# University of Southampton

Faculty of Social Sciences

School of Economic, Social and Political Sciences

**Education as a Growing Source of Social and Political Cleavage**

by

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Thesis for the degree of Doctor of Philosophy

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## Abstract

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The deepest gradient observed in voting at the United Kingdom's 2016 referendum on European Union membership was structured along educational lines. Since Brexit, education has continued to play a key role in shaping public opinion and electoral behaviour. Despite there now being a consensus within public discourse that a stark educational divide has emerged in British politics, scant academic research has been undertaken in this area to-date and thus, little is known about the complex association of educational attainment with public opinion and electoral behaviour. This three-paper thesis provides a timely address to these gaps in knowledge. Each paper applies advanced quantitative methods to high-quality secondary data sources - including the British Election, British Household Panel and Understanding Society surveys - and contributes to providing a deeper understanding of how, and why, it is that educational attainment has come to shape the ways individuals think and vote in Britain today. Paper 1 seeks to understand why individuals with differing levels of educational attainment have tended to vote differently in recent British political contests. It uses mediation analysis to explore precisely what proportion of education's total effect on vote choices was transmitted indirectly in British referendums and general elections from 2016-2019 and to identify the relative contribution of economic orientations, cultural attitudes and political cue-taking behaviours as drivers of this educational divide. Paper 2 builds on Paper 1, by investigating why it is that individuals with differing levels of education come to think differently in the first place. It uses a within-sibship design to provide a more robust test of higher education's causal effect on British individuals' attitudes in the period 1994-2020 and ultimately reveals the extent to which the differences observed in graduates' and non-graduates' attitudes are shaped by non-random selection into universities versus the educational and experiential effects of university study. Finally, Paper 3 moves beyond the individual-level of analysis, bringing geography in, to consider whether the impacts of the educational cleavage are felt evenly across Britain today. It uses a multilevel modelling strategy to explore the extent to which individuals with identical qualifications voted differently in different kinds of constituencies at British general elections from 2015-2019. Taken together, the novel findings presented in these papers provide an exceptionally detailed picture of education's role in the realignment of British politics and shed light on how, and why, graduates have become a distinctive electoral group. In doing so, this thesis not only makes an important contribution to the British political sociology literature, but also informs broader debate(s) about the educational realignment of the politics of advanced Western democracies.

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# Research Thesis: Declaration of Authorship

Print name: Elizabeth Simon

Title of thesis: Education as a Growing Source of Social and Political Cleavage

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
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Signature: Date: 07.11.2022

# Author's Contribution

The first two empirical papers (Chapter 4 and Chapter 5) presented in this thesis were authored solely by Elizabeth Simon. The final empirical paper (Chapter 6) was authored jointly by Elizabeth Simon, and her supervisors, Professors Gabriele Durrant and Will Jennings. Simon is the principal author of this final paper. She devised the initial idea for this investigation, wrote the bulk of this paper and performed all statistical analyses. Durrant provided advice on the modelling strategy that was adopted in Chapter 6 and Jennings advised on the development of the theoretical framework of contextual effects that was tested in the paper. Both also undertook some editing of the manuscript. Simon, herself, was ultimately responsible for producing the body of research presented in Chapter 6.

Author contribution statement certified by:

**Gabriele Durrant**

Signature: Date: 02.11.2022

**Will Jennings**

Signature: Date: 02.11.2022

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# Abbreviations

ASHE ..... Annual Survey of Hours and Earnings

BBC ..... British Broadcasting Corporation

BESIP ..... British Election Study Internet Panel

BHPS ..... British Household Panel Study

ERGO ..... Ethics and Research Governance Online

EU ..... European Union

GCSE ..... General Certificate of Secondary Education

HE ..... Higher Education

KHB ..... Karlson-Holm-Breen

MICE ..... Multivariate Imputation by Chained Equations

MQL1 ..... First-order Marginal Quasi-likelihood

MSOA ..... Middle-layer Super Output Area

NVQ ..... National Vocational Qualification

OECD ..... Organisation for Economic Co-operation and Development

ONS ..... Office for National Statistics

PRC ..... Pew Research Center

PTA ..... Parent Teacher Association

UCAS ..... Universities and Colleges Admissions Service

UK ..... United Kingdom

UNESCO ..... United Nations Educational, Scientific and Cultural Organisation

US ..... United States of America

# Chapter 1 Introduction: Education as a Growing Source of Social and Political Cleavage

Over the past decade, the electoral politics of advanced Western democracies have experienced a period of profound disruption. In Western Europe, not only have new political parties emerged, and achieved unparalleled successes, but many mainstream centre right and left parties have lost ground among their traditional electorates and become fragmented as they have tried to adapt to threats from the radical right (Abou-Chadi and Hix, 2021; Bornschier *et al.*, 2021; Evans, de Geus and Green, 2021; Ford and Jennings, 2020; Gethin, Martínez-Toledano and Piketty, 2022; Gidron and Hall, 2017; Hooghe and Marks, 2018). Many countries have also experienced 'shock' election outcomes - with the United Kingdom (UK) opting to leave the European Union (EU) and the United States (US) electing Donald Trump as President, in 2016, despite polls having predicted otherwise (Curtice, 2016; Dalton, 2018).

While it is possible that these disruptions to the established political order are simply a product of short-term reactions to current events, it seems more likely that they have been engendered by longer-term shifts in the structural divisions which shape electoral politics (Bovens and Wille, 2017; Enyedi, 2008; Ford and Jennings, 2020; Sobolewska and Ford, 2020). One possibility raised by recent scholarship is that the transition toward knowledge economies, and dramatic periods of expansion in higher education (HE) provision and participation, which have been occurring across many advanced Western democracies since the 1960s, have created the ideal demographic basis for education-based social and political divisions to emerge (Bovens and Wille, 2017; Kriesi, 1998; Kriesi *et al.*, 2008; Stubager, 2010, 2013).

Although this explanation of recent political turbulence has achieved an almost common-sense status in public discourse, as politicians and political commentators have, since 2016, repeatedly remarked that politics now divide starkly along educational lines and that this 'new' education gap threatens to tear politics apart (e.g., Cohn, 2021; Harris, 2018; Kirkup, 2021; Runciman, 2016; Williams, 2020), there is little empirical evidence to support such claims. It is striking that despite this explosion of interest in educational attainment's structuring effect on politics, our understanding of this phenomenon remains limited because few existing scholarly works have explored the nature or causes of the educational divisions which have emerged across many advanced Western democracies in recent years.

Addressing this gap in knowledge is both timely and imperative. If educational groups become less able to find political 'middle-ground' elected officials will find it increasingly difficult to govern

for whole populations. Any such rise in education-based polarisation would not only risk creating a situation of political gridlock but engendering mass dissatisfaction with governance and a deep sense of alienation amongst those educational groups who feel governed by the will of 'others' (Bornschier *et al.*, 2021; Duffy *et al.*, 2019; Runciman, 2016; Stubager, 2009). Only armed with a detailed understanding of how, and why, educational attainment shapes public opinion and electoral behaviour today can we hope to take targeted action to reconcile these divisions, and the fundamental challenges to social cohesion and democratic functioning they pose, or make calculated predictions about the impact this educational divide may have in years to come. Considering how, for example, this might shape the results of future elections, the direction taken by public policy or whether this might lead to the emergence of new political parties (Stubager, 2010, 2013). Furthering our understanding of the educational divide in this way is more important now than ever, as generation-on-generation increases in the share of highly educated electors are shifting the educational composition of the populations of advanced Western democracies in ways that mean education's shaping effect on politics is only likely to strengthen in years to come (Bovens and Wille, 2017; Ford and Jennings, 2020).

## 1.1 Research Objectives

The overarching aim of this thesis is to provide a deeper understanding of the complex association of educational attainment with public opinion and electoral behaviour. It does so by presenting a body of empirical research that explores how, and why, educational attainment has come to shape the ways individuals think and vote in Britain today.

This thesis, first, aims to 'get to the roots' of the stark educational divide that has emerged in modern British politics. While we know that individuals with differing levels of educational attainment tend to exhibit divergent socio-political attitudes and cast their votes in very different ways in Britain today, we know relatively little about why these patterns of educational division occur and the extent to which they coincide. The empirical research presented in this thesis seeks explicitly to address these gaps in knowledge. It not only explores the extent to which education's *total effect* on British electors' vote choices was transmitted *indirectly* at recent elections and referendums - with the 'educational gap' in voting being driven by differently educated individuals' asymmetric attitudes, interests and political behaviours, rather than by any *direct* consequences of experiencing more education - but considers the relative strength of the various different indirect mechanisms at play in this process (see Chapter 4). Moreover, it investigates the extent to which the experience of studying for a university degree actually *causes* British graduates to develop distinctive socio-political attitudes (see Chapter 5).

Having established why it is that British individuals tend to think and vote differently today (in Chapters 4 and 5), this thesis then extends the study of the relationship between educational attainment and electoral behaviour beyond the individual level of analysis (in Chapter 6), with the aim of investigating whether the impacts of the educational divide have been felt (un)evenly across Britain in recent years. It provides a novel exploration of the spatial variation observed in the association of educational attainment with voting at the 2015, 2017 and 2019 British general elections and, ultimately, allows identification of the kinds of Parliamentary constituencies in which identically qualified individuals have chosen to vote differently in recent years.

This thesis takes a three-paper format, with each of the empirical papers presented contributing to advancing our understanding of distinct, but closely linked, components of the complex association of educational attainment with public opinion and electoral behaviour. When the insights presented in these papers are taken together, they therefore provide an exceptionally detailed account of the nature and causes of the stark educational divide that has emerged in modern Britain.

## 1.2 Thesis Outline

The first three chapters of this thesis comprise introductory material. Chapter 1 briefly sets this research in context, details the main research objectives pursued and explains the novel intellectual contribution made by this thesis. Chapter 2 and Chapter 3 then lay out the theoretical and empirical underpinnings of the three research papers presented subsequently. Chapter 2 provides a review of existing literature which considers how educational attainment has come to shape public opinion and electoral behaviour in advanced Western democratic contexts and identifies where important gaps in our understanding remain. This chapter also explains the motivation for selecting the modern British context as the case for exploration. Chapter 3 then outlines how high-quality, nationally representative sources of British survey data and advanced quantitative methods can be used to address the gaps in our understanding of the complex association of educational attainment with public opinion and electoral behaviour that were highlighted in Chapter 2.

Chapter 4, Chapter 5 and Chapter 6 present the three distinct but linked empirical research papers which comprise the core of this thesis. Chapter 4 (Paper 1[1]) uses mediation analysis to provide the first robust test of the hypothesis that politics divided along educational lines, in

[1]Paper 1, 'Explaining the educational divide in electoral behaviour: testing direct and indirect effects from British elections and referendums 2016-2019', is published in the Journal of Elections, Public Opinion and Parties. See: (Simon, 2022a).

British general elections and referendums in the period 2016-2019, largely because educational groups possess asymmetric attitudes, interests and political behaviours which shape their vote choices. The findings of Paper 1 - which indicate that the overwhelming majority of education's *total effect* on vote choices (67-91%) was transmitted *indirectly* in recent British political contests, and that attitudinal mechanisms were consistently the strongest drivers of this association - demonstrate that we must understand why educational groups tend to think differently if we are to 'get to the roots' of why politics divide along educational lines in Britain today. This premise informs the central research objective of the second paper of this thesis, which seeks to understand how it is that gaining additional educational qualifications actually comes to shape our attitudes in the first place.

Chapter 5 (Paper 2[2]) builds explicitly on Chapter 4, by investigating the extent to which studying for a university degree *causes* British graduates to develop distinctive socio-political attitudes. Through applying a within-sibling design to a unique household-structured dataset, this study seeks to tighten the bounds of causal inference in this area. It leverages sibling fixed-effects to control for all unmeasured family-invariant pre-adult experiences, in addition to the effects of measured pre-adult and adult confounders, when estimating the independent effect of HE study on British individuals' attitudes. Ultimately, it shows that university attendance has only a modest *causal* effect on British graduates' economic and cultural attitudes and that contrary to common assumptions, the education-attitudes linkage is largely spurious. It materialises predominantly because individuals who possess a distinctive set of liberal cultural values and illiberal economic values disproportionately self-select into university enrolment, and to a lesser extent because university determines our adult-status positions, which also influence our attitudes.

Chapter 6 (Paper 3) starts from the premise that the individual-level association of educational attainment with vote choice (modelled in Chapter 4) is unlikely to be spatially homogenous. In doing so, Chapter 6 builds on the analysis presented in the first two papers, by extending the study of the relationship between educational attainment and electoral behaviour beyond the individual-level of analysis. It not only lays out a more encompassing theory of education's shaping effect on British electors' vote choices, by considering the interplay of compositional and contextual effects, but tests this empirically - investigating whether the impacts of the educational divide are felt (un)evenly across Britain. Chapter 6 uses data on individual and constituency characteristics, and a multilevel random-coefficient modelling strategy, to conduct a detailed

[2]Paper 2, 'Demystifying the link between higher education and liberal values: A within-sibship analysis of British individuals' attitudes from 1994-2020', is published in the British Journal of Sociology. See: (Simon, 2022b).

exploration of the spatial variation observed in the association of educational attainment with voting at recent British general elections. Its findings not only provide evidence to suggest that the impacts of the British educational cleavage have not been felt evenly across space in recent years, but also sheds light on the kinds of Parliamentary constituencies in which identically educated British individuals were voting differently at the 2015, 2017 and 2019 general elections.

The final chapter of this thesis (Chapter 7) serves as a discussion and conclusion. It summarises the novel insights provided by the empirical work presented in Chapters 4-6, considers how these findings relate to existing literature and details how advancing our understanding of the complex relationship of educational attainment with British public opinion and electoral behaviour in this way promises to make contributions both within academia and beyond. Chapter 7 also considers the limitations of the research presented in this thesis and sets out some future research agendas that must be pursued if we are to gain a fuller understanding of the educational divide which is emerging in advanced Western democracies.

## 1.3 Intellectual Contribution

This thesis makes an important intellectual contribution, building on existing academic work in two main ways. Firstly, it makes a vital substantive contribution - in offering a significant advance in our understanding of the link between educational attainment, socio-political attitudes and voting behaviour. The body of empirical work presented here sheds new light on the complex association of educational attainment with public opinion and electoral behaviour and, in doing so, provides a more comprehensive understanding of the nature and causes of the stark educational divide that has emerged in Britain in recent years. This thesis also makes a substantial methodological contribution. It can be seen as something of a 'methodological blueprint' for social scientists, in that it makes a series of recommendations as to how advanced quantitative methods can, and should, be used to improve our understanding of how individuals' socio-demographic characteristics shape their political views and behaviours.

