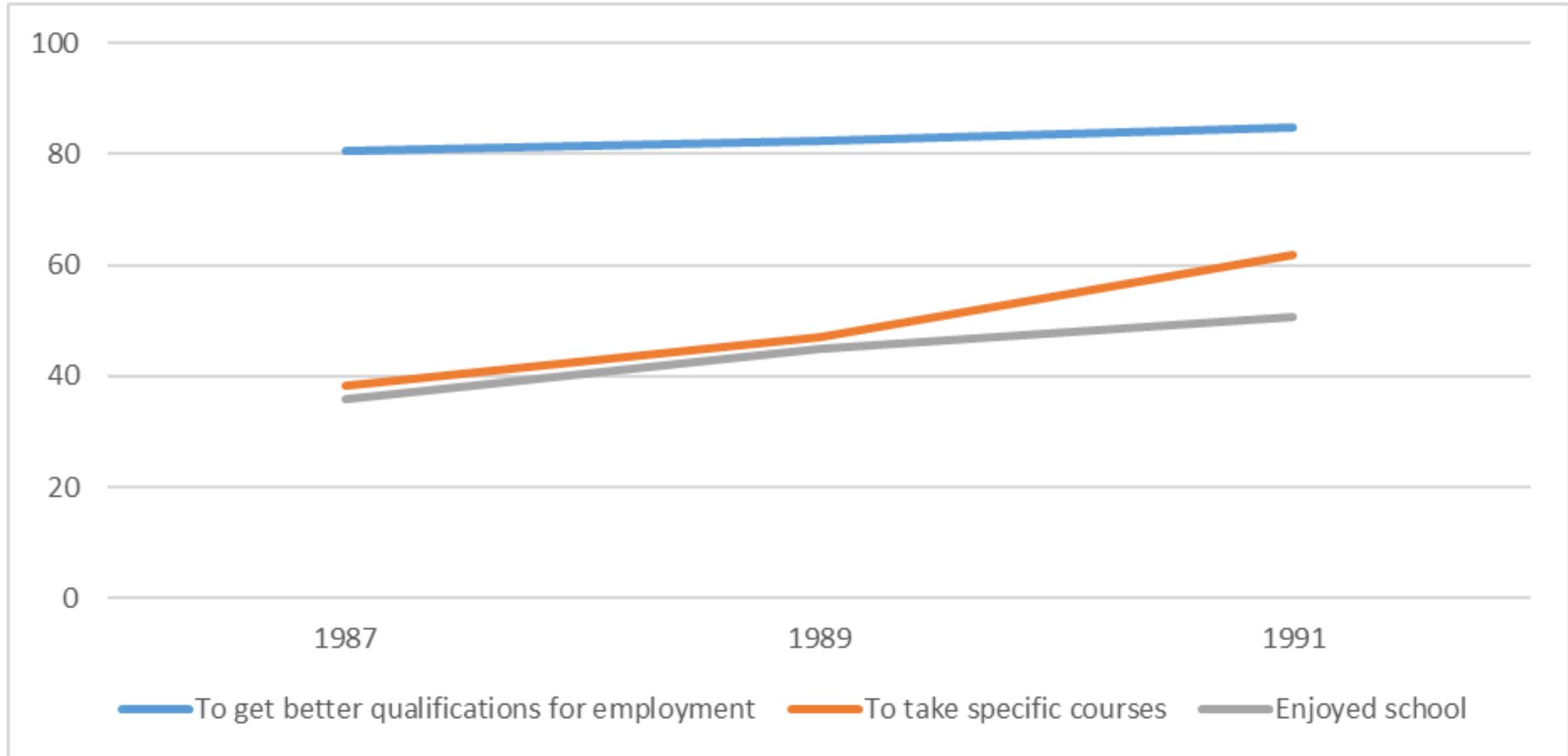
Rise in staying-on rates, and effects of local unemployment, 1985-91



Models include control for attainment, sex, parental education and parental social class.

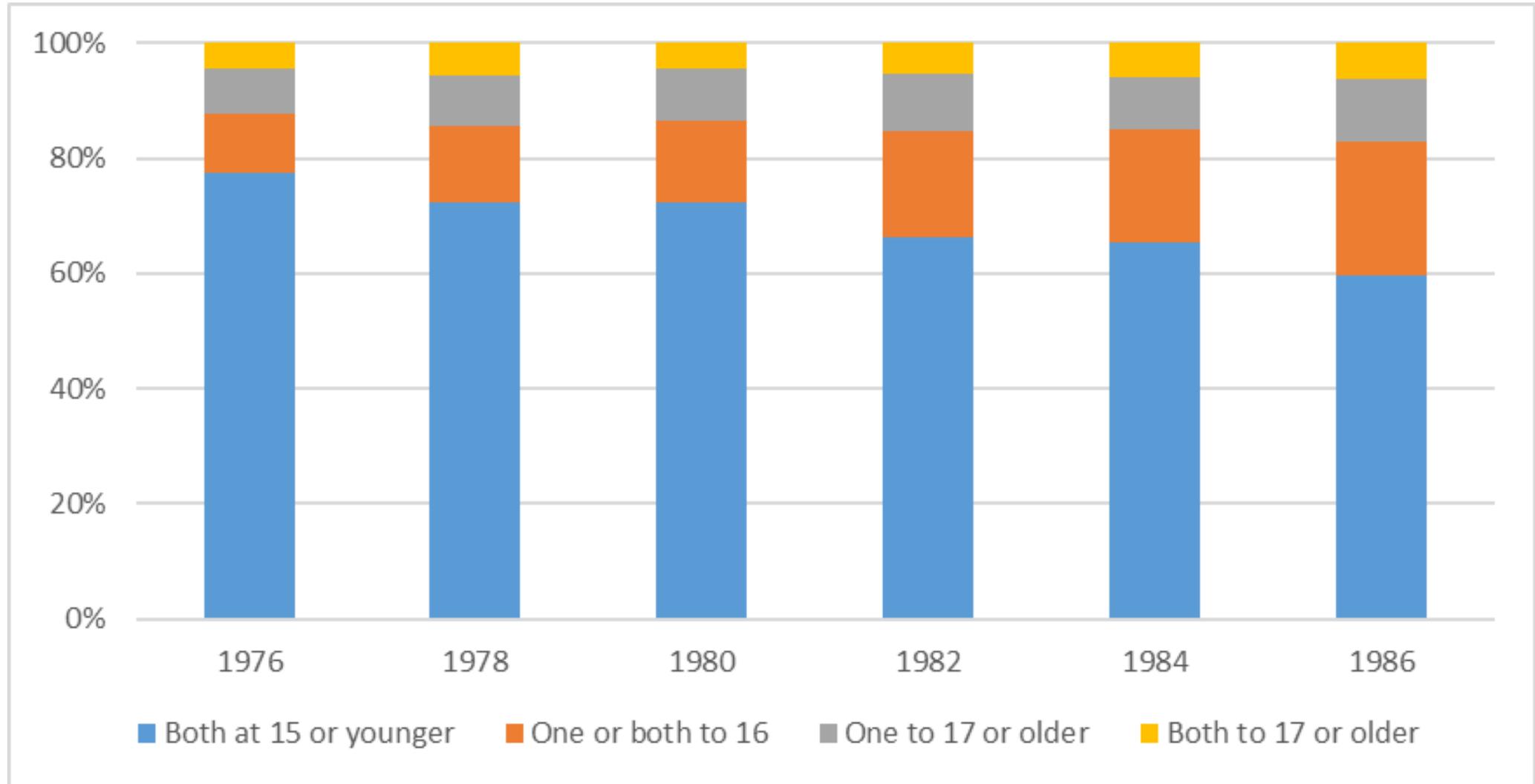
Source: Scottish School Leavers' Surveys (1985-91). Derived from pp. 11-15 in Paterson, L. and Raffe, D. (1995), 'Staying on in full time education in Scotland, 1985 1991', *Oxford Review of Education*, 21, pp. 3-23.

Selected reasons for staying on in school beyond minimum leaving age, 1987-1991



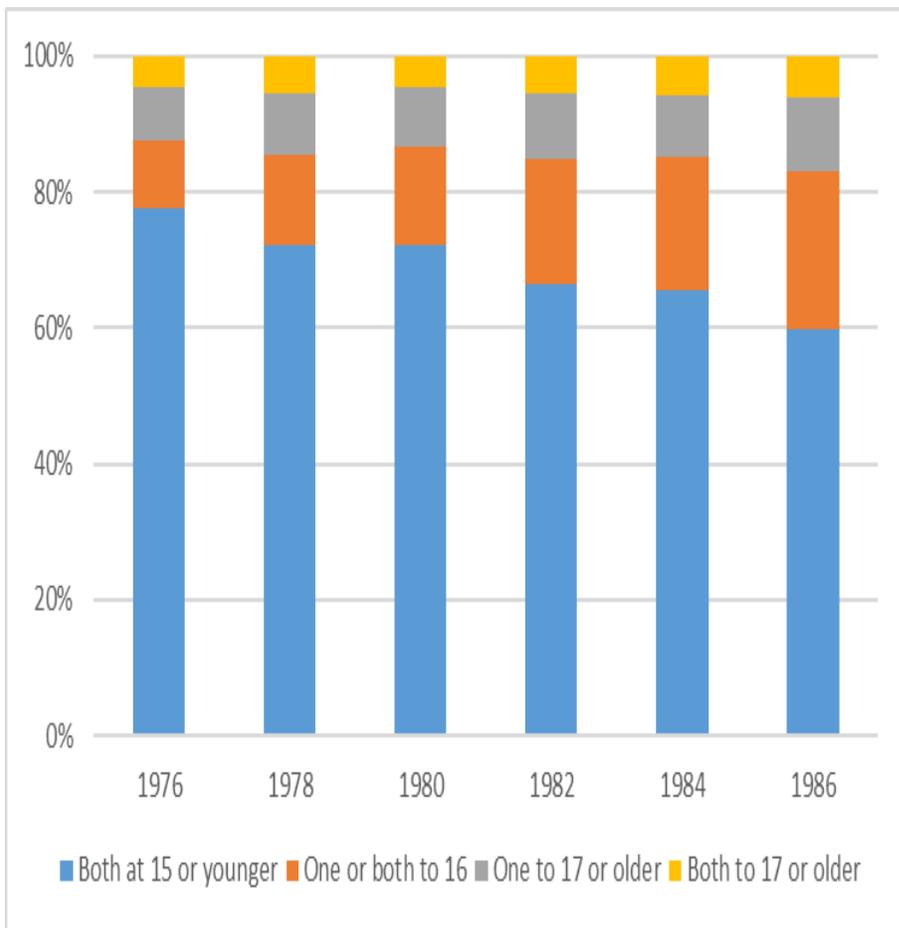
Source: Scottish School Leavers' Surveys (1987-91). Selected from Table VII in Paterson, L. and Raffe, D. (1995), 'Staying on in full time education in Scotland, 1985 1991', *Oxford Review of Education*, 21, pp. 3-23.

Ages at which parents left school, among school leavers, 1976-1986

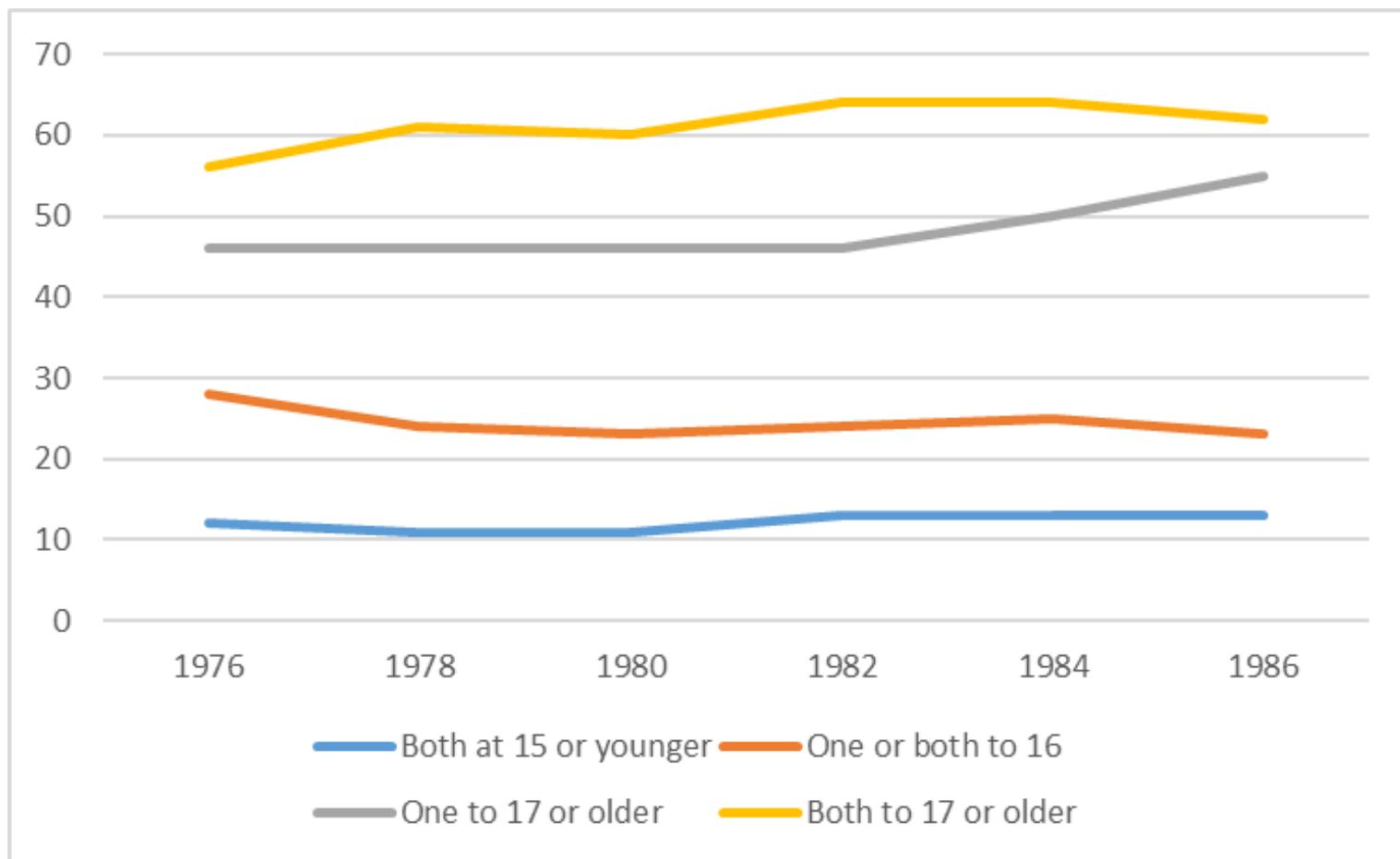


Source: Scottish School Leavers' Surveys (1977-87). From Table 3.2 in Burnhill, P., Garner, G. and McPherson, A. (1988), 'Social change, school attainment and entry to higher education, 1976-1986', in D. Raffe (ed.), *Education and the Youth Labour Market*, Lewes: Falmer, pp. 66-99.