The empirical papers presented in Chapters 4-6 of this thesis make distinct but highly related substantive contributions, because each paper explores a different aspect of the complex association of educational attainment with modern British public opinion and electoral behaviour. When taken together, the novel findings presented in these papers therefore provide a deeper understanding of precisely how, and why, it is that educational attainment has come to shape the ways individuals think and vote in Britain today. The following section proceeds by detailing the substantive and methodological contributions made by each paper.

Few existing works have explored why it is that vote choices divide along educational lines in advanced Western democracies (for some notable exceptions, see: Attewell, 2022; Fieldhouse *et al.,* 2019a; Goodwin and Heath, 2016a; Stubager, 2010, 2013). Those which do have largely focussed on testing the role played by cultural attitudes in driving this linkage and have typically employed methods which are not well-suited to decomposing education's effect on categorical outcome variables, like vote choice (Breen, Karlson and Holm, 2013). Paper 1 (Chapter 4) goes beyond the scope of previous research not only by theorising a more expansive set of mechanisms through which educational attainment's shaping effect on individuals' vote choices may be transmitted, but by using a sophisticated mediation methodology to conduct the first robust empirical test of this model. Doing so allows this study to provide a more comprehensive understanding of the reasons why British electors with different levels of educational attainment chose to vote in different ways at the 2016 EU referendum and 2017 and 2019 general elections. It shows that precisely 67-91% of education's total effect on vote choices was transmitted indirectly at these recent British political contests and that while cultural attitudes consistently had the strongest effects in mediating this association, economic orientations and political cue-taking behaviours also had non-negligible mediating effects.

Paper 1 makes an important methodological contribution, in showing that using a mediation method specifically designed for decomposing effects in non-linear models produces a rather different understanding of how educational attainment's *total effect* on voting is transmitted than that provided by standard methods. It provides a clear illustration of the ways in which our understanding of the mechanisms through which education shapes vote choice will be distorted unless sophisticated mediation methods are adopted. In doing so, Paper 1 serves as something of an update in methodological best practice for scholars in the social sciences - demonstrating that future works seeking to explore how, and why, socio-demographic characteristics constitute bases for political division must adopt these kinds of mediation methods if they are to draw accurate conclusions.

The novel findings presented in Paper 1 also make a substantive contribution by advancing our understanding of the educational divide in electoral behaviour. Firstly, in showing that greater exposure to education, in itself, has little direct influence on vote choices, and rather that educational groups have voted differently in recent British elections and referendums largely because they tend to exhibit asymmetric attitudes, this study provides provisional evidence to suggest that the educational divide in British politics constitutes a cleavage in the 'Rokkonian' sense (Lipset and Rokkan, 1967; Rokkan, 1970). This suggests that the stark 'educational gap' observed in voting at recent British political contests may well be symptomatic of the development of an enduring, structurally anchored, education-based conflict, which will continue

to serve as a fault line in British politics for many years. Secondly, the novel insights presented in Paper 1 demonstrate that if we are to 'get to the roots' of the educational divide in British electoral behaviour, and understand what has *caused* this to develop, we must gain a better understanding of how it is that education actually comes to shape individuals' attitudes in the first place.

The second paper of this thesis (Chapter 5) takes up precisely this challenge. It goes beyond the scope of existing work by tightening the bounds of causal inference in estimating the independent effect of university study on socio-political attitudes. While existing analyses have tended to overestimate education's effect on British individuals' attitudes[3], because they control only for the limited range of pre-adult and adult-status confounders available in survey data (Campbell and Horowitz, 2016; Sieben and de Graaf, 2004), this study leverages the shared family background of siblings to better identify education's *causal* effect. Paper 2 ultimately finds that the size of HE's effect on cultural attitudes is reduced by at least 70% in within-sibship models, as compared to conventional methods, and reveals that university study has only a small *direct causal effect* on British individuals' adult attitudes which is not universally liberalising. In doing so, this paper makes a clear methodological contribution - it not only presents compelling evidence to suggest that quasi-experimental designs (e.g., sibling matching) provide considerably less biased estimates of education's effect on attitudes than conventional methods, but also advocates for the wider use of such techniques in the social sciences.

Paper 2 also makes an important and timely substantive contribution, in providing evidence to suggest that the association of HE with socio-political values is largely spurious. It considerably furthers our knowledge of why it is that British graduates actually come to think differently to non-graduates, by showing that the link between university study and liberal attitudes is predominantly driven by a self-selection effect - whereby those who experience pre-adult environments conducive to the formation of these distinctive values disproportionately enrol in HE. It also shows that adult stratification experiences matter - with at least part of the difference in graduates' and non-graduates' attitudes being explained by these groups' typically divergent occupational statuses. These findings present a challenge to several popular assumptions about education's 'liberalising role'. They not only demonstrate that right-leaning commentators' claims that universities are hotbeds of left-liberal bias (e.g., Hopkins, 2016; Torres, 2020) are evidentially unfounded, at least in the modern British context, but suggest that aggregate public opinion is unlikely to become significantly more liberal as graduate concentration increases, as has often been suggested.

[3]See Scott (2022) for a notable exception to this rule.

The headline finding of Paper 2 - that educational attainment appears to act largely as a proxy for pre-adult and adult experiences of social stratification in the study of socio-political attitudes - also contributes to changing the way we think about the educational divide that has emerged in British politics. While the findings of Papers 1 and 2, respectively, confirm that British graduates do indeed think and vote differently to non-graduates, the evidence presented in Paper 2 indicates that these differences are *not so much strictly educational differences*. Graduates have tended to vote differently to non-graduates in Britain, in recent years, and have been motivated to do so by virtue of their distinctive attitudes (Paper 1) - but the development of these attitudes is more a product of the graduate group's pre-adult and adult status-based experiences than it is of their experiences of studying at university (Paper 2). Education, then, can only to a relatively small extent be considered the *root cause* of the stark educational divide that has emerged in British politics. Instead, this educational divide appears to a large extent to be a manifestation of stratification-based differences. This clearly has important implications when it comes to interpreting the findings of Papers 1 and 3 - which study the education-vote choice association - as it highlights that we cannot be sure to precisely what extent the education-based differences in voting identified in these studies actually materialise as a direct product of British electors having gained additional educational qualifications.

Finally, while a substantial body of literature has explored the spatial distribution of the relationship between social class and voting in Britain (e.g., Andersen and Heath, 2002; Butler and Stokes, 1969; Johnston *et al.,* 2004; MacAllister *et al.,* 2001; Miller, 1978), there has been little research into the geography of educational effects. The final empirical paper of this thesis (Chapter 6) addresses this gap in our understanding, by offering a novel account of the spatial variation observed in the association of educational attainment with recent British general election voting. It not only provides clear evidence to suggest that considerable spatial variation exists in the British education-vote choice association but is able to pinpoint the precise types of Parliamentary constituencies in which this relationship varies. It shows that constituency left behind-ness (broadly defined) and interaction dynamics are likely to be particularly important factors in explaining why English and Welsh individuals who possessed identical educational qualifications voted differently across space at the 2015, 2017 and 2019 general elections. Paper 3 makes an important substantive contribution to the British electoral geography literature, in evidencing that the impacts of the educational cleavage have not been felt evenly across Britain in recent years.

# Chapter 2 Educational Attainment, Public Opinion and Electoral Behaviour: Understanding the Links

While the growing importance of educational attainment in shaping the contours of public opinion and electoral behaviour has been evident in advanced Western democracies for decades (Abou-Chadi and Hix, 2021; Bovens and Wille, 2017; Gethin, Martínez-Toledano and Piketty, 2022; Inglehart, 1977; Kalmijn and Kraaykamp, 2007; Kriesi, 1998; Kriesi *et al.*, 2008; Stubager, 2010, 2013; Surridge, 2016; Weakliem, 2002; Weil, 1985; Zingher, 2022), this has been felt particularly strongly in recent years. Since 2016, a host of countries - including the US, the UK, the Netherlands, Australia and France - have experienced similar combinations of 'shock' electoral outcomes and stark education-based divisions in voting (Beaumont, 2019; Curtice, 2016; Dalton, 2018; Gethin, 2022; Krouwel, 2021). This had led a number of scholars including Bovens and Wille (2017), Ford and Jennings (2020), Hooghe and Marks (2018) and Stubager (2010, 2013) to propose that this recent spate of disruptions to the established political order of advanced Western democracies may be symbolic of the emergence of an educational cleavage.

It certainly seems plausible that this could be the case. University graduates not only have distinctive social identities, values and interests, but also support different political parties than their non-graduate counterparts (e.g., Stubager, 2008, 2009; Surridge, 2016; Weakliem, 2002). The dramatic expansions of HE provision and participation which have played out across advanced Western democracies over the past decades have driven ongoing compositional shifts in the electorates of these societies, which have created the ideal conditions for politics to divide along educational lines (Bovens and Wille, 2017; Ford and Jennings, 2020; Sobolewska and Ford, 2020). As the number of persons with few, or no, educational qualifications has declined and the number with university degrees has increased substantially, the graduate group 'has grown to a size that makes it politically relevant in the sense that parties may be able to base their existence on catering to [their] interests' (Stubager, 2010: 509). If we are to understand whether an educational cleavage has indeed emerged and driven the recent education-based realignment of advanced Western democratic politics, we need a broad theoretical framework within which we can integrate the growing array of empirical findings regarding educational attainment's shaping effect on public opinion and electoral behaviour.

This chapter proceeds by introducing cleavage theory as a framework for understanding the socio-structural division of politics. It then moves on to evaluate, and ultimately dismiss, the major challenges which have been levelled against cleavage theory and to outline how this framework can be adapted to the study of educational divisions in voting. The pre-requisites for

educational cleavage formation are set out and the extent to which each of these are met in advanced Western democracies today is examined. This chapter then considers what existing research can tell us about the mechanisms through which educational attainment shapes individuals' socio-political attitudes and vote choices and highlights some important gaps in our knowledge of these processes. The final section of this chapter explains why the modern British case was selected for study.

## 2.1 Cleavage Theory: A Framework for Understanding the Socio-structural Division of Politics

The cleavage concept was first introduced by Lipset and Rokkan (1967) and denotes 'a specific type of conflict in democratic politics…rooted in…social structural transformations [which] have been triggered by large-scale processes' (Bornschier, 2009: 1). Lipset and Rokkan (1967: 34) observed that two fundamental societal shifts - the National and Industrial Revolutions - acted as 'critical junctures' in Western European politics, in that these developments generated four decisive new dimensions of social conflict which were forged along the lines of centre-periphery, religious-secular, urban-rural and labour-capital based divisions. When universal suffrage was granted across Europe, the structure of national party systems developed such that they clearly reflected the different combinations of these four conflicts that were salient at the outset of mass democracy (Bornschier, 2007, 2009; Deegan-Krause, 2007; Ford and Jennings, 2020; Hooghe and Marks, 2018; Kriesi, 1998; Lipset and Rokkan, 1967; Scarbrough and Knutsen, 1998; von Schoultz, 2017). In Belgium, for example, the party system was heavily structured along a centre-periphery conflict, which represented longstanding ethnolinguistic divisions between the Flanders and Wallonia regions, while in contrast, Nordic societies saw agrarian parties command strong and lasting influence, as 'the power of landed rural interests increased the salience of the urban-rural conflict' (Ford and Jennings, 2020: 297).

Cleavage theory not only explains the origins of party systems, but also their stability. It argues that because early Western European political parties developed effective organisational structures and distinct issue platforms which exploited social divisions, they were able to forge long-term partisan commitments among supporters from their core social bases, allowing them to effectively fend off challenges from new parties (Lipset and Rokkan, 1967; Rokkan, 1970). As a result, the party systems of Western Europe have largely remained 'frozen' since the outset of mass democracy, continuing to reflect the unique interactions of the centre-periphery, religious-secular, urban-rural and labour-capital based divisions which were previously salient, even though many of these conflicts have now weakened or ceased to be relevant (Bornschier, 2007; Deegan-Krause, 2007; Ford and Jennings, 2020; von Schoultz, 2017). This phenomenon is commonly

referred to as the 'freezing hypothesis' and was clearly evidenced by Lipset and Rokkan (1967: 50), who observed that 'the party systems of the 1960s reflect[ed], with few but significant exceptions, the cleavage structures of the 1920s'.

The appeal of cleavage theory lies in its ability to provide a complete and stable theory of the linkage of socio-demographic characteristics with public opinion and electoral behaviour. It proposes that large-scale societal transformations create historically-rooted social differences, that members of the new social groups produced by these macro-social developments will not only possess a shared sense of social group identity, but a common set of interests, preferences and attitudes and finally, that these social groups will become loyal to, and ultimately vote for, the political parties which, have at least historically, represent(ed) their interests (Bartolini and Mair, 1990; von Schoultz, 2017). Identifying the socio-structural anchors which underpin conflicts in democratic politics in this way is essential if we are to gain a 'deeper understanding of the[se] conflict[s], [their] content and likely duration' (Stubager, 2013: 374).

While political scientists have, since the 1960s, generally agreed that cleavages are stark and enduring divisions between social groups which are rooted in historically generated conflicts, there has been considerable debate about precisely which kinds of divides constitute cleavages (Deegan-Krause, 2007). In recent years, however, a general consensus has emerged that the definition of this concept proposed by Bartolini and Mair (1990) best captures the essence of the 'Rokkonian' cleavage (see: Bornschier, 2009; Bovens and Wille, 2017; Ford and Jennings, 2020). According to this conceptualisation, political divisions can be described as fully-fledged cleavages if they display all three of the following core elements:

1. *A socio-structural element* - there must be large social groups with conflicting interests
2. *A normative element* - these groups must share a coherent set of interests, preferences and attitudes which reflect their position in the relevant social conflict and exhibit a sense of group-based identity and consciousness
3. *An organisational or behavioural element* - these identities, loyalties and values must be mobilised by political parties who organise and structure the political conflict arising between these social groups

This definition makes evident that political divides only come to constitute cleavages when socio-structural groups with shared identities, attitudes, interests and preferences become organised into the political space by political parties, and come to vote loyally for these parties on account of their differing outlooks (Bornschier, 2007, 2009; Deegan-Krause, 2007; Ford and Jennings, 2020; Kriesi, 1998; von Schoultz, 2017).