Changing levels of parental education



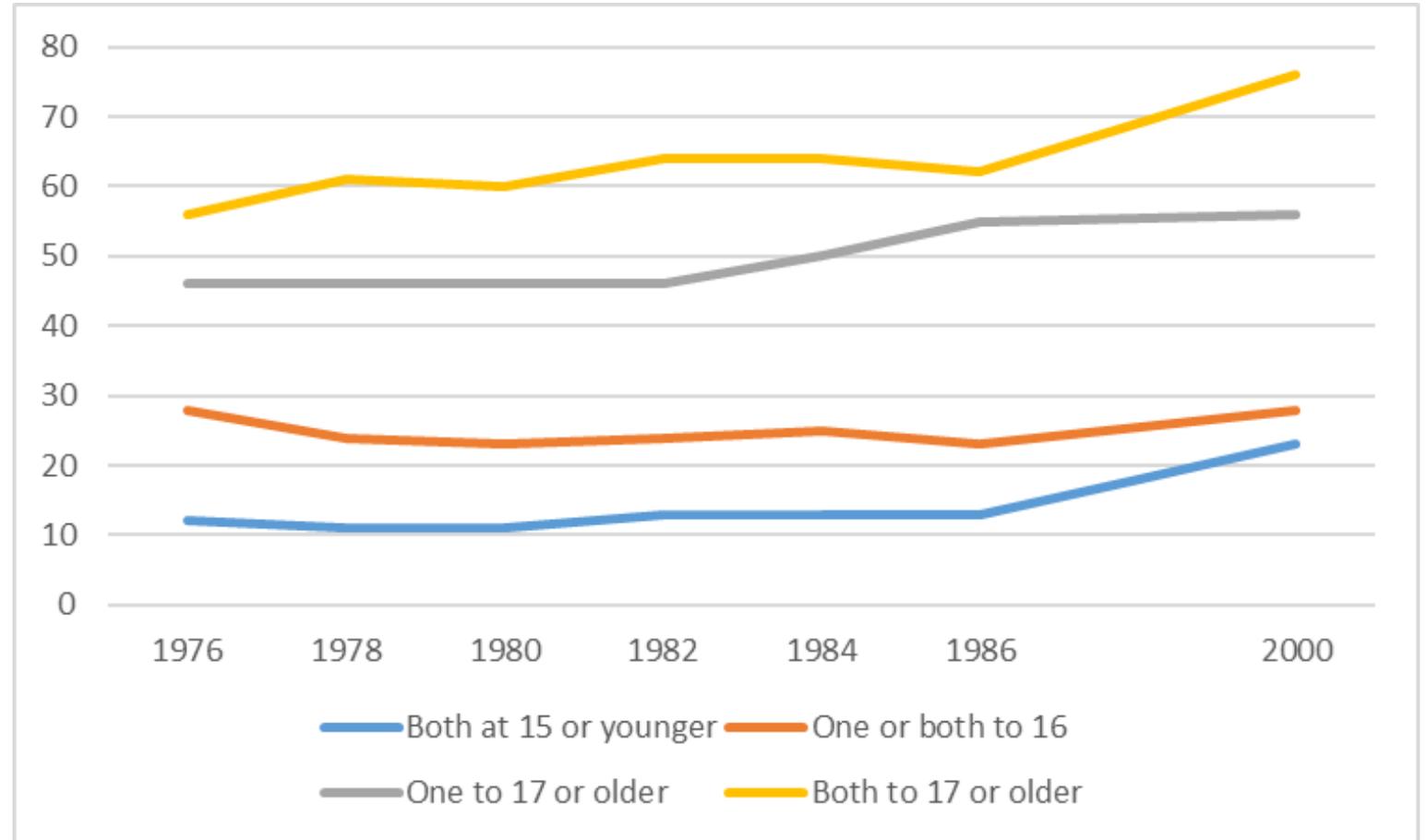
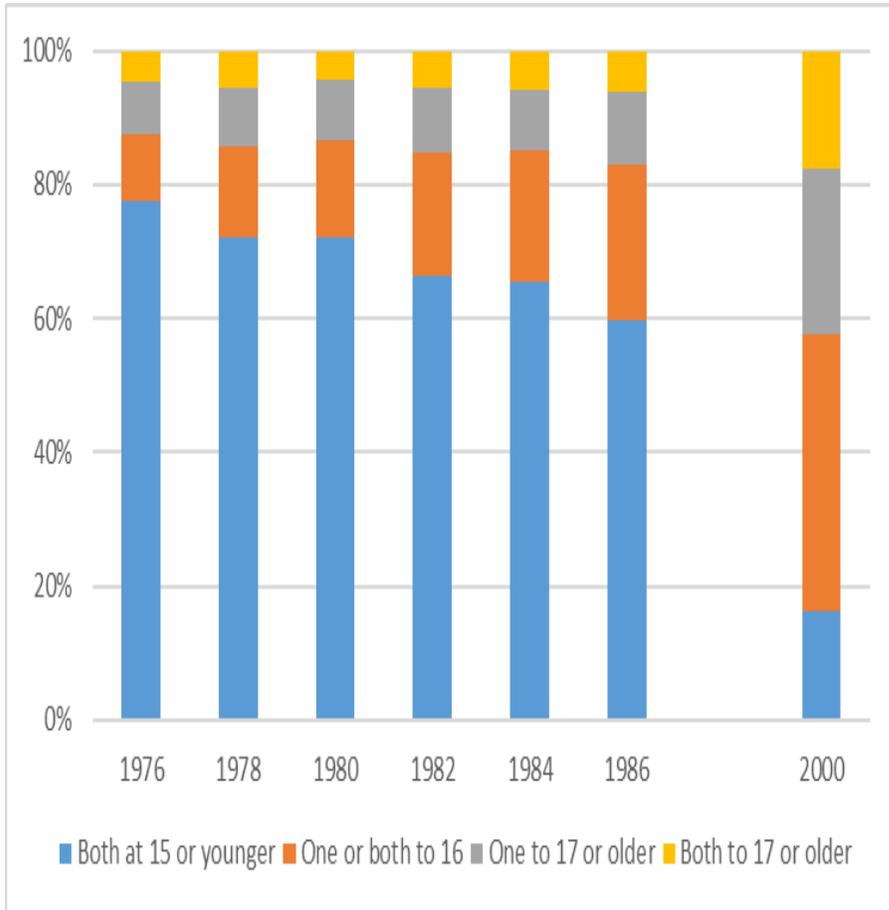
Rate of passing 3+ Highers, by parental education, 1976-1986



Source: Scottish School Leavers' Surveys (1977-87). From Table 3.2 in Burnhill, P., Garner, G. and McPherson, A. (1988), 'Social change, school attainment and entry to higher education, 1976-1986', in D. Raffe (ed.), *Education and the Youth Labour Market*, Lewes: Falmer, pp. 66-99.

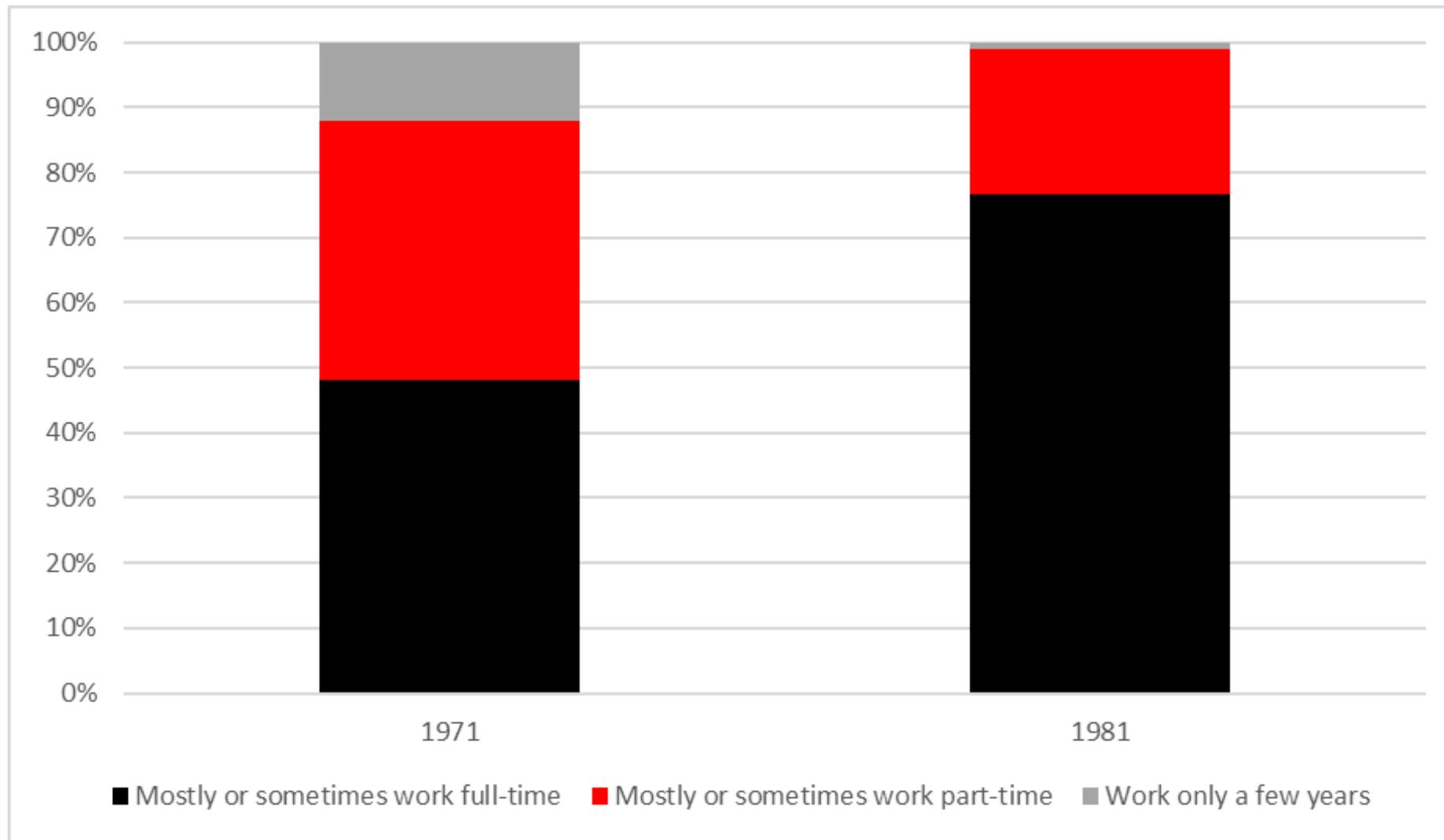
Rate of passing 3+ Highers, by parental education, 1976-2000

Changing levels of parental education



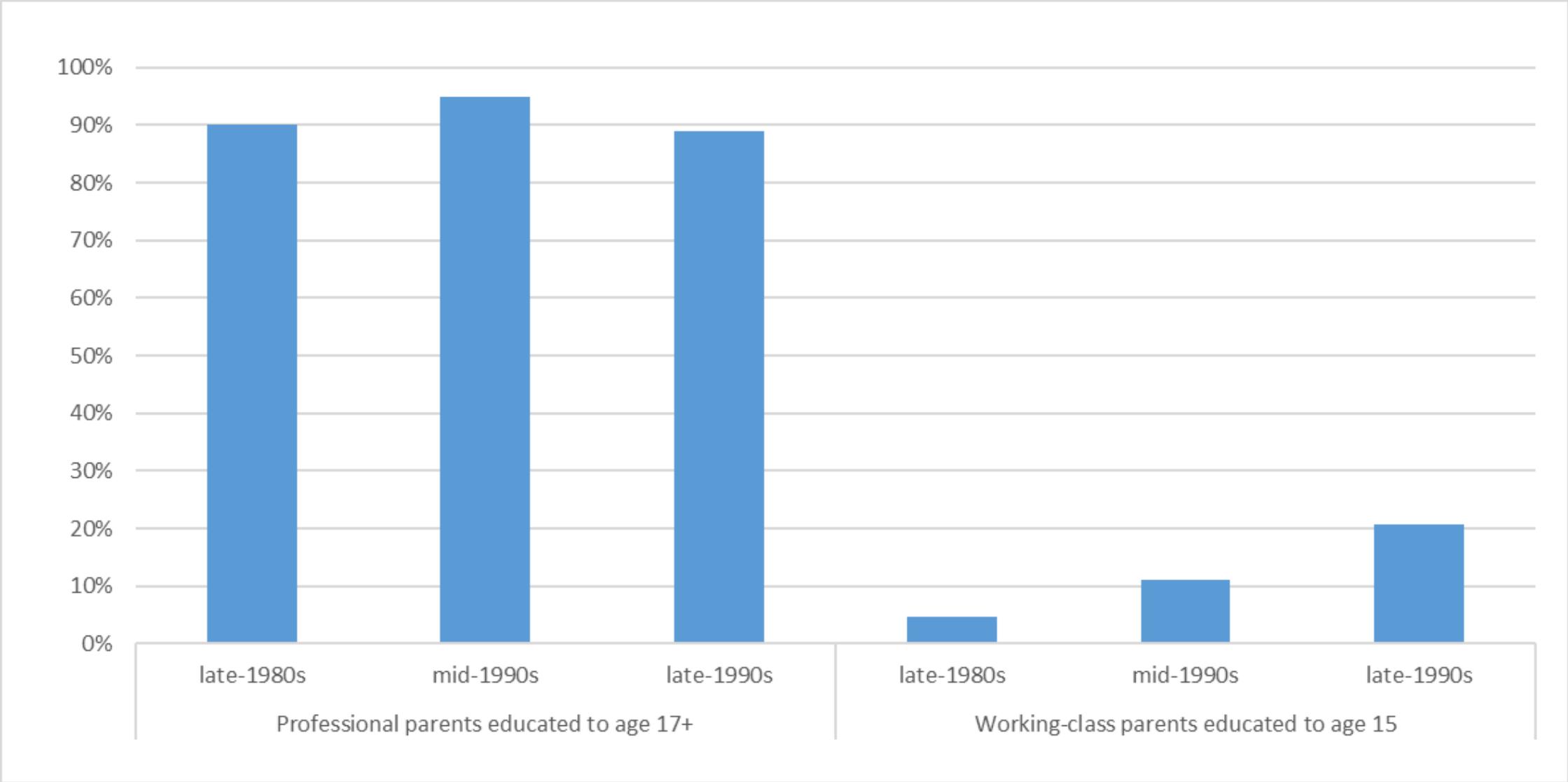
Source: Scottish School Leavers' Surveys (1977-87 supplemented by 2001). From Table 3.2 in Burnhill, P., Garner, G. and McPherson, A. (1988), 'Social change, school attainment and entry to higher education, 1976-1986', in D. Raffe (ed.), *Education and the Youth Labour Market*, Lewes: Falmer, pp. 66-99.