### 2.1.1 The Limits of Cleavage Theory

While the cleavage concept has, since its inception, been highly influential in explaining the connection between the social structure, public opinion and electoral behaviour, advocates of the dealignment (or cleavage decline) thesis have questioned the adequacy of this theoretical framework. Their challenge is based in the argument that several highly inter-related macro-social processes - including modernisation, globalisation and secularisation - have led to an individualisation of politics (Dalton, 1996; Franklin, Mackie and Valen, 1992; Knutsen, 1988). These developments have created societies where individuals are, for example, less involved in large-scale social group-based organisations - such as churches and trade unions - and less often live in socio-politically homogenous environments and thus, have weakened the micro social foundations of cleavage politics (Enyedi, 2008). As the potential for peer group pressure and social group-based socialisation has diminished, individuals have come to rely more on policy preferences, issue interests, the popularity of leaders and judgements of past government performance, than socio-structural reference groups, when choosing who to vote for (Dalton, 1996; Franklin, Mackie and Valen, 1992; Knutsen, 1988). Ultimately, cleavage decline theorists argue that this has led social groups to become less homogenous in their electoral choices and caused a waning in the strength of many traditional voting cleavages (Lachat, 2007).

Empirical work conducted across various advanced Western democratic contexts has provided support for this behavioural dealignment hypothesis - showing that the strong loyalties which traditionally existed between social class and religious groups and 'their own' political parties are generally weaker, or at least no stronger, today than they were in the past (Best, 2011; Brooks, Nieuwbeerta and Manza, 2006; Goldberg, 2020)[4]. However, behavioural changes are not the sole drivers of this decline in cleavage voting. Structural changes have also played an important role. As the size of the working-class populations of these countries have shrunk, due to the decline of traditional industries, the electoral relevance of the class-based divisions of 'old' have also diminished (Best, 2011; Bovens and Wille, 2017; Evans, 2000; Mair, 2008). Even if class-based voting behaviours had remained constant over time then, this process of structural dealignment would have gradually eroded the strength of the class cleavage, as working-class groups would have come to comprise a (relatively) smaller portion of the electorate. Structural and behavioural dealignment should then be seen as intrinsically interconnected processes, because:

[4]There are some notable exceptions to this rule. For example, Goldberg (2020) finds class groups have become more homogenous in their voting behaviours since 2000 and Brooks, Nieuwbeerta, and Manza (2006) find both class and religious-based voting has strengthened in the Netherlands since the mid-1990s.

> 'electoral support [from] an increasingly shrinking social group might not be enough for parties to successfully compete in the electoral arena….[so] parties may adapt their strategies to mobilise voters from different social groups, which in turn may add to behavioural dealignment (by their traditional electorate)' (Goldberg, 2020: 70)

Although the dealignment perspective appears to pose a serious challenge to cleavage theory - suggesting this will have little explanatory power today, as structural and behavioural changes have rendered social group membership a relatively unimportant determinant of electoral behaviour - a possibility suggested in Lipset and Rokkan's original framework, but neglected by cleavage decline scholars, highlights that this is not the case (Ford and Jennings, 2020). While Lipset and Rokkan (1967) indeed argued post-war cleavage structures had become 'frozen' in ways that mapped onto earlier societal conflicts, they also theorised that new cleavages would emerge organically as others declined and new forms of social division became dominant. Support for this more dynamic understanding of cleavage structures, as a 'theory of electoral realignment rooted in an evolving social structure' is apparent in recent scholarship which provides 'abundant evidence that objective social structural location continues to matter for electoral preferences even after the decline of class conflict' (Bornschier *et al.*, 2021: 2). We cannot, therefore, argue that cleavage theory is redundant simply because traditional socio-structural categories have become weaker determinants of modern electoral behaviour. Rather, this remains a productive lens for furthering our understanding of modern political divides, so long as we recognise that the various macro-social transformations which have occurred over the past century will mean that the cleavages prevalent today differ from those which Lipset and Rokkan (1967) found structured electoral competition in the post-war era.

Exploring whether new cleavages have been forged and can help explain the recent period of disruption and fragmentation experienced in the politics of advanced Western democracies therefore constitutes both a productive and timely research agenda.

## 2.2 An Emergent Educational Cleavage?

A plethora of studies conducted since the 1980s have noted that educational attainment is becoming an increasingly strong determinant of public opinion and electoral behaviour in advanced Western democracies (Abou-Chadi and Hix, 2021; Bovens and Wille, 2017; Gethin, Martínez-Toledano and Piketty, 2022; Inglehart, 1977; Kalmijn and Kraaykamp, 2007; Kriesi, 1998; Kriesi *et al.*, 2008; Stubager, 2010, 2013; Surridge, 2016; Weakliem, 2002; Weil, 1985; Zingher, 2022). However, the idea of an educational divide in politics was bought to the forefront of public debate only very recently when it became apparent that a deep educational gradient in voting was the most remarkable feature of the 2016 US Presidential Election and the UK EU referendum,

in which Trump and the Leave campaign, respectively, claimed surprise victories (Curtice, 2016; Dalton, 2018). These developments were not simply one-off occurrences. Since then, a host of other advanced Western democracies - including Australia (Beaumont, 2019), the Netherlands (Krouwel, 2021) and France (Gethin, 2022) - have also experienced 'shock' electoral outcomes in combination with stark educational divisions in voting. While it seems plausible that the emergence of an education-based cleavage could have caused this recent spate of disruptions to the established order of politics, certain social and demographic conditions would need to have been established if this were to be the case.

Although education-based divisions did not feature in Lipset and Rokkan's (1967) original study of political cleavages[5], recent scholarship has detailed precisely how this theoretical framework can be adapted to facilitate the study of educational cleavages. By tailoring Bartolini and Mair's (1990) general pre-requisites for cleavage formation, Bovens and Wille (2017) and Stubager (2010, 2013) set out three specific conditions which must be satisfied if fully-fledged education-based cleavages are to have emerged. These are as follows:

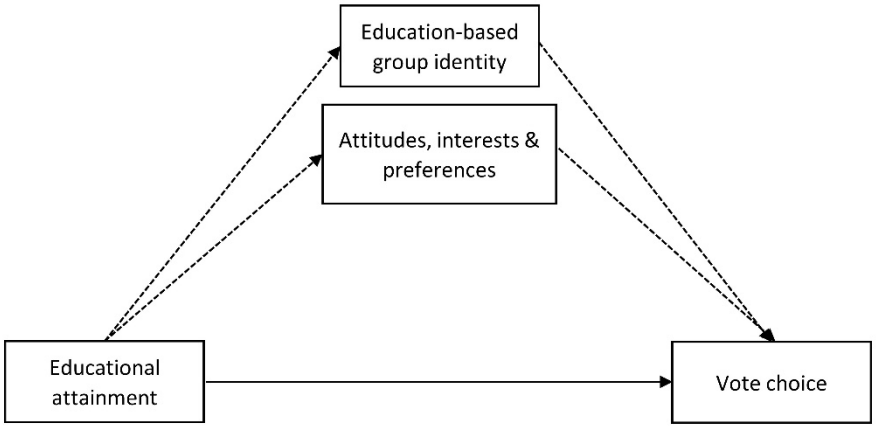
1. Macro-social transformations must have created large education-based social groups with distinct and conflicting interests
2. Each such group must not only exhibit a sense of education-based group identity and consciousness but also possess a shared set of attitudes, interests and preferences
3. Members of different educational groups will, on account of their divergent socio-political attitudes, interests, preferences and identities, tend to vote for alternative political parties, with each group showing loyalty to the parties that represent 'their' interests

Viewed through the lens of cleavage theory, educational divisions in voting exist largely because members of different educational groups tend to think differently. This process is depicted in Figure 2-1, which illustrates that the *direct* effect of educational attainment on individuals' vote choices is likely mediated by two key types of *indirect* mechanisms - education-based group identity and socio-political attitudes, interests and values. The remainder of this sub-section presents evidence to suggest that each of these three essential conditions for education-based cleavage formation have been satisfied in advanced Western democracies today and lays the

[5]This is unsurprising, given there was virtually no education-based differentiation in Western European societies, in the 1960s, when Lipset and Rokkan developed their theory. Because the majority of the population(s) of these countries had no, or only very low-level, educational qualifications, at this time, there would have been almost no basis for politics to divide along educational lines. See 2.2.1 for a discussion of how the demographic basis for the formation of education-based divisions has developed over the past half century or so.

groundwork for the research questions explored, and analysis presented, in Paper 1 (Chapter 4) of this thesis.

**Figure 2-1 - Understanding the Association of Educational Attainment with Vote Choice**




### 2.2.1 The Demographic Basis for Educational Realignment

Political cleavages are rooted in demography. There is no basis for the formation of education-based divisions unless large educational groups with distinct and conflicting interests exist (Bovens and Wille, 2017). Historically, educational attainment has not been an important source of social differentiation. For example, across all countries with advanced economies, adults in the 1950s had experienced just 6 years of schooling, on average - with the vast majority (67%) receiving no more than primary education (Lee and Lee, 2016). In this same decade, very few had high levels of educational attainment, with just 8.3% of North Americans and 6.8% of Western Europeans aged 20-64 possessing post-secondary educational qualifications (European Commission Joint Research Centre, 2018). It is evident then, that just three quarters of a century ago, most individuals living in advanced Western democracies had low levels of educational attainment and therefore, that there was no demographic basis for educational division in these societies.

Since then, advanced Western democracies have been profoundly transformed by a series of macro-social developments (Bovens and Wille, 2017; Ford and Jennings, 2020). The economies of these countries have, since the 1960s, become increasingly 'based on the production, distribution and use of knowledge and information' (Clarke, 2001: 189). This, in turn, has driven exponential growth in the demand for highly skilled workers, who are qualified to undertake professional, technical, administrative and managerial roles (Organisation for Economic Co-operation and Development (OECD), 2001). To ensure the demand for workers with these skills could be satisfied, and that these countries could maintain their status as globally competitive economic

powers in the era of the knowledge economy, participatory revolutions in HE also began to occur in the 1960s (Bathmaker, 2003; Boliver, 2011). These inter-related developments fundamentally altered the HE systems of advanced Western democracies. Universities transformed from elite institutions, which were accessible only to the most privileged and designed to reproduce the social order, by preparing only a select few for elite, professional roles, to near universal institutions, intended to train large swathes of the population for roles in advanced industrial economies (Marginson, 2016; Trow, 2007).

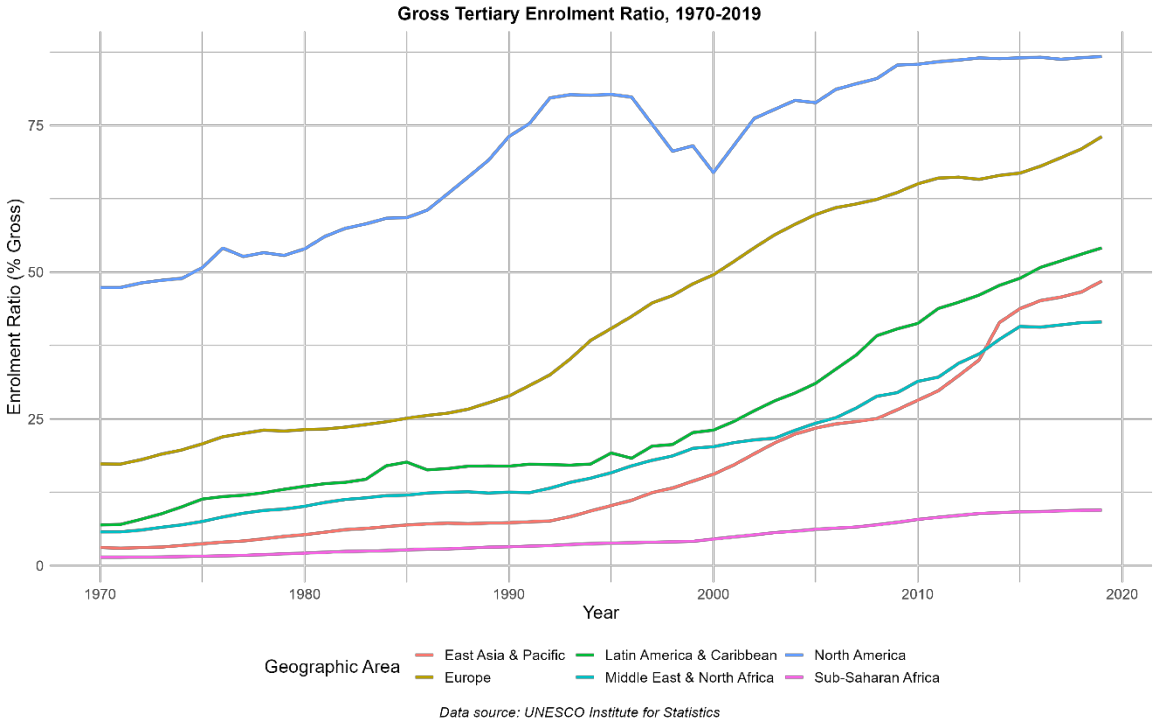
The vast scale of the increases in HE enrolment engendered by these processes is illustrated clearly in Figure 2-2, which uses data from the United Nations Educational Scientific and Cultural Organisation (UNESCO) Institute for Statistics (2022) to chart the gross tertiary education enrolment ratio[6] from 1970-2019. This figure shows that while tertiary enrolment rates have increased across the globe in this period, this educational revolution did not occur at the same pace, or to the same extent, across all geographical contexts. It is only in Europe and North America, for example, that clear trends toward tertiary enrolment growth were observed from the early 1970s onwards, with this pattern not replicated elsewhere until the early 1990s. This is expected and reflects that the transition to economic modernisation had an earlier onset in geographies dominated by advanced Western democracies (like Europe and North America), than it did elsewhere (Marginson, 2016). Figure 2-2 also shows that Europe experienced a particularly dramatic increase in HE enrolments during the period - with tertiary enrolment rising by 56-percentage points (from 17% to 73%) in this context, compared to the maximum increase of 47-percentage points observed elsewhere.

These macro-social transformations have not only fundamentally altered the educational composition of advanced Western democracies but also rendered educational credentials increasingly important determinants of social stratification in these societies (Bell, 1973; Bourdieu, 1984; Bovens and Wille, 2017; Brint, 1984; Collins, 1979). A ‘new middle class’ of university-educated ‘knowledge workers’, who are primarily employed in the emerging socio-cultural professions and human service sector, has emerged (Kriesi, 1999; van de Werfhorst and de Graaf, 2004). As the highly educated individuals comprising this group possess the transferable skills valued in globalised economies, they are rewarded with high-paid, economically-secure and ‘mobile’ work, and ultimately with a high social status position, while the less educated are typically exposed to insecure employment, low pay and high levels of job competition, and

[6]The gross enrolment ratio is defined by UNESCO's Institute for Statistics (2022: n.p.) as the ‘total enrolment in a specific level of education [here tertiary education], regardless of age, expressed as a percentage of the eligible official school-age population corresponding to the same level of education in a given school year.’

therefore occupy lower status positions (Gabel and Palmer, 1995; Kriesi *et al.*, 2008). These divisions are then continually maintained through educational segregation. Becaue the areas in which we live, schools we attend and social activities in which we partake as children are all closely linked to our parents' educational backgrounds, educational groups now scarcely meet or mingle (Bovens and Wille, 2017) and the majority of marriages are educationally homogenous (Domański and Przybysz, 2007; Huber and Fieder, 2016). In light of this reinforcing cycle of education-based stratification and segregation which keeps the highly educated in high-status positions, while stifling the upward mobility of the low-status, low-education group, it is clear why the educational groups of advanced Western democracies would come to develop conflicting interests; with the highly educated interested in maintaining this status quo and the less educated wishing to disrupt this (Stubager, 2009).

**Figure 2-2 - Gross Tertiary Enrolment Ratio Worldwide, 1970-2019**




Though the large-scale societal changes which have altered the educational composition of advanced Western democracies began to play out several decades ago, their effects continue to be felt today. Many countries are still experiencing sharp increases in the concentration of their highly educated populations from one generation to the next. European Social Survey data from 2016, for example, shows that while HE graduates comprise 32% of the adult population, on average, across 15 Western European nations today, this figure disaggregates to 37% among the under 30s compared to just 21% for the over 70s (Ford and Jennings, 2020: 300). Comparing this recent 32% statistic with the 6.8% figure from the 1950s clearly demonstrates that the shifts towards knowledge economies and educational revolutions experienced across Western

European, and indeed advanced Western democratic, societies over the past three-quarters of a century or so have engendered precisely the kind of 'massive expansion [in] the number of well-educated citizens [which] provides the demographic basis for [education-based] cleavage formation' (Bovens and Wille, 2017: 46). These highly inter-linked macro-social transitional processes have then acted as 'critical junctures', creating a reinforcing cycle of educational stratification and segregation which has laid the groundwork for the politics of a host of advanced Western countries to be shaped by an emerging educational cleavage.

### 2.2.2 The Development of Education-based Identity and Group Consciousness

If a fully-fledged educational cleavage is to have formed, the objective education-based divisions outlined in the previous section must also have taken on a psychological dimension - being internalised at a subjective level within the minds of electors (Stubager, 2009). Drawing on the conceptual framework of Social Identity Theory (Tajfel, 1978; Tajfel and Turner, 1979), Stubager (2009) argues that subjective conflicts over education are observed in societies where two key criteria are met:

1. There is a sense of education-based group identity, in that individuals feel they belong to the educational group which reflects their own attainment
2. These educational groups view their inter-group relations as inherently conflictual and exhibit negative evaluations of the other group. In other words, a sense of education-based group consciousness has developed

While it is true that 'there is little evidence [to suggest] education produces the kind of social group identity [and consciousness] that is needed to classify a divide as a cleavage' (Surridge, 2018: n.p.), this evidential deficit can be attributed more to the lack of suitable data and appropriate analytical tools for studying this phenomenon, than to a genuine absence of such feeling (Bornschier, 2007). Indeed, what rather scant evidence does exist in this regard is compelling.

Bornschier *et al.* (2021) and Stubager (2009), for example, find that individuals consistently report feeling closer to the education-based social groups which correspond with their own level of attainment, than they do to contrasting groups. This means that, at least in the Swiss and Danish contexts where these studies were conducted, respectively, highly educated individuals feel more attached to university graduates and people with high education than they do to people without a degree and people with low education and vice versa (Bornschier *et al.*, 2021; Stubager, 2009). Additional evidence to suggest that a sense of education-based group identity exists in advanced Western democracies today comes from data collected as part of the UK's largest household

longitudinal study - the Understanding Society survey. Panel data from this survey shows more respondents have come to report that their educational attainment is important in determining their sense of who they are over time, with 59% of Understanding Society (2021a) respondents claiming this was 'very' or 'fairly' important in 2019/20, compared to just 48% in 2010/11.

Empirical evidence presented in Stubager's (2009) pioneering work on the subjective side of the Danish educational divide also suggests that a sense of education-based group consciousness, akin to that which has often been documented in relation to social class, has now developed - with educational groups perceiving themseleves as existing in a relation of dominance to one another. Stubager (2009) shows that while the 'dominant', highly educated group, have positive evaluations of the less educated group and perceive little conflict between educational groups in Denmark; the 'dominated', low education group express negative evaluations of the highly educated. This reflects both that the lower educated group perceives inter-group relations conflictually, in that they desire to change the status quo while the high-educated group do not, and 'the need [for this group] to obtain positive self-esteem in the inter-group situation by devaluing the high education group' (Stubager, 2009: 226). It therefore seems reasonable to expect that individuals living in advanced Western democracies today have developed a sufficient concept of education-based identity and group consciousness as to make the emergence of an educational cleavage viable.

### 2.2.3 The Educational Structuring of Attitudes

It is well established that the political spaces of advanced Western democracies are structured along two core ideological dimensions today: an economic, or left-right, dimension and a socio-cultural, or libertarian-authoritarian, dimension (Dalton, 2018; Häusermann and Kriesi, 2015; Hooghe, Marks and Wilson, 2002; Marks *et al.*, 2006; Norris and Inglehart, 2019; Wheatley, 2016). The former, which encompasses issues concerning (in)equality and exploitation, has been an important feature of political contestation since the early post-war period (Adams, Green and Milazzo, 2012a; Langsæther and Evans, 2020). Economic ideology has traditionally acted as a source of social class-based conflict over politics. This has been seen clearly in that those on the economic left - typically the working-class - have tended to favour redistribution, believe businesses benefit at the expense of workers and that the rich are bound by different laws than the poor, for example, while those on the right - typically the middle-class - have largely taken the opposite view (Clark and Lipset, 1991; Evans, Heath and Lalljee, 1996; Lipset and Rokkan, 1967). Although it is undisputable that conflicts over economic issues remain an important feature of political contestation in advanced Western democracies today (Häusermann and Kriesi, 2015), there is considerable empirical evidence to suggest that electors' left-right positions have become

increasingly less important determinants of their vote choices since the 1990s (Adams, Green and Milazzo, 2012a, 2012b; Green and Hobolt, 2008).

In contrast, the cultural dimension has only gained significance in advanced Western democracies since the 1970s. Once economic and physical security became guaranteed for most in these societies, individuals began to focus on values related to self-expression (Dalton, 2018; Flanagan and Lee, 2003; Inglehart, 1977, 1997; Inglehart and Abramson, 1994; Kitschelt, 1994). As a result, new social movements promoting gender equality, acceptance of diverse lifestyles, solidarity with the Third World and environmentalism emerged, and began to forge a cultural divide between citizens who were comfortable with modernisation and took liberal stances on 'new issues', and those who exhibited conservative attitudes towards these issues, on account of their opposition to the changing 'status quo' (Norris and Inglehart, 2019). This aspect of cultural contestation has commonly been termed the libertarian-authoritarian divide and has been mobilised both by the emergence of green parties and a re-shaping of the issue platforms of existing social democratic and socialist parties (Flanagan and Lee, 2003; Kitschelt, 1994).

The intensification of globalisation in the 1990s added a new aspect to the existing cultural ideological divide (Dalton, 2018; Kriesi *et al.*, 2008). Populist and nationalist parties emerged to mobilise a new strand of 'cultural backlash' which constituted a 'react[ion] against a series of perceived threats to the national community' which included immigrants, foreign influence and international agencies (Hooghe, Marks and Wilson, 2002: 976). In response to the electoral success of these populist parties, which have promoted culturally conservative agendas, many mainstream parties shifted their cultural positions towards populist offerings (Bayerlein, 2021). As this transformation has played out across advanced Western democracies, scholars have sought to define the contours of this new cultural divide. Bornschier *et al.* (2021: 7) provide a concise summary of the various conceptualisations which have been developed, highlighting that:

> *'the…[cultural] divide has been variously labelled as opposing green-alternative-left…and traditional-authoritarian-nationalist…positions (Hooghe, Marks and Wilson, 2002), libertarian-universalistic and traditionalist-communitarian values (Bornschier, 2010), or as a divide exhibiting distinctive "grid" and "group" components (Kitschelt and Rehm, 2014)...[It has also been defined as an]…"integration-demarcation" (Bartolini, 2005; Kriesi et al., 2008) , or "cosmopolitan-communitarianism" (de Wilde et al., 2019; Strijbis, Helmer and de Wilde, 2020)…[based conflict]'*
> ***all cited in Bornschier et al. (2021).***

While each of these definitions of the cultural ideological dimension are subtly different in emphasis, with some more centred on the struggle over national borders, and others focussed on conflicts within states, all centre around two core features - views relating to social hierarchy and

tolerance for non-conformity (Stubager, 2013). Regardless of which terms are used to describe the cultural dimension which structures political conflict in advanced Western democracies today, this conflict is comprised of a culturally liberal pole and a diametrically opposing authoritarian pole. Those taking liberal socio-cultural stances typically support equal opportunities for all, regardless of gender identity, ethnicity and sexual orientation, have 'open' and 'international' outlooks, are environmentally friendly, do not see immigration as a 'threat', oppose censorship and the principle of obeying authority figures unquestioningly, while authoritarians tend to take the opposite positions (Häusermann and Kriesi, 2015; Wheatley, 2016).

If an educational cleavage is to have formed across advanced Western democracies, educational groups in these societies must share distinct and opposing sets of attitudes along these core ideological dimensions. A plethora of studies suggest this is indeed the case in terms of socio-cultural attitudes. In fact, the association of education with liberal cultural attitudes is one of the most replicated findings in the social sciences (Surridge, 2016; Weakliem, 2002). Research conducted over the past few decades has shown, with remarkable cross-national consistency, that highly educated persons are, on average, considerably more culturally liberal than their less educated counterparts (see: Kalmijn and Kraaykamp, 2007; Stubager, 2010, 2013; Weakliem, 2002; Weil, 1985; van de Werfhorst and de Graaf, 2004). However, this association is not a simple linear one, whereby each additional year spent in education leads to increasingly liberal cultural attitudes; but rather is characterised by a marked divide between graduates' and non-graduates' attitudes (Brennan *et al.*, 2015; Hainmueller and Hiscox, 2007; Stubager, 2008; Surridge, 2016). In advanced Western democracies today then, university graduates typically possess liberal cultural attitudes while less educated individuals tend to exhibit authoritarian attitudes.

The evidence regarding the educational structuring of economic attitudes is more mixed. While many studies, including works by Bullock (2021), Dion and Birchfield (2010), Gelepithis and Giani (2022), Kalmijn and Kraaykamp (2007) and Surridge (2016), have found educational attainment to be negatively associated with economic attitudes - with highly educated individuals across advanced Western democracies tending to be more opposed to re-distribution than their less educated counterparts - this finding is not universal. Van de Werfhorst and de Graaf (2004) and Zampelli and Yen (2021), for example, find no statistically significant link between education and economic preferences.

Although this section has demonstrated that there is clear evidence to suggest individuals' socio-cultural and economic attitudes divide along educational lines in advanced Western democracies today, it has also highlighted that these education-based patterns of ideological differentiation are complex and cannot be understood in terms of simple linear associations.

### 2.2.4 The Educational Divide in Electoral Behaviour

Although the stark educational divide in electoral behaviour has come to the forefront of public debate in advanced Western democracies only recently, these 'new' patterns of education-based voting have actually been developing for several decades (Abou-Chadi and Hix, 2021; Gethin, Martínez-Toledano and Piketty, 2022; Kitschelt and Rehm, 2019; van der Waal, Achterberg and Houtman, 2007).

Prior to the 1970s - when party competition operated along a single, economic dimension - the educational differences observed in voting in advanced Western democracies could be subsumed under the general heading of 'class voting'. Working-class, low income and low educated voters all overwhelmingly favoured left-wing social democratic parties while middle-class, high income and highly educated electors tended to vote for conservative parties and those on the right (Houtman, Achterberg and Derks, 2008; van der Waal, Achterberg and Houtman, 2007). Since then, however, the increasing salience of issues along the 'new' cultural dimension and the development of a multidimensional political space, has led these highly correlated demographic attributes to push voters in opposite directions (Gidron, 2022; Häusermann and Kriesi, 2015). This phenomenon is referred to as voter 'cross-pressure' and describes the situation whereby our tendency to vote:

> *'for a leftist (rightist) party on the basis of economic liberalism (conservatism) [which is rooted in our occupation-based class position] conflicts with [our desire to] vote…for a rightist (leftist) party on the basis of social conservatism (social liberalism) that is rooted in a limited (large) amount of cultural capital' (van der Waal, Achterberg and Houtman, 2007: 408)*

This 'cross-pressure' has fundamentally altered the association of educational attainment with electoral behaviour[7]. In fact, empirical works conducted by Gethin, Martínez-Toledano and Piketty (2022), de Graaf, Jansen and Need (2013), Kitschelt and Rehm (2019) and Zingher (2022) suggest that the education-vote choice relationship has now been completely reversed in many advanced Western democratic contexts - with highly educated electors no longer being

[7]The inconsistent picture of the relationship between educational attainment and economic attitudes provided by the existing literature (see Section 2.2.3) is likely a product of voter cross-pressure. Cavaillé and Trump (2015) show that although redistributive attitudes have typically been thought to have a unidimensional structure, they actually have two dimensions - preferences relating to 'taking from the rich' (which load more on the traditional economic ideological dimension) and 'giving to the poor' (which load more on the 'new' cultural dimension). Educational groups are cross-pressured on these dimensions. This is demonstrated clearly by Attewell (2022) who shows that while ideas of economic deservingness are positively associated with educational attainment across an array of Western European contexts, the opposite is true of support for the welfare state.

statistically significantly more likely than their less educated counterparts to vote for parties on the right (as they were in the early 1970s), but rather favouring parties on the left. Although the findings of this body of research are remarkably consistent in the geographical sense, they are more mixed temporally - in that while de Graaf, Jansen and Need (2013) and Kitschelt and Rehm (2019) find this reversal was evident as early as the late 1970s and early 1980s, Gethin, Martínez-Toledano and Piketty (2022) and Zingher (2022) find no evidence of this until the turn of the century. Irrespective of these differences, these studies clearly suggest the pattern of educational division observed in vote choices in most advanced Western democracies today - whereby more (less) educated individuals tend to favour parties on the left (right) - has been in existence for some time.