Career expectations of first-year Scottish university women, 1971 and 1981



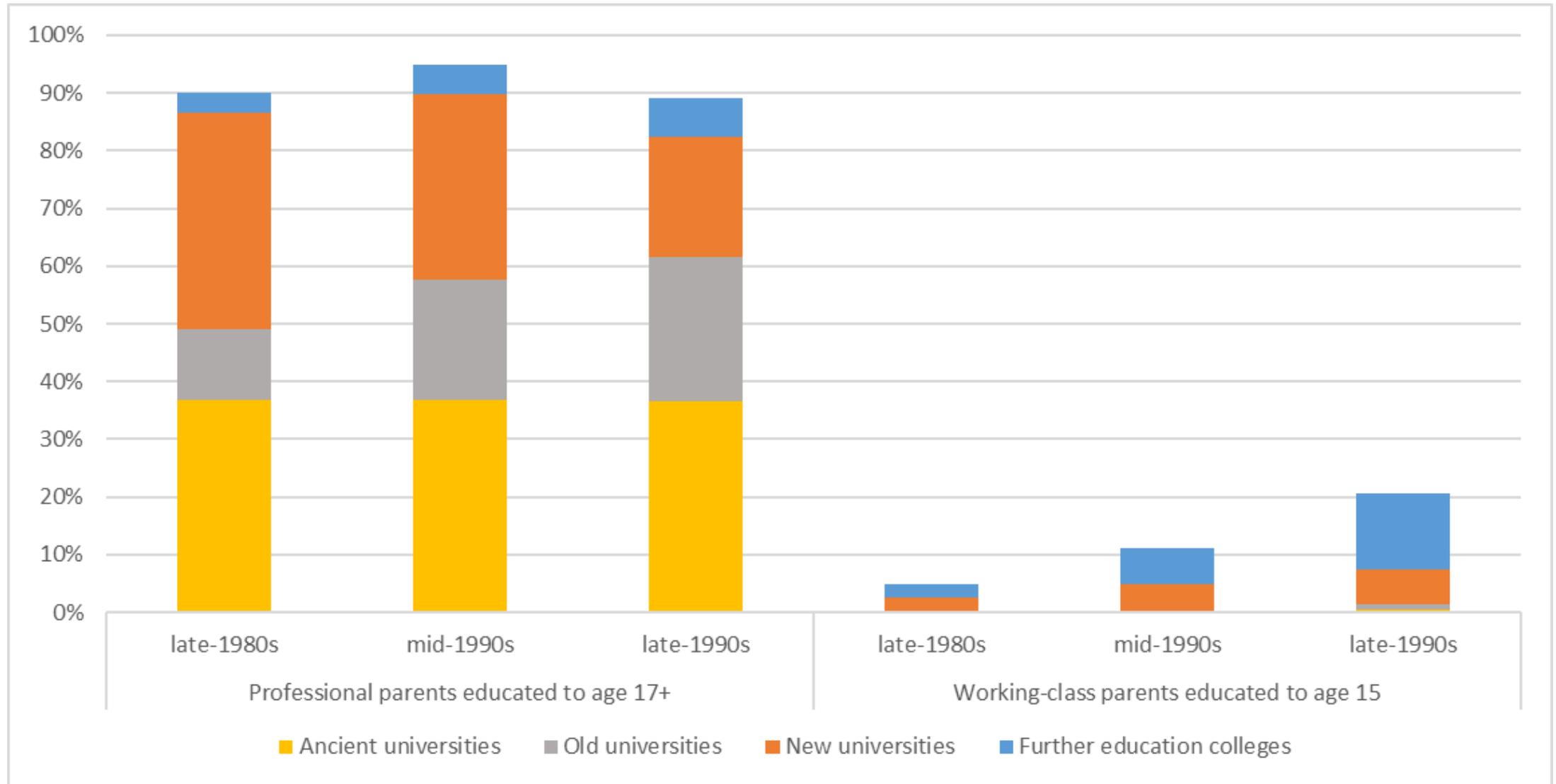
Source: Scottish School Leavers' Surveys (1971 and 1981), women who entered university. Adapted from Figure III in Burnhill, P. and McPherson, A. (1983), 'The Scottish university and undergraduate expectations, 1971-1981', *Higher Education Quarterly*, 37, pp. 253-70.

Any higher education, by social circumstances, 1987-91 to 1999-01



Source: Scottish School Leavers' Surveys (1987-2001). From Table 7 in Iannelli, C., Gamoran, A. and Paterson, L. (2011), 'Expansion through diversion in Scottish higher education, 1987-2001', *Oxford Review of Education*, 37, pp. 717-41.

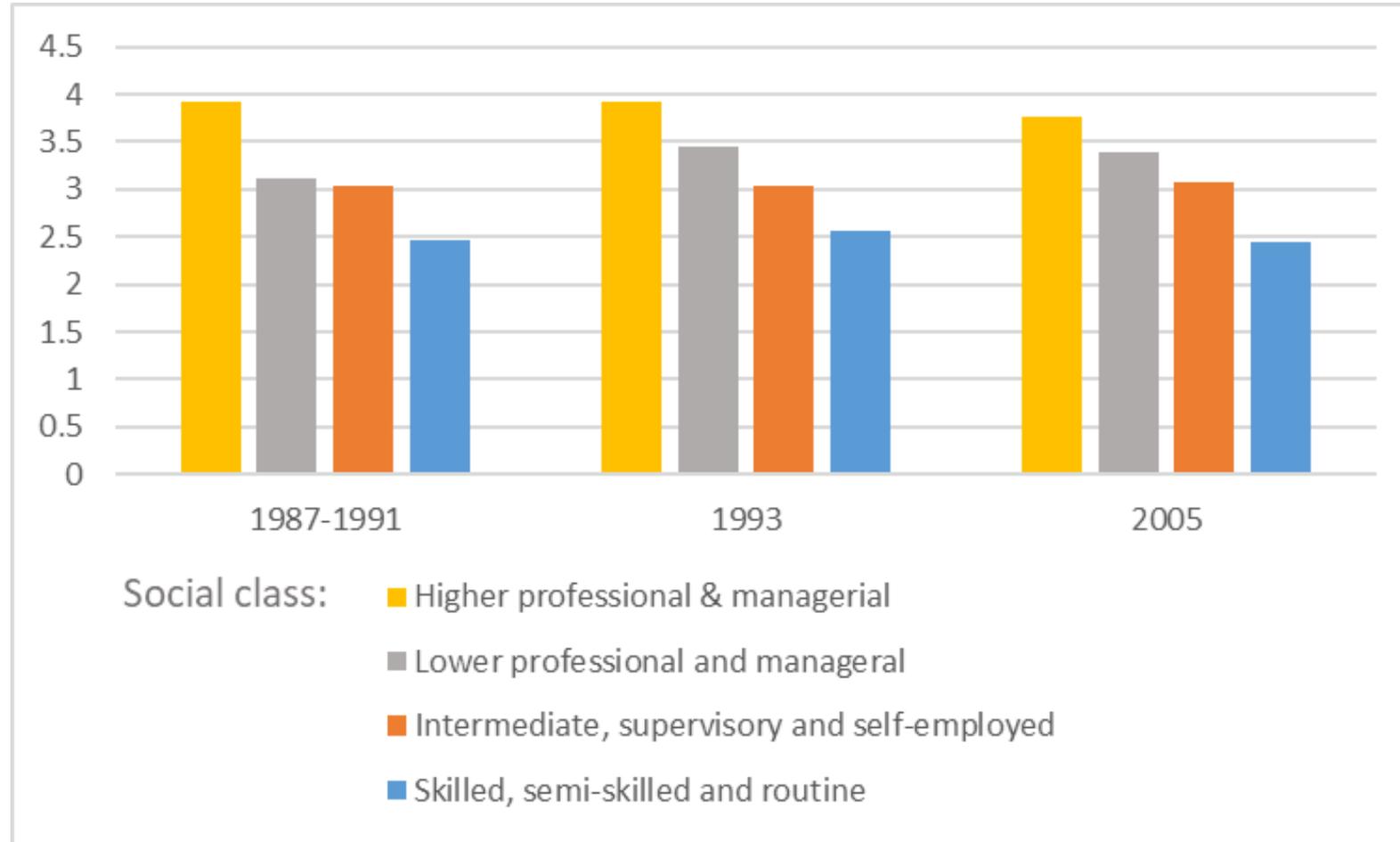
Types of higher education, by social circumstances, 1987-91 to 1999-01



Source: Scottish School Leavers' Surveys (1987-2001). From Table 7 in Iannelli, C., Gamoran, A. and Paterson, L. (2011), 'Expansion through diversion in Scottish higher education, 1987-2001', *Oxford Review of Education*, 37, pp. 717-41.