Recent studies by Abou-Chadi and Hix (2021) and Attewell (2022), however, highlight that much of the association between educational attainment and left/right voting observed in Western Europe today is driven by the stark 'educational gap' in voting for green, liberal and radical right parties. This demonstrates the importance of using the most nuanced classifications of voting behaviour possible when analysing, and seeking to understand, the ways in which education shapes electoral behaviour.

### 2.2.5 Educational Cleavages: What We Already Know

Evidence presented in the previous sections clearly demonstrates that the pre-requisites for educational cleavage formation are satisfied in advanced Western democracies today. It therefore seems quite plausible that the emergence of a fully-fledged education-based cleavage could have driven the period of disruption, fragmentation and realignment experienced in these societies' politics in recent years. It is surprising then, that just a handful of existing studies have sought to confirm whether this kind of educational cleavage can indeed be observed in advanced Western democratic contexts today.

While the pioneering work of scholars including Attewell (2022), Bornschier *et al.* (2021), Evans, de Geus and Green (2021), Fieldhouse *et al.* (2019a), Goodwin and Heath (2016a) and Stubager (2009, 2010, 2013) has indeed begun to shed light on this, by showing that educational groups' asymmetric attitudes and social identities have contributed to driving the 'educational gap' observed in voting in recent years, our understanding of educational cleavage voting remains limited. Firstly, because these studies have been conducted across only a relatively limited set of geographic contexts - focussing largely on the Swiss, Danish and British cases - and secondly, because they have typically used methodologies which are not well-suited to the task of

decomposing education's *total effect* on vote choice into *direct* and *indirect* effects[8], and therefore have not been able to provide a comprehensive picture of how it is that educational attainment has come to shape the ways individuals vote. If we are to gain a fuller understanding of the complex association of educational attainment with public opinion and electoral behaviour in advanced Western democracies, future research endeavours must not only use sophisticated mediation methodologies to investigate why it is that individuals with divergent levels of educational attainment vote in different ways but also study this process across a wider array of country contexts.

## 2.3 Getting to the Roots of the Educational Cleavage: Understanding Why Educational Groups Think Differently

Thinking about the emerging educational divide in politics in terms of cleavage theory clearly highlights that understanding *why* educational groups come to possess the asymmetric attitudes, interests and preferences which motivate them to cast their votes in different ways is essential if we are to 'get to the roots' of what has *caused* this education-based political divide. There are several ways in which education could be linked with individuals' socio-political attitudes.

The experience of being educated, in itself, could have a direct, *causal* effect on attitudinal formation. According to Phelan *et al.* (1995) and Stubager (2008) there are three main mechanisms through which this 'absolute education effect' is theorised to flow: these are laid out in the psychodynamic, cognitive and socialisation models. The psychodynamic explanation proposes that increasing exposure to education promotes greater psychological security - making us feel more in control of our own lives - and that this sense of (in)security means (less) highly educated individuals feel (more) less threatened by social change and those with experiences that deviate from their own (Adorno *et al.*, 2019; Jenssen and Engesbak, 1994; McClosky and Brill, 1983; Weil, 1985). The cognitive model, on the other hand, proposes that education not only imparts knowledge of civil liberties and the plurality of values and belief systems which exist in society, but teaches us to think from others' points of view (Bobo and Licari, 1989; Nunn, Crockett and Williams, 1978; Weakliem, 2002; Weil, 1985). Given that 'tolerance of the unconventional…[is the] mainstay of social liberalism', both the psychodynamic and cognitive models suggest that

[8]Attewell's (2022) recent study is a notable exception to these rules. It uses data on 15 Western European countries (Austria, Belgium, Finland, France, Germany, Britain, Iceland, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden and Switzerland) and employs a sophisticated mediation methodology which allows the decomposition of education's total effect on vote choice into direct and indirect portions.

greater exposure to education will engender increasingly liberal socio-cultural attitudes (Surridge, 2016: 148).

The socialisation model is, however, the 'education-as-a-cause' theory of attitudinal formation which has received the most attention. It argues that individuals internalise the (il)liberal socio-cultural and economic values they are exposed to on educational campuses, either via formal socialisation (e.g., the teaching of liberal values alongside subject-specific knowledge) or through informal socialisation processes (e.g., conversing with peers and instructors) (Jacobsen, 2001; Jenssen and Engesbak, 1994; Pascarella and Terenzini, 1991). Support for this socialisation-based model of education's effect on attitude formation has been provided by studies conducted across a range of advanced Western democratic contexts - including Australia, Denmark, the Netherlands, the UK and the US - over the past half-century (see: Brońić and Miles, 2021; Dey, 1996, 1997; Gelepithis and Giani, 2022; Hastie, 2007a, 2007b; Mendelberg, McCabe and Thal, 2017; Pascarella, Ethington and Smart, 1988; Paterson, 2009, 2014; Scott, 2022; Stubager, 2008; Surridge, 2016; van de Werfhorst and de Graaf, 2004). As a result, the conventional view in the political sociology literature has been that differing levels of exposure to education are indeed the *direct cause* of educational groups' distinctive attitudinal profiles.

However, it also seems quite plausible that at least part of the linkage between educational attainment and individuals' socio-political views is spurious; with education simply acting as a proxy for other important factors. This revisionist 'education-as-a-proxy' stance, according to Persson (2014, 2015), comprises two main theories: the pre-adult experience, or self-selection, model and the relative education, or sorting, model. The pre-adult experience model posits that the same factors which determine our decisions to enrol in, and likelihood of successfully completing, educational programmes (e.g., socio-economic background, genetics, cognitive ability and parental socialisation) also shape attitudinal formation (Campbell and Horowitz, 2016; Lancee and Sarrasin, 2015; Sieben and de Graaf, 2004; Surridge, 2016). For proponents of the pre-adult experience model, the experience of being educated, in itself, *does not cause* attitudinal change, it simply appears this way due to a self-selection effect whereby individuals with early experiences which pre-dispose them to develop a highly distinctive set of attitudes also disproportionately choose certain educational paths.

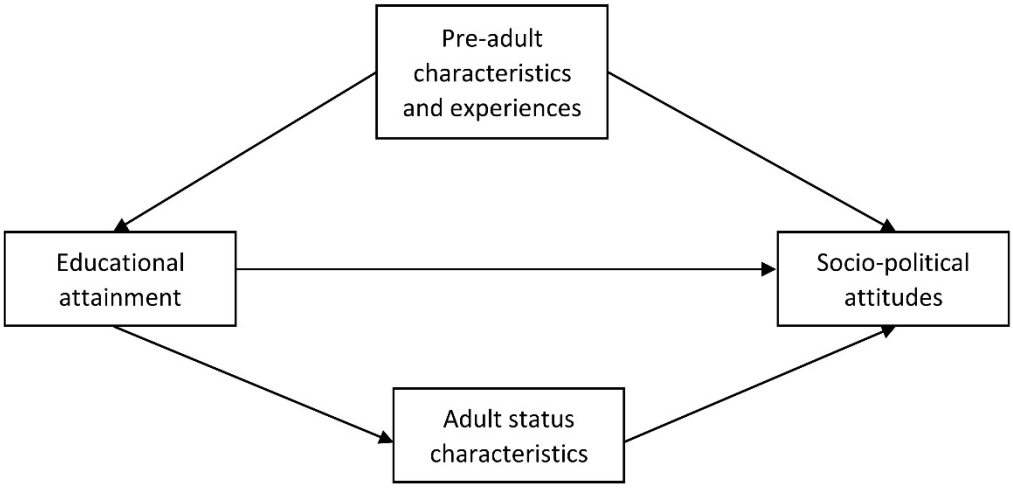
In contrast, the sorting model argues that the linkage of education with adult attitudes is transmitted largely through social status-based mechanisms (Stubager, 2008; Surridge, 2016). Educational attainment is a crucial determinant of status position in the globalised knowledge economies of advanced Western democracies today (e.g., Bourdieu, 1984; Brint, 1984; Collins, 1979). While the highly educated are generally well-paid, able to find secure, flexible and autonomous work and experience relatively low levels of job competition, the opposite tends to

be true of those with less education (Gabel and Palmer, 1995; Hainmueller and Hiscox, 2007; Jenssen and Engesbak, 1994; Kitschelt and Rehm, 2014; Kriesi *et al.*, 2006, 2008). As a result of these diverging material interests, educational groups may come to exhibit differing economic and cultural attitudes. Education is also thought to shape attitudes via indirect status-based social network effects e.g., the fact that educational groups rarely meet and mingle (Bovens and Wille, 2017). Individuals with high levels of educational attainment might, for example, be more supportive of immigration and tolerant towards ethnic minorities, than their less educated counterparts, as by virtue of their educationally conferred social status position they are less exposed to job competition from low-skilled migrant workers or because they are more often embedded in networks which endorse these attitudes.

The previous discussion makes evident that there are several different mechanisms through which educational attainment's influence on individual's attitudes may be transmitted. These are outlined in Figure 2-3. Understanding precisely why it is that educational groups come to think differently necessitates that we discriminate between the mechanisms depicted in Figure 2-3 by conducting empirical analyses which isolate the independent causal effect of education on socio-political attitudes from spurious education-as-a-proxy effects. Doing so is a notoriously difficult task (Persson, 2014, 2015). This is highlighted by a recent, and growing, body of scholarship which suggests that existing studies are likely to have overestimated education's effect on a range of adult outcomes - from attitude formation to political participation and vote choice - as many have only controlled for a limited array of measured pre-adult and adult status experiences when estimating this effect (e.g., Brońić and Miles, 2021; Campbell and Horowitz, 2016; Kam and Palmer, 2008; Kunst, Kuhn and van de Werfhorst, 2020; Lancee and Sarrasin, 2015; Marshall, 2016; Mayer, 2011; Mendelberg, McCabe and Thal, 2017; Persson, 2014; Scott, 2022; Sieben and de Graaf, 2004). While these pioneering studies have undoubtedly improved our knowledge of how best to obtain unbiased estimates of education's effect on adult outcomes, just a handful of studies have sought to use these techniques to better identify education's causal effect on socio-political attitudes. Those which do cover only a limited array of advanced Western democratic contexts and are often based on somewhat outdated samples. As a result, it remains a relatively open question as to whether the complex and well-established association of educational attainment with individuals' socio-political attitudes is genuinely causal.

The previous discussion makes evident that future research endeavours must make wider use of the kinds of quasi-experimental methodologies which have been adopted in this emerging body of research and apply these to contemporary data from a range of country contexts if a more detailed understanding of the association of educational attainment with public opinion is to be established.

**Figure 2-3 - Understanding the Association of Educational Attainment with Socio-political Attitudes**




## 2.4 Moving Beyond the Individual Level: Exploring Spatial Variation in the Association of Educational Attainment with Electoral Behaviour

Most studies of electoral behaviour have adopted *compositional* approaches, arguing that our vote choices are predominantly determined by individual-level factors such as our socio-demographic characteristics and socio-political attitudes or our assessments of party leaders and the current political-economic situation (Johnston and Pattie, 2004, 2006; Johnston, Pattie and Allsopp, 1988). While it is indisputable that 'who we are' and 'how we think' shapes the way we vote, it also matters 'where we are'. Like all human action, the decision of who to vote for is inherently spatially situated (Agnew, 1987, 1996). Individuals do not cast their votes in a vacuum, rather their choices are influenced by the local contexts within which they live their daily lives (Enos, 2017; Ethingon and McDaniel, 2007; Huckfeldt and Sprague, 1995; Johnston and Pattie, 2006). The people we talk to about political issues, the local political culture and the economic situation of our neighbourhood, for example, all represent contextual factors which have the potential to shape the way we vote. It is only by synthesising these compositional and contextual approaches and, thus, acknowledging that while 'people occupying particular positions within society are likely to choose one party over another…[this] tendency is stronger in some places than others', that we can hope to gain a fully comprehensive understanding of why it is that individuals choose to vote in the ways they do (Johnston and Pattie, 2006: 40).

Social categories, and the divisions demarcated on the basis of these, are not geographically uniform. Rather, the relative significance and meaning ascribed to these social positions varies across space, depending upon the socio-cultural, historical and economic particularities of the

local context (Agnew, 1996). Possessing a university degree, for example, is likely to be a qualitatively different experience for individuals who live in areas where there are an abundance of secure, well-paid graduate jobs on offer, than it is for individuals who live in areas where their degree lends them few opportunities to 'get ahead' (Goodwin and Heath, 2016a). It is problematic then, that while a plethora of existing studies have explored education's shaping effect on individual vote choices in advanced Western democracies (e.g., Abou-Chadi and Hix, 2021; Bovens and Wille, 2017; Fieldhouse *et al.,* 2019a; Gethin, Martínez-Toledano and Piketty, 2022; Houtman, Achterberg and Derks, 2008; Kitschelt and Rehm, 2019; Stubager, 2010, 2013; van der Waal, Achterberg and Houtman, 2007), few have investigated the geographical contingency of these 'educational effects'.

The remainder of this sub-section proceeds, firstly, by providing a review of the literature which has synthesised compositional and contextual approaches to explore when and where individuals with identical socio-demographic characteristics have voted differently across advanced Western democracies. It then considers the extent to which these *contextual* effects are likely to be the *causal drivers* of the spatial heterogeneity observed in individual voting behaviours.

### 2.4.1 How Context Shapes Voting: When and Where Identically Qualified Individuals Vote Differently

There exists a substantial body of literature which has explored the geography of social class voting. An abundance of studies have, since the 1960s, shown not only that the strength of the individual-level association between social class and voting varies considerably across space, but also that working-class people tend to vote more like middle-class people in middle-class areas and vice versa (e.g., Andersen and Heath, 2002; Butler and Stokes, 1969; Johnston *et al.*, 2004; Johnston, Pattie and Allsopp, 1988; MacAllister *et al.,* 2001; Miller, 1978). While there is a clear consensus in the electoral geography literature that individuals from the same social class background are likely to vote differently in areas with different kinds of overall class profiles, there remains a lively debate as to precisely why this is. These debates primarily centre around two kinds of explanations for the spatial variation observed in voting.