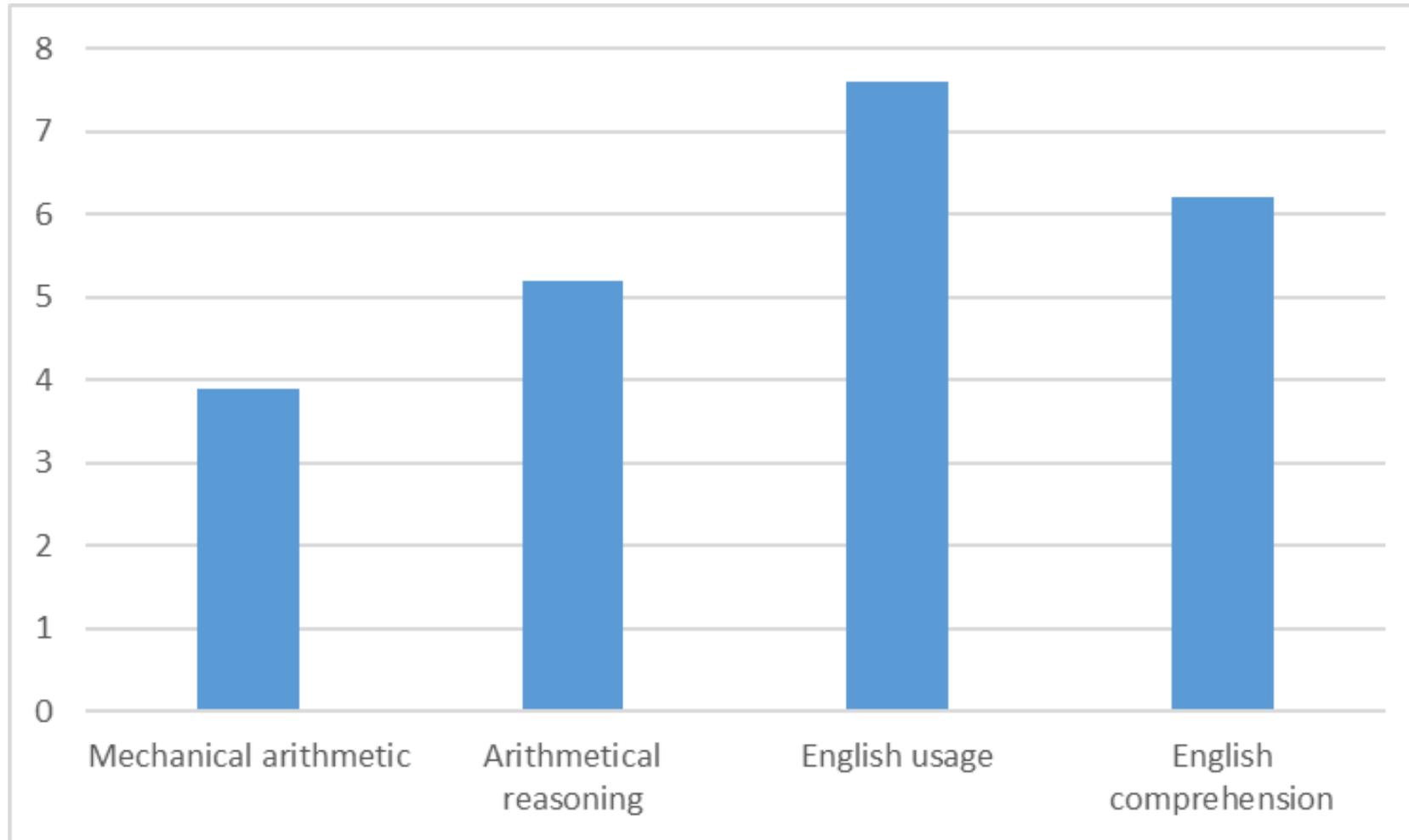
Average number of 'facilitating' subjects* in upper secondary education, by social class, 1987-91 to 2005

*English, languages, mathematics, history, physics, chemistry, biology and geography



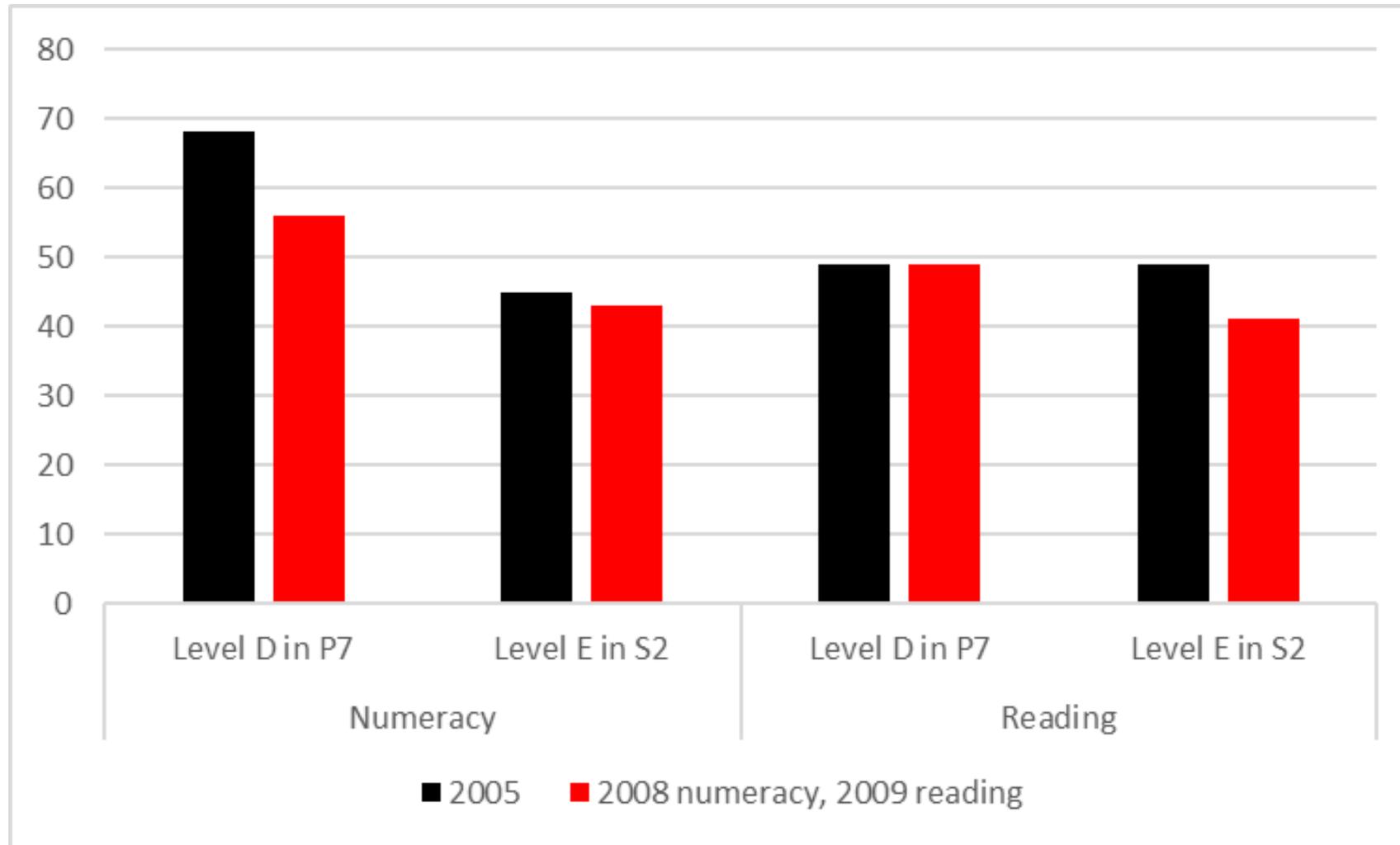
Source: Scottish School Leavers' Surveys (1987-2005). Adapted from Figure 1 in Iannelli, C. and Klein, M. (2015), *Subject Choice and Inequalities in Access to Higher Education*, AQMeN Research Briefing 7. See also Iannelli, C., Smyth, E. and Klein, M. (2016), 'Curriculum differentiation and social inequality in higher education entry in Scotland and Ireland', *British Educational Research Journal*, 42, pp. 561-81.