The first are *social contagion* and *interaction-based* explanations. Perhaps the earliest articulation of these ideas came from Butler and Stokes (1969) and Miller (1977: 65), who essentially argued that place-based patterns of voting were a result of 'people who talked together vot[ing] together'. For Miller (1977, 1978), it followed that because working-class people would more often come into contact with middle-class individuals in predominantly middle-class areas, they would come to vote more like this group than less-exposed working-class individuals who resided in largely working-class areas, and vice versa. These kinds of *contagion theories* were criticised by

Dunleavy (1979), who thought it unlikely that simply 'rubbing shoulders' with particular kinds of people on the street could change the way individuals voted - he argued that such effects were only plausible if these groups were actually engaging in *social interaction* with one another. Although a substantial body of evidence which appears to support this interaction-based explanation has since emerged, with studies conducted across an array of advanced Western democratic contexts showing that individuals will often switch their vote in a particular direction if those with whom they discuss politics also support that direction (e.g., Huckfeldt and Sprague, 1995; Pattie and Johnston, 1999, 2000), it is possible that political talk could influence individuals' voting behaviour without being a driver of any spatial variation observed in voting (see: Curtice, 1995). In light of this, and the fact that Enos' (2017: xi) recent work demonstrates that the simple 'property of being close [to others]…penetrates our psychology and affects our thoughts [and] behaviours', it seems that *contagion theory* should not yet be dismissed entirely.

The second are *environmental observation* explanations, which describe the situation whereby similar individuals are more (or less) likely to vote for certain parties in some areas than others, as some parties are seen as particularly likely (or unlikely) to act in the interests of certain kinds of places, and the people residing in these places (Johnston *et al.*, 2004). The fact that our evaluations of the economy operate at the local, rather than national, scale, is one reason why similar individuals vote differently across space - as those living in struggling areas are more likely to punish incumbent governments, while those in prospering areas tend to reward them (Books and Prysby, 1999; Johnston *et al.*, 2000). The opportunities afforded by virtue of living in particular kinds of places also matter. Across many advanced Western democracies a divide has emerged between citizens who live in areas strongly connected to, and able to reap the benefits of, global growth and those who do not (Jennings and Stoker, 2016, 2017). These left-behind and declining areas have emerged as hotbeds of political discontent and populist support (MacKinnon, 2021; Rodríguez-Pose, 2018), and as a result, have recorded very different aggregate-level vote patterns to thriving, urban, cosmopolitan areas in national elections and referendums in various contexts - including the UK, the US, Germany, Austria and France - in recent years (e.g., Dijkstra, Poelman and Rodríguez-Pose, 2020; Essletzbichler, Disslbacher and Moser, 2018; Ford and Goodwin, 2014; Goodwin and Heath, 2016b; McQuarrie, 2017; Weisskircher, 2020). Those who feel they represent the 'winners' and 'losers' of globalisation (Kriesi, 1998; Kriesi *et al.*, 2008) - a feeling which is in large part determined by geographic location and locally constrained opportunity structures - are therefore likely to vote differently.

Given that the geography of social class-based voting has received so much attention, and that class cleavages are now being displaced by education-based cleavages across many advanced Western democratic contexts (Bovens and Wille, 2017; Ford and Jennings, 2020; Stubager, 2010),

it is surprising that so few studies have considered when and where individuals with identical educational qualifications vote differently. To the best of my knowledge, there exist just two pioneering studies which have considered how the relationship between educational attainment and voting preferences varies across space. While Goodwin and Heath (2016a: n.p.) explore the spatial distribution of this 'educational effect' in relation to 2016 EU referendum voting in Britain, and Zingher (2022) considers this for partisanship in the US from 2006-2020, both studies have uncovered the same general trend - finding a large and highly statistically significant interaction effect between individuals' levels of educational attainment and the educational profiles of the areas in which they live. These studies provide clear evidence to suggest that people with identical qualifications who reside in areas where differing proportions of the population have degree-level qualifications choose to vote, and express their partisan identity, in different ways (Goodwin and Heath, 2016a; Zingher, 2022).

While these studies have clearly advanced our understanding of the geography of educational effects, there remains much left to learn. For example, although Goodwin and Heath (2016a) and Zingher (2022) agree on where identically educated individuals vote differently - in different kinds of educational environments - they disagree with regards to the mechanisms that drive this patterning. For Goodwin and Heath (2016a: n.p.), the educational profiles of areas only matter in that they act as proxies for the 'availability of local resources and opportunities'. They essentially subscribe to the *environmental observation* account, in arguing that individuals with the same qualifications vote differently across space because these qualifications do not afford the same opportunities to 'get ahead' in left-behind and declining areas as they do in thriving, urban centres. On the other hand, Zingher (2022: 274) proposes a more direct role for area-level education in essentially arguing for a *contagion* or *social interaction* effect, whereby living among 'high [or low] densities of college-educated people [is] likely to reinforce a [particular] set of values [and] shared social identity' and therefore to also influence partisanship and vote preferences. While both explanations seem plausible, it is impossible to discriminate between these on the basis of Goodwin and Heath's (2016a) and Zingher's (2022) analyses, as they do not include controls for a full range of alternative contextual explanations when estimating how area-level educational composition moderates the individual-level education-vote choice association[9]. It therefore remains an open question as to whether it is really the *educational environment* of

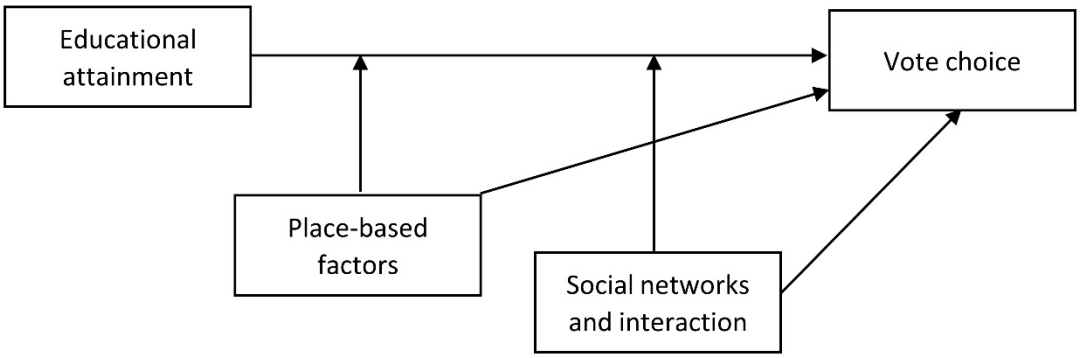
[9]While educational composition (at county-level in the US) is the only contextual predictor modelled by Zingher (2022), Goodwin and Heath (2016a) also control for the age structure and proportion of foreign born residents, at the Parliamentary constituency-level, when testing the interaction of individual-level and aggregate-level educational effects on voting.

areas, as opposed to their *interaction contexts* or *opportunity structures*, that matter when it comes to understanding where identically qualified individuals vote differently across space.

The previous discussion makes evident that the relationship between individuals' educational attainment and their vote choices is unlikely to be homogenous across space; suggesting instead that identically qualified individuals are likely to vote differently in areas characterised by differing kinds of place-based characteristics (e.g., local economic conditions) and social interaction contexts. Figure 2-4 illustrates this process, demonstrating how the individual-level education-vote choice association may be moderated by contextual effects.

It is clear that if we are to gain a fully comprehensive understanding of when and where individuals with identical qualifications vote differently across advanced Western democracies today, we must draw on the insights and explanations from the literature on the geography of class voting and conduct analyses which simultaneously test how a fuller range of *contextual factors* moderate the individual-level education-vote choice association. Future endeavours to explore the spatial distribution of educational voting must also go beyond the scope of existing work not only by expanding this research agenda to a broader array of national contexts but by reconsidering the British and US cases, using more direct and obviously generalisable measures of vote choice than those employed in existing studies. This is because it seems highly likely that Goodwin and Heath (2016a) and Zingher (2022) would have produced different understandings of the spatial distribution of educational voting had they studied presidential or general election voting, as opposed to partisanship and voting at the EU referendum - which constitutes a highly specific example of a British political contest.

**Figure 2-4 - Area-level Moderators of the Individual-level Education-Vote Choice Association**



### 2.4.2 The Drivers of Spatial Heterogeneity in Voting: Contextual Effects or Residential Self-selection?

The central argument of *contextual* theories of electoral behaviour is that, for various reasons, individuals will tend to gradually assimilate towards the dominant political persuasion of the areas in which they reside (Gallego *et al.*, 2016). While it is certainly plausible that living in a particular kind of place (e.g., one where the majority hold liberal or conservative economic or cultural attitudes) could *cause* individuals to change the way they vote, it is also possible that these contextual effects are in fact spurious; simply being driven by the disproportionate tendency of individuals to self-select or sort themselves into living in areas where a large proportion of residents think and vote like themselves (Bishop and Cushing, 2008; Iyengar *et al.*, 2019).

Much of the evidence that suggests self-selection, rather than contextual factors, is likely to be a major driver of the link between geography and voting comes from the US. Since the publication of Bishop and Cushing's (2008) *The Big Sort,* which argued that people are increasingly moving to places where inhabitants have lifestyles and ideological views that are more congruent with their own, a host of studies have demonstrated that Americans prefer to relocate to areas which are heavily populated with co-partisans (e.g., McDonald, 2011; Sussell, 2013; Tam Cho, Gimpel and Hui, 2013). However, Maxwell (2019, 2020) has also found evidence for self-selection in a range of European contexts - including Switzerland and Germany - showing that the link between living in large, urban centres and pro-immigration attitudes is, to a large extent, a product of the disproportionate tendency of those with more favourable immigration attitudes to choose to live in cities. On the basis of this evidence, it appears likely that any tendency of individuals with identical educational qualifications to vote differently across space may be more a product of the fact that these individuals have chosen to live in different kinds of areas, than any direct consequence of their experiences of living in these areas.

However, not all studies have produced results so emphatic in their support for self-selection. For example, while Gallego *et al.* (2016) do indeed find evidence for geographical sorting, in observing that British individuals' political preferences are strong and significant predictors of the political orientations of the areas they move to, they also find considerable evidence for *contextual effects*. Their research shows that 'movers to safe Conservative seats became more economically right-wing and more likely to vote Conservative following the move…[with individuals clearly becoming more] aligned in their political preferences with the local majority' (Gallego *et al.*, 2016: 546). Additional cause for doubt in relation to the self-selection hypothesis is presented by Mummolo and Nall (2017), who find that although people in the US generally claim they would prefer to live among co-partisans, this partisan sorting often does not bear out in practice, as concerns such as neighbourhood quality and affordability are relatively more important factors in

deciding where to relocate. Given the mixed picture of evidence surrounding the extent to which self-selection and sorting versus contextual effects drive the spatial variations observed in voting behaviours, it seems too early to dismiss the possibility that the experience of living, or having lived, in certain kinds of areas could drive individuals with identical educational qualifications to vote differently across space in advanced Western democracies.

## 2.5 Why the British Case?

This thesis uses the British context as a case study for addressing the gaps in our knowledge of the nature and causes of the educational divide that has emerged in many advanced Western democracies in recent years. Its overarching aim is to provide an exceptionally detailed understanding of the complex association of educational attainment with public opinion and electoral behaviour which is observed in Britain today. The decision to focus on the modern British context was made for several reasons.

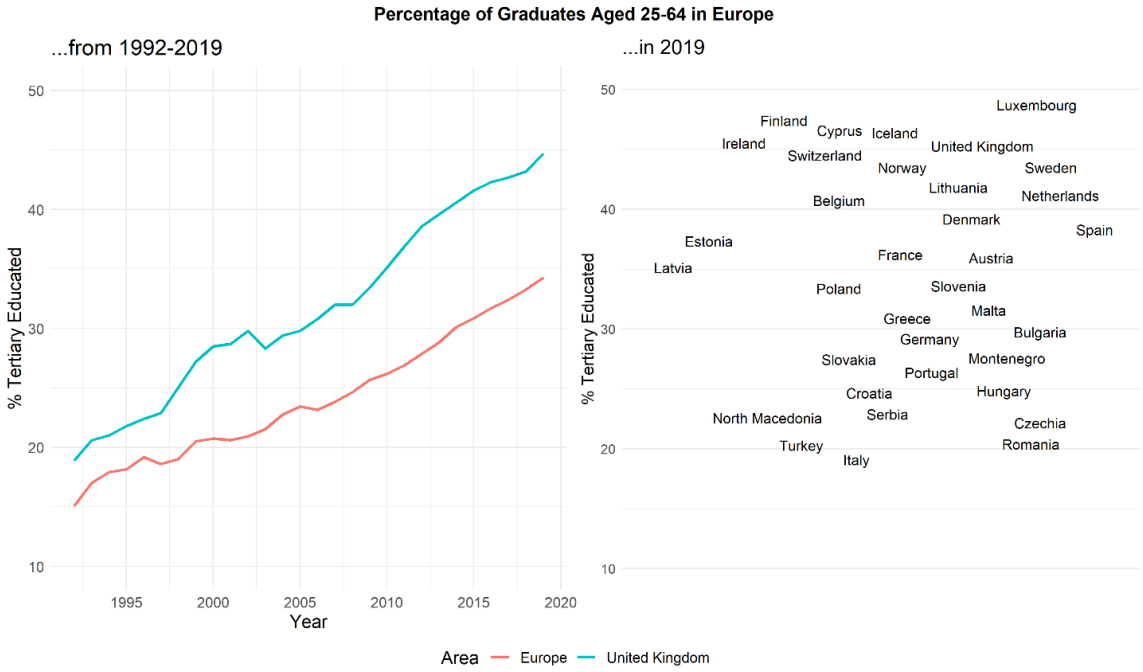
The first is that the UK, and Britain more specifically, can be considered a most-likely case for the emergence of educational divisions. This is because Britain more readily meets the demographic conditions necessary for educational cleavage formation than many other advanced Western democratic societies (see Section 2.2.1). This can be seen clearly in Figure 2-5 which plots Eurostat (2022) data showing the proportion of the population aged 25-64 who possessed degree-level qualifications across various European countries from 1992 to date[10]. The UK has experienced a sharper increase in the concentration of its graduate population since the early 1990s than other European countries, on average, and now has proportionally more graduates than almost anywhere else in Europe - nearly 50% of the UK population possess degree-level qualifications today. In fact, only a handful of advanced Western democracies, including the US and Canada, have a higher graduate concentration than the UK (UNESCO Institute for Statistics 2022). Given there is little existing research on the educational divide, it was felt it made sense to investigate this phenomenon in a context like Britain, where divisions were likely to be most stark, before moving on to consider other national contexts.