Gains in attainment in primary school, 1953-63 (measured in months of progress of the average pupil in 1963)



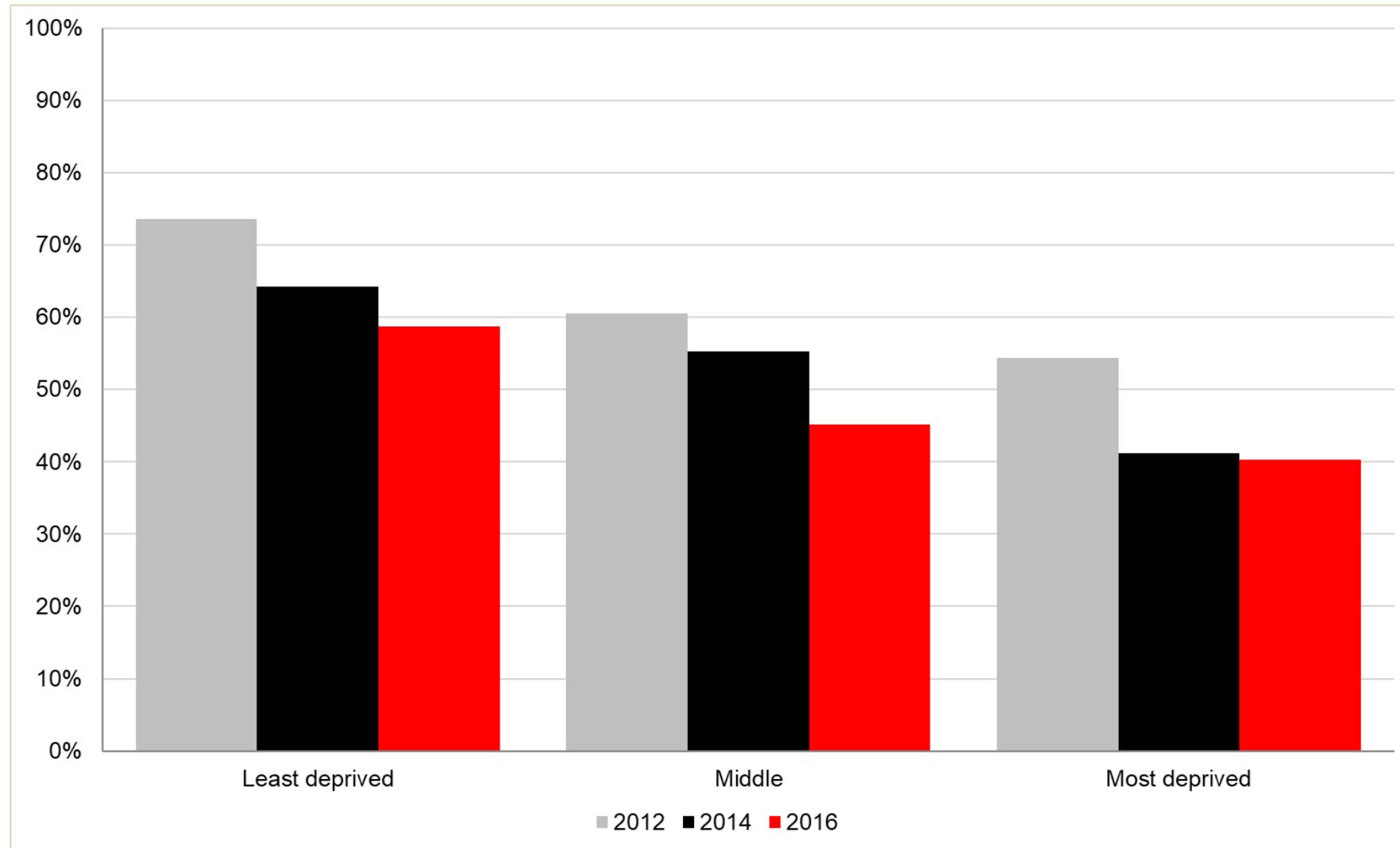
Source: Scottish Scholastic Surveys (1953 and 1963). From p. 57 in Scottish Council for Research in Education (1968), *Rising Standards in Scottish Primary Schools, 1953-1963*, London: University Press.

Percentage attaining stipulated levels in Reading and Numeracy in Primary 7 and Secondary 2, 2005-2008/9



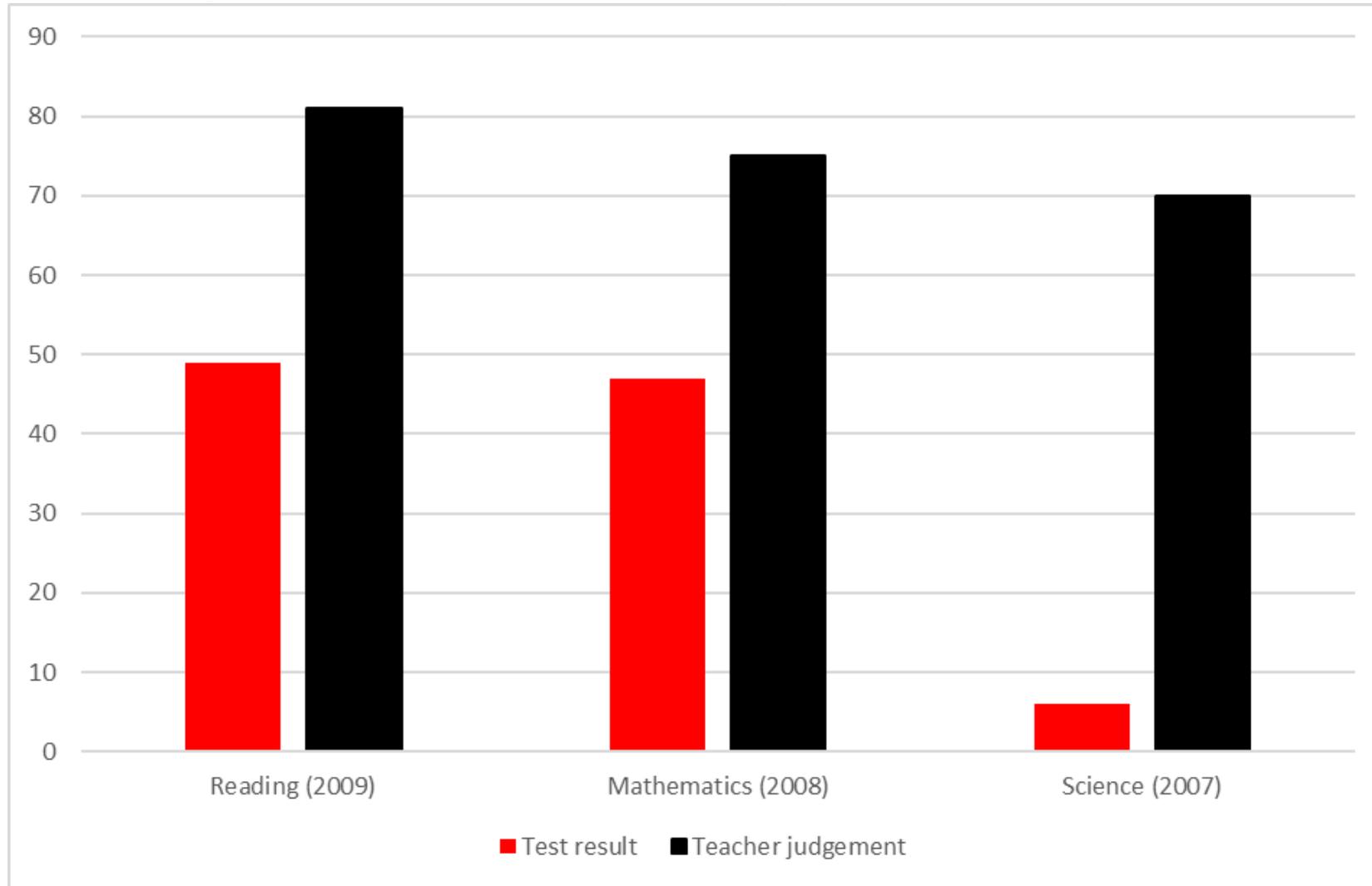
Source: Scottish Survey of Achievement (2005, 2008 and 2009). Table F1 in Scottish Government (2006), *Numeracy Attainment Estimates*; p. 46 in Scottish Government (2008), *2008 Scottish Survey of Achievement*; p. 7 in Scottish Government (2009), *Scottish Survey of Achievement 2009*.