The second is that Britain offers an interesting case, as the British political landscape has been particularly turbulent in recent years. The disruption to the established political order which has occurred in this context since 2016 has perhaps been the most dramatic of all such upsets experienced across advanced Western democratic contexts. In 2016, the UK made the landmark

[10]Figure 2-5 only plots data up to and including the year 2019 as Eurostat did not collect educational attainment data for the UK in the more recent 2020 and 2021 data releases.

decision to leave the EU, becoming the first country to ever formally do so, by a slim majority vote of 52%. A deep educational gradient was observed in voting at this referendum, with just a quarter of postgraduates voting Leave, compared to over two thirds of those with no qualifications (Hobolt, 2016). This educational divide has shown no signs of subsiding since 2016 (see Figure 2-6), with marked 'educational gaps' being observed in voting at the 2017 and 2019 British general elections, where they had not been in 2015. These post-Brexit changes in voting patterns reversed the decades long pattern of educational division in Britain, whereby less qualified voters had historically been more supportive of Labour, and more qualified voters tended to vote Conservative (Ford *et al.*, 2021). Given that fundamental realignments in political systems are often preceded, and bought to our attention by, periods of political instability (Enyedi, 2008; Kriesi *et al.*, 2008; Lachat, 2007), it seems imperative that future work explores the role played by education in disrupting traditional British patterns of electoral behaviour.

**Figure 2-5 - The Proportion of European Populations Aged 25-64 with Degrees, 1992-2019**

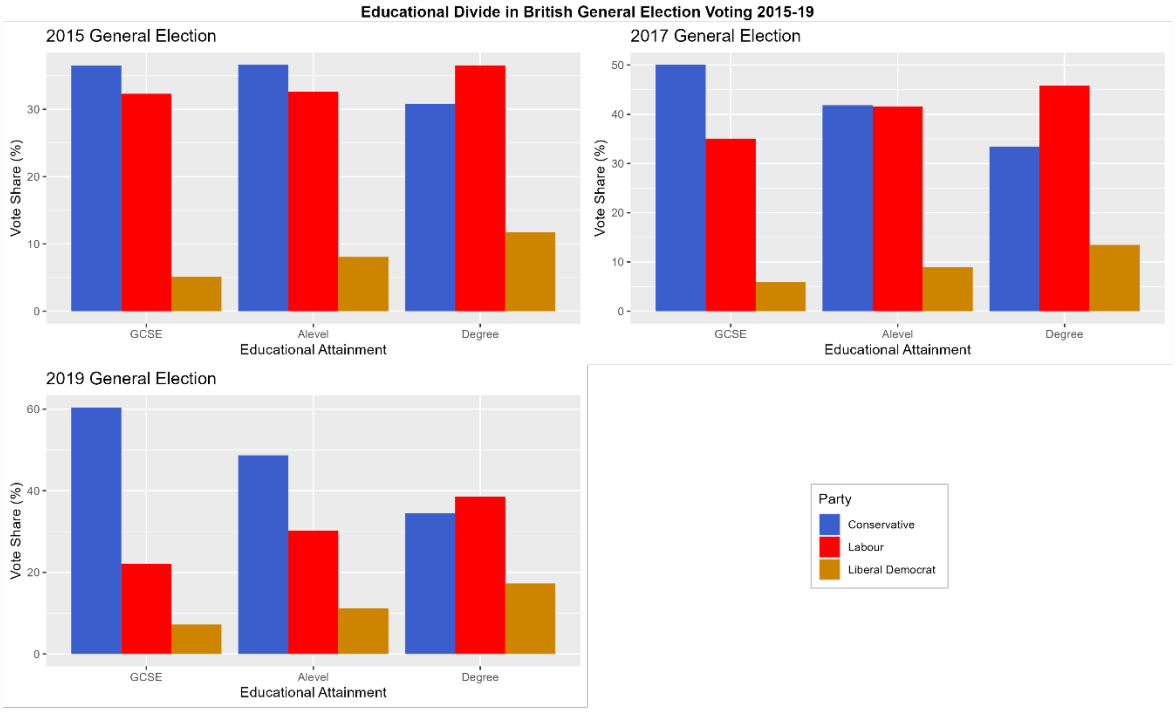



*Data source: Eurostat.*
*Note: Right hand panel has no x-axis. Graph simply shows which countries had relatively higher/lower graduate concentration in 2019.*

The final reason this thesis focusses on the modern British context is the availability of an abundance of high-quality, nationally representative UK survey datasets. Studying the complex association of educational attainment with public opinion and electoral behaviour has demanding data requirements. Longitudinal data covering a long time span is required if the effect of educational attainment on individuals' attitudes is to be assessed, and data on a wide range of socio-demographic characteristics, socio-political attitudes and voting behaviours - both at aggregate and individual levels - are essential if a detailed picture of education's shaping effect on individuals' vote choices is to be built. Between a number of the UK's headline social surveys -

including the British Election Study and the harmonised British Household Panel (BHPS) and Understanding Society data - and its large registry of publicly available aggregate data sources (e.g., the Census), these data requirements are clearly satisfied. See Chapter 3 for more details on the data (and methods) used throughout this thesis.

**Figure 2-6 - The Educational Divide in British General Election Voting, 2015-2019**




*Data source: British Election Study Internet Panel.*

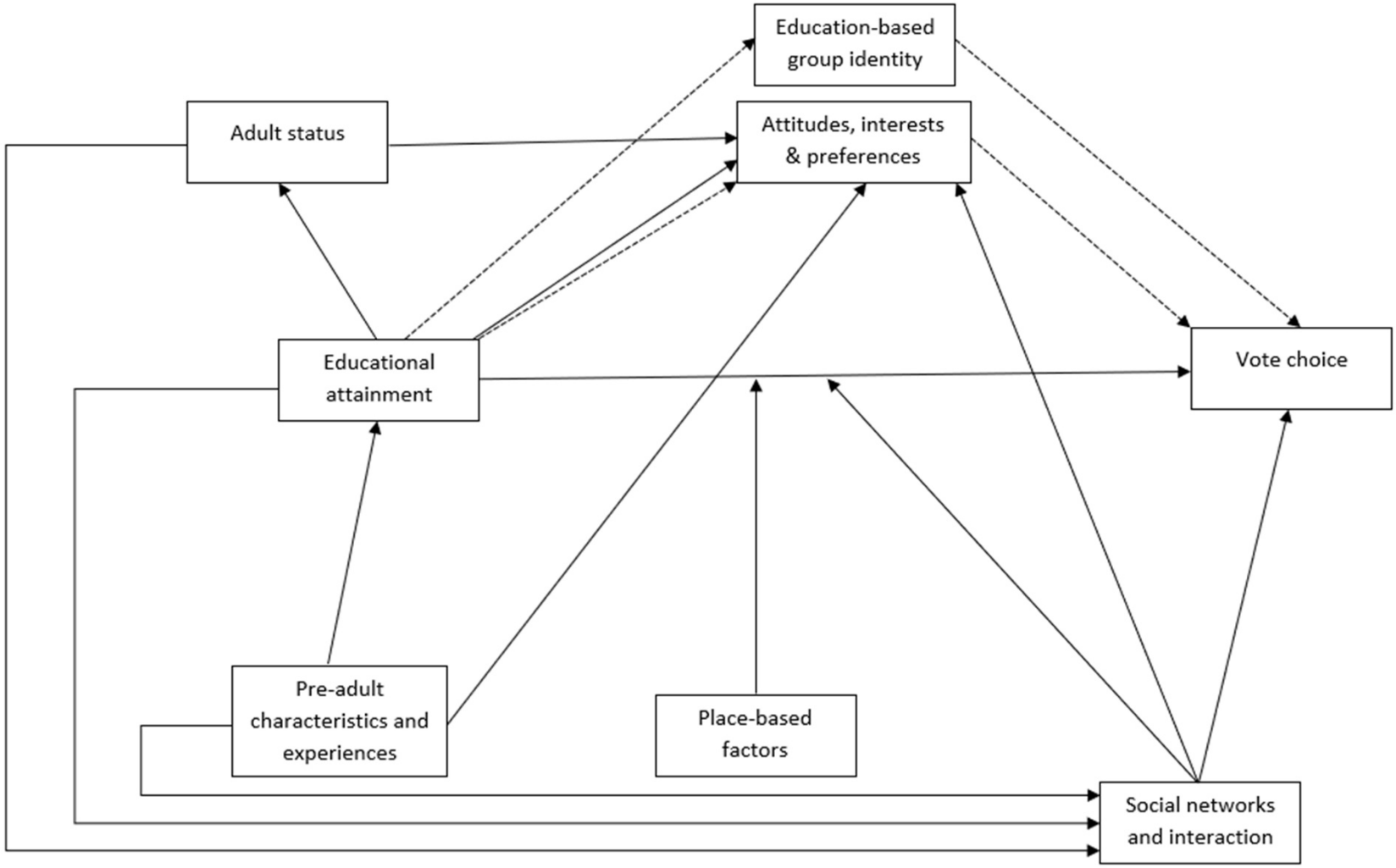
The decision to restrict the focus of this thesis to a single national context (Britain) reflects that the precise nature and development of political cleavages may well vary according to 'idiosyncrasies of the national political and social context', such as the configuration of educational and party systems (Stubager, 2010: 506). Studying the educational divide therefore involves a trade-off between depth and breadth. This thesis opts for the former. It provides a deeper understanding of the complex association of educational attainment with public opinion and electoral behaviour that is observed in Britain today, rather than a shallower account of these relationships in comparative perspective.

# Chapter 3 Understanding the Complex Association of Educational Attainment with Public Opinion and Electoral Behaviour: Data and Methods

The papers presented in this thesis advance our understanding of the complex association of educational attainment with public opinion and electoral behaviour in modern Britain through empirical study. They do so by applying advanced quantitative methods to a range of high-quality, nationally representative British secondary data sources to explore how it is that educational attainment has come to shape the ways British individuals think and vote in recent years. This chapter proceeds by considering the main difficulties encountered when seeking to estimate educational attainment's effect on individuals' socio-political attitudes and voting behaviours. It then provides an overview, and justification for the selection, of the sources of British secondary data and methodological approaches utilised in each of the research papers presented in this thesis. These sections are fairly brief, firstly, because each paper contains its own discussion of the data and methods used and, secondly, because it is difficult to talk about these papers in general, as each use different data, variable specifications, analytical samples and quantitative methods - chosen according to their suitability for addressing that particular paper's research objectives.

An abundance of factors confound the association of educational attainment with public opinion and electoral behaviour (various aspects of our pre-adult experiences, like family socio-economic status for example, are strong predictors of both subsequent educational attainment and political behaviour). This was made evident in the previous chapter (Chapter 2) and is illustrated clearly in Figure 3-1. These confounders make it difficult to isolate and identify the independent effects of gaining additional educational qualifications on adult outcomes in empirical work, as omitting any important confounding variables in analysis, or including poor measures of these, will produce biased estimates of education's effect and ultimately, result in distorted understandings of how education shapes these outcomes (Campbell and Horowitz, 2016; Persson, 2014, 2015; Sieben and de Graaf, 2004). Given that providing robust and fully accurate estimates of educational attainment's effect on individuals' socio-political attitudes and vote choices (and understanding how the latter is moderated by the characteristics of the areas in which individuals reside) necessitates that all such confounding is controlled, this research was subject to particularly demanding data and methodological requirements.

**Figure 3-1 - The Complex Association of Educational Attainment with Public Opinion and Electoral Behaviour**



Randomised experiments are generally considered the 'gold standard' for estimating the causal effects of treatments (Rubin, 2007). The ideal research design for estimating the effect of educational attainment on adult outcomes - like individuals' socio-political attitudes and voting behaviours - would then involve randomly assigning people to 'treatment groups' which receive differing levels of education and estimating how outcomes vary between individuals assigned to each of these treatment conditions (Persson, 2015). While this design is attractive from a methodological standpoint, Persson (2015: 693) makes clear that this kind of design could never be implemented in practice, due to important practical and ethical considerations, for example the fact that:

> *'Even if it would be possible to randomly distribute scholarships for higher education it would be hard to make sure that everyone participated in such experiments. Likewise, it would not be possible to hinder those who were assigned to the control group from receiving any education.'*

The research presented in this thesis therefore employs the next best solution, which involves using observational data from panel studies - which follow the same people over time - to build a better understanding of how, and why, educational attainment has come to shape the ways British individuals think and vote today. While there are a number of high-quality, nationally representative secondary sources of British panel data, none were designed with the explicit aim of exploring the complex association of educational attainment with public opinion and electoral behaviour. Unfortunately, as a result, no existing panel study contained all the information that would *ideally* be required to study this phenomenon. In a perfect situation, for example, panel data would contain information on a full range of respondent socio-political attitudes and socio-demographics, have detailed data on respondents' social networks and early life experiences, elicit information on differences in educational experiences (e.g., institution attended, subjects studied and place of residence while studying) and follow respondents from childhood well into adulthood. Given the time and resource constraints of PhD study, it was not feasible to design, and administer, my own panel study to collect primary data which addressed these data limitations.

However, several existing British panel studies contained the kinds of information necessary to facilitate robust empirical analyses of the complex association of educational attainment with public opinion and electoral behaviour. This thesis therefore seeks to advance our understanding of the British educational divide by applying advanced quantitative methods to these high-quality, nationally representative British secondary datasets. A number of different data sources (which contain both individual- and aggregate-level data) are used throughout, as data was selected based on its suitability for addressing the research questions and hypotheses specified in each of

the individual research papers presented in this thesis (for more detail see Section 3.1). While the limitations of these secondary data sources mean that the research presented in this thesis is not always able to make *causal* claims, this research nevertheless makes a novel, important and timely contribution to the field of political sociology, by providing a deeper understanding of how it is that educational attainment has come to shape the ways British individuals think and vote in recent years.