Writing: percentage of Primary 7 pupils performing well, very well or beyond the stipulated level, by deprivation category of pupil's home neighbourhood, 2012-16



Source: Scottish Survey of Literacy and Numeracy (2012-16). Adapted from Tables 4.3 in Scottish Government (2017), *Scottish Survey of Literacy and Numeracy (SSLN) 2016 – Literacy*.

Percentage attaining stipulated level in Primary 7 – test result and teacher judgement



Source: Scottish Survey of Achievement (2007-2009). pp. 3 and 6 in Scottish Government (2009), *Scottish Survey of Achievement 2009: Reading and Writing*; pp. 4 and 88 in Scottish Government (2008), *2008 Scottish Survey of Achievement: Mathematics and Core Skills*; Tables B1, B3 and B4 in Scottish Government (2007), *Scottish Survey of Achievement: 2007 Science, Science Literacy and Core Skills*.

Why surveys matter

Through survey design

Why?

Through survey measurement

Why?

Why surveys matter

Through survey design

Why?

Series

Policy happens in time

Social change happens through time

Why surveys matter

Through survey design

Why?

Series

Policy happens in time

Social change happens through time

Longitudinal

Students learn

Why surveys matter

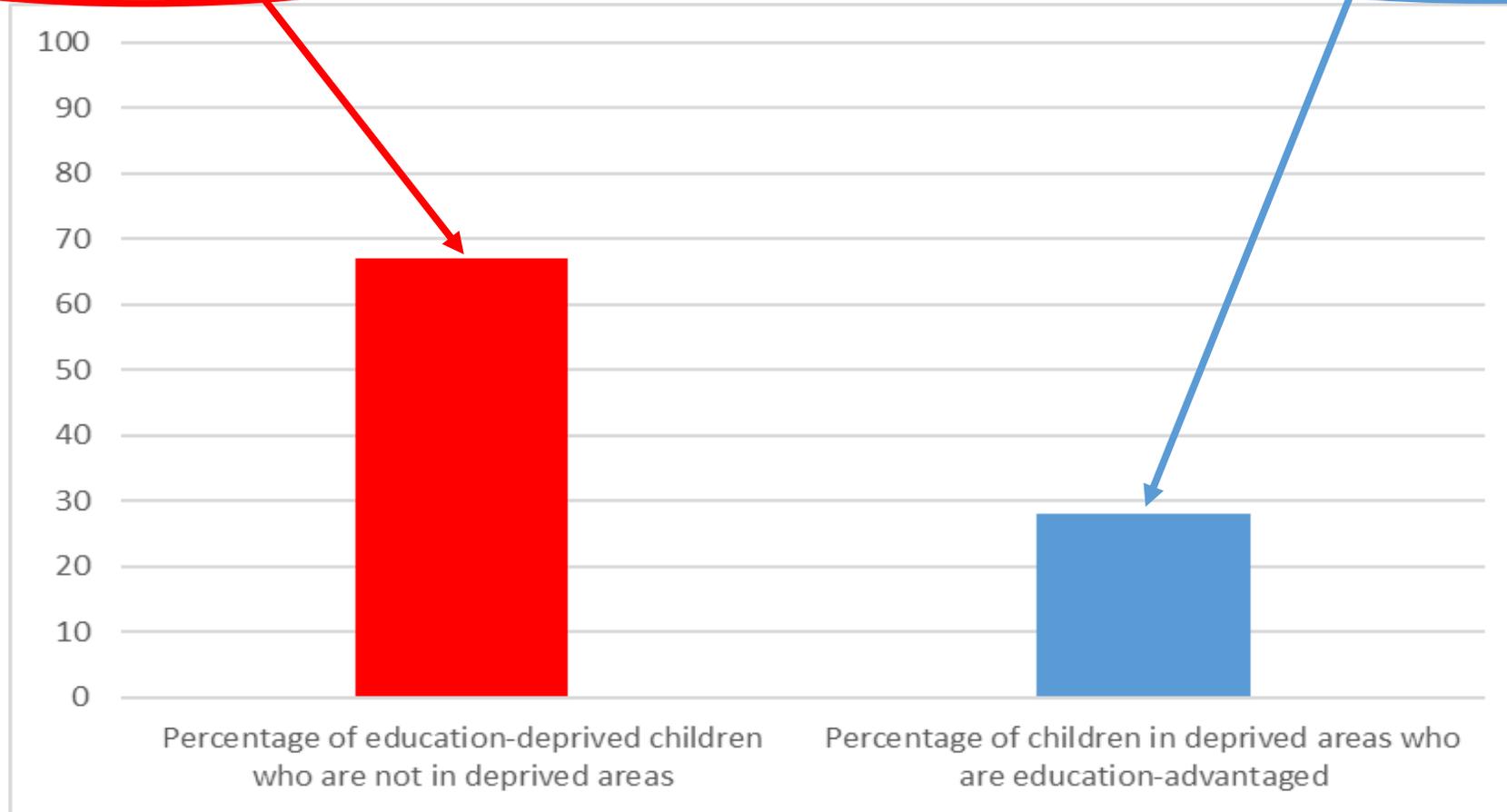
Through survey design	Why?
Series	Policy happens in time
	Social change happens through time
Longitudinal	Students learn
Multiple levels	Students learn in institutions
	Policy shapes institutions

Why surveys matter

Through survey design	Why?
Series	Policy happens in time
	Social change happens through time
Longitudinal	Students learn
Multiple levels	Students learn in institutions
	Policy shapes institutions
Through survey measurement	
External and internal to the student	Sociology and psychology both explain

Two thirds of deprived children are not in deprived areas

One quarter of children in deprived areas are not deprived



'Deprived area' is 20% most deprived by Scottish Index of Multiple Deprivation.

'Education-deprived' means no adult in the household has a higher-education qualification.

'Education-advantaged' means at least one adult in the household has a higher-education qualification.

Why surveys matter

Through survey design

Series

Why?

Policy happens in time

Social change happens through time

Longitudinal

Students learn

Multiple levels

Students learn in institutions

Policy shapes institutions

Through survey measurement

External and internal to the student

Sociology and psychology both explain

Ideas from policy

Policy has the authority to do things

Policy has to be held to account

Why surveys matter

Through survey design

Series

Why?

Policy happens in time

Social change happens through time

Longitudinal

Students learn

Multiple levels

Students learn in institutions

Policy shapes institutions

Through survey measurement

External and internal to the student

Sociology and psychology both explain

Ideas from policy

Policy has the authority to do things

Policy has to be held to account

Ideas in public debate

Debate stops academic introspection