## 3.1 Data Sources

While the analysis presented in the first two papers of this thesis (Chapter 4 and Chapter 5) relies exclusively on individual-level sources of secondary data, Paper 3 (Chapter 6) uses both individual- and aggregate-level (constituency) data. This individual-level data comes from two high-quality, nationally representative British panel studies: the British Election Study Internet Panel (BESIP) survey (Fieldhouse *et al.*, 2020, 2021) and the Harmonised BHPS and Understanding Society surveys (University of Essex, Institute for Social and Economic Research, 2021). The aggregate-level data used in the final paper come from a variety of sources, including: the British Election Study Constituency Results File (Fieldhouse *et al.,* 2019b), the 2011 Census of England and Wales (Office for National Statistics (ONS), 2021a), the Annual Survey of Hours and Earnings (ASHE) (ONS, 2021b) and the Universities and Colleges Admissions Service (UCAS) database (UCAS, 2016, 2017, 2018). This paper also uses a custom dataset which was created to record the distance (in kilometres) from the centre of each Westminster Parliamentary constituency in England and Wales to the nearest university campus.

Ethical approval to use these secondary data sources for analysis was obtained from the University of Southampton's Ethics and Research Governance Online (ERGO) Committee[11].

### 3.1.1 The British Election Study Internet Panel Survey Data

The first wave of the BESIP was fielded from February to March 2014 by YouGov using online questionnaires which were administered to a sample of adults designed to be representative of the British population (Fieldhouse *et al.*, 2020). BESIP data collection efforts have taken place at roughly equal intervals over the period from February 2014 to May 2022, yielding 23 waves of data with approximately 30,000 respondents per wave. At each wave, all initial BESIP respondents have been invited to take part, and from wave 16 (May to June 2019) onwards a number of

[11]Paper 1 ethics under ERGO number 55357.A1, Paper 2 ethics under ERGO number 62220 and Paper 3 ethics under ERGO number 68812.A1.

replacement respondents who resembled those who had dropped out at earlier waves have also been surveyed, to ensure the BESIP sample continues to be representative of the British adult population (Fieldhouse *et al.*, 2020).

The BESIP data is used in Papers 1 and 3 (Chapters 4 and 6) which explore the association of educational attainment with vote choice in modern Britain. This data is well suited for use in these studies because it includes information on a vast range of respondents' socio-political attitudes, interests and preferences, which is unrivalled by other British panel datasets, in addition to data on their socio-demographic characteristics and voting behaviours at recent British political contests (including the 2016 EU referendum and the 2015, 2017 and 2019 general elections). Using such a rich source of data on individuals' attitudinal positions was essential, as Paper 1 would not have been able to provide such a comprehensive understanding of the reasons why people with different educational qualifications appear to have voted differently at recent political contests if important attitudinal mediators of the education-vote choice association were not accounted for in analysis. Having access to this wide array of attitudinal variables was also essential for Paper 3, as it would not have been possible to measure how education's effect on voting varied across space, if the 'true' education-vote choice association (unconfounded by attitudes) was not first identified.

Additionally, the fact that the BESIP not only records where respondents lived when they cast their votes in recent British political contests but provides this residence data at differing levels of geographical specificity (local authority, constituency and middle-layer super output areas (MSOA)), meant this data was ideal for answering the research questions presented in Paper 3[12]. The inclusion of this geographic identifier data in the BESIP not only facilitated the matching of individual-level data with aggregate-level data, which was essential for analysing the spatial distribution of educational voting, but allowed exploration as to which unit of spatial analysis would provide the most appropriate scale for studying where identically educated individuals vote differently in Britain. Ultimately, Westminster Parliamentary constituencies were selected (see Paper 3 for justification of this decision).

[12]The standard BESIP data release does not contain information on respondents' MSOA. This finer level of geographic detail is only provided in the safeguarded UK Data Service version of the data. Therefore, two citations for the BESIP data are provided in the 'Data Sources' section (Section 3.1), as the standard release data is used in Paper 1 and the extended version is used in Paper 3.

### 3.1.2 The Harmonised British Household Panel and Understanding Society Survey Data

The BHPS was a nationally representative panel survey which used face-to-face interviews, conducted in respondents' homes by trained interviewers, to collect data from individuals living in 8,500 randomly sampled UK households over eighteen annual waves from 1991 to 2009 (Fumagalli, Knies and Buck, 2017). Data collection from BHPS households continued from 2010 onwards, as part of the larger Understanding Society longitudinal survey, which has followed individuals from approximately 40,000 UK households in twelve waves from 2009 to 2022 (Understanding Society, 2021b). Both panels collect(ed) data at each wave from all individuals aged 16 and over in originally sampled households, and from all those who subsequently came of age, or to reside with original sample members. Because of this design feature, and the fact that many of the 'instruments and questions from the BHPS live on in Understanding Society', it is possible to 'exploit data from the two studies jointly to create a long panel of data' (Fumagalli, Knies and Buck, 2017: 5) which is ideal for studying within-individual change over time.

The Harmonised BHPS and Understanding Society panel data is used in Paper 2 (Chapter 5), which investigates the association of educational attainment with individuals' socio-political attitudes. Although this data contains a less detailed raft of information on respondents' attitudinal positions than the BESIP data, it affords two key advantages which facilitate the teasing out of the *causal* effect of university study on British individuals' attitudes which the BESIP data do not. The first is the long duration over which individuals are followed. Given that university degrees typically take a minimum of three years to complete in Britain, and that attitudes must be measured both pre- and post- university to provide an accurate assessment of change, the relatively short 8-year duration of the BESIP panel would offer limited opportunity to observe how gaining a university degree shapes individual attitudes, compared to the 30-year span of the BHPS/Understanding Society data. The second is the household structure of the data, which can be leveraged in analysis by using within-sibship fixed effects to control for all unmeasured family-invariant pre-adult experiences which confound the association of educational attainment with individual attitudes (Campbell and Horowitz, 2016; Sieben and de Graaf, 2004). Exploiting the household structure of the BHPS/Understanding Society data in this way allows Paper 2 to make a novel contribution, in providing the first fully robust sibling-matched estimate of HE's causal effect on British individuals' socio-political attitudes.

The Harmonised BHPS/Understanding Society data is not the only household-structured longitudinal study which follows British individuals over several decades and contains the detailed repeated measures of educational attainment, socio-political attitudes and key confounding variables which are necessary to study how graduating from university influences individuals' attitudes. The 1958 National Child Development Study and 1970 British Cohort Study, which have

followed the lives of 17,000 individuals born in Britain over a single week in 1958 and 1970, respectively, and collect information on twins, also satisfy this criteria (University College London Centre for Longitudinal Studies, 2022). As almost three-quarters of students are aged 20 or under when they begin studying for their first degree in Britain (Universities UK, 2019), the effect of gaining a university degree on attitudes uncovered using these cohort studies would largely relate to the mid- to late-1970s (for the 1958 cohort) and late 1980s and early 1990s (for the 1970 cohort). Given that the British HE sector has undergone a fundamental period of transformation since the 1990s, with new institutions and types of course being created, funding arrangements being altered and campuses becoming more diverse spaces (Bathmaker, 2003; Boliver, 2011; Carpentier, 2018; Surridge, 2016), it is reasonable to expect that the 'HE effect' on attitudes would be different today than it was in the past. Using the BHPS/Understanding Society data therefore offered the advantage of being able to provide a more up-to-date study of the 'HE effect', by considering how graduating from university between 1994 and 2020 shaped British individuals' attitudes.

### 3.1.3 Aggregate-level Data

Neither the structure of, nor reasons for choosing, the aggregate-level data sources used in Paper 3 warrants much explanation. The selection criteria were simply that data must be reported at the constituency-level, be publicly available, of high-quality and contain information on the kinds of constituency characteristics likely to explain why identically educated individuals might vote in different ways in different parts of Britain (see Section 2.4). The only exception is the dataset which was compiled to measure the proximity of each constituency to the nearest university campus. A detailed description of how this dataset was constructed is provided in Paper 3.

It should also be noted that some of the constituency-level data used in Paper 3 was derived by aggregating up (averaging) individual-level BESIP data for all respondents living in each constituency (see Paper 3 for more details).

## 3.2 Paper 1: Methods for Decomposing Educational Attainment's Total Effect on Vote Choices

The aims of Paper 1 (Chapter 4) are twofold. The first is to quantify the precise proportion of educational attainment's *total* effect on British individuals' vote choices that was transmitted *indirectly*, via attitudes, interests-based and behavioural mechanisms, at the 2016 EU referendum and 2017 and 2019 general elections. The second is to identify the relative strength of individuals' economic orientations, cultural attitudes and political cue-taking behaviours as drivers of these

educational divisions in voting. These objectives were achieved by using a sophisticated mediation analysis technique to decompose education's *total* effect on British electors' vote choices into *direct* and *indirect* effects.

There are several quantitative techniques which can be applied to the task of effect decomposition. One widely used method is structural equation modelling. While a series of methodological innovations have meant that structural equation modelling can now handle categorical independent (or endogenous) variables, many statistical software packages still offer only very limited options for including such variables in analysis (e.g., only allowing for binary variables or requiring that all categorical variables be treated as ordinal) and often require hand calculation of equations involving un-ordered categorical variables (Lefcheck, 2021). As many of the mediating and control variables to be included in Paper 1's analysis were nominal categorical variables, structural equation modelling was not felt to be an appropriate modelling strategy.

Another commonly used method involves estimating a series of nested regression models and using changes in the size of the coefficient of the key independent variable to measure the extent to which sequentially added mediating variables explain the relationship of the independent variable and dependent variable of concern. While this simple regression-based technique for identifying mediation works perfectly well in linear frameworks, the effect decomposability properties of this method do not extended to non-linear models (Breen, Karlson and Holm, 2013; Karlson, Holm and Breen, 2012; Kohler, Karlson and Holm, 2011). This is because when new variables are added to non-linear models, *both* mediating effects *and* coefficient re-scaling effects contribute to changes in the reported coefficient of the independent variable of interest (Karlson, Holm and Breen, 2012). As the relative contribution of these effects cannot be disentangled, it is impossible to identify the 'true' extent to which each variable mediates the association of interest when using standard regression techniques in non-linear modelling contexts. Given that vote choice (the dependent variable in Paper 1) is an inherently categorical variable - in that it involves choosing one party over a series of others - it was essential that Paper 1 went beyond the scope of existing works by using a sophisticated mediation methodology which could solve this identification problem if it was to provide a more robust test of what drives the link between educational attainment and vote choice in modern Britain. The Karlson-Holm-Breen (KHB) methodology, which was explicitly designed to deal with the issue, is therefore used. See Paper 1 for a more detailed discussion of the implementation of this methodology.

## 3.3 Paper 2: Methods for Identifying Educational Attainment's Causal Effect on Socio-political Attitudes

The central aim of Paper 2 (Chapter 5) is to tighten the bounds of causal inference in estimating the shaping effect of HE on individuals' attitudes, by providing a more robust estimate of the independent effect of university study on British individuals' economic and cultural attitudes. There are two main ways of going about this using panel data. The first would be to estimate the effect of university study on attitudes *within-individuals.* By estimating the extent to which the attitudes of those who have attended university have changed over time, in comparison to those of non-attendees, while simultaneously controlling for a range of pre-treatment differences observed between these individuals (variables associated with self-selection), it is possible to isolate the 'average treatment effect' of university study on individuals' attitudes from selection-into-university effects (Scott, 2022). Using this within-individual framework allows all unobserved time-invariant confounding to be controlled in estimation. Another option is to estimate this effect *within-sibship* clusters. Much of the logic of this approach is the same as the former. The within-sibship method again involves estimating how the attitudes of university attendees, versus non-attendees, change over time, while controlling for a range of variables which confound the education-attitudes association (those linked to self-selection and sorting effects) but also includes sibling-fixed effects to leverage the shared family background and early life experiences of siblings to account for all unmeasured family-invariant confounding (Campbell and Horowitz, 2016; Sieben and de Graaf, 2004).

The *within-sibship* estimation method was used in Paper 2 for a number of reasons. Firstly, because this technique had never before been applied to the study of how HE shapes individual attitudes in Britain, implementing this research design offered an important and timely opportunity to make a novel contribution to the political sociology literature. Secondly, because using this kind of within-sibship design made the most of the rich BHPS/Understanding Society data, which collects information on all sampled individuals who share or have ever shared a household. A within-individual design could have been implemented, but this would not have made use of the unique sibling data available. The within-sibship design also offers the advantage of being both intuitive and convincing - it is easy to demonstrate to readers how using this approach helps tighten the bounds of causality when estimating how university study shapes British individuals' attitudes.

## 3.4 Paper 3: Methods for Detecting Area-level Moderators of the Individual-level Association of Educational Attainment and Vote Choice

Paper 3 (Chapter 6) seeks to understand whether the voting behaviours of British individuals with identical educational attainment varied across Parliamentary constituencies at the 2015, 2017 and 2019 general elections, and if so, to explore which educational groups were most sensitive to local context and which constituency characteristics acted as moderators of this individual-level education-vote choice association. A multilevel random-coefficient modelling strategy is used to assess these research questions.

The multilevel modelling framework has been used widely in electoral geography to investigate how compositional and contextual determinants of voting behaviour interact to produce the spatial variations observed in voting patterns. The flexibility of the random-coefficient multilevel model, which not only allows individual-level and area-level (in this case constituency-level) data to be analysed simultaneously, but offers a unique opportunity to explore how the relationships of outcomes (vote choice) with individual-level variables (education) vary across clusters (constituencies) (Snijders and Bosker, 2012; Sommet and Morselli, 2017), makes this modelling strategy ideal for use in addressing Paper 3's research questions. See Paper 3 for more detail on how precisely these models were built and estimated.

Although the multilevel analysis presented in Paper 3 allows identification of the kinds of constituencies in which identically educated individuals have voted differently at recent British general elections, it cannot tell us whether living in constituencies with these kinds of characteristics has actually *caused* these individuals to change the way they voted, as it only identifies associations. The goal of Paper 3 was not to identify causality, though. Given that so few existing studies have studied the geography of educational voting, this paper had exploratory aims - simply seeking to understand if identically qualified individuals do indeed vote differently in different parts of Britain, and if so, when and where this occurs.

Now that the theoretical and empirical underpinnings of the research have been set out in Chapter 2 and Chapter 3, respectively, the three papers that comprise the core of this thesis are now presented in Chapter 4, Chapter 5 and Chapter 6.

# Chapter 4 Paper 1. Explaining the Educational Divide in Electoral Behaviour: Testing Direct and Indirect Effects from British Elections and Referendums 2016-2019

*An educational divide has become apparent in Western democratic politics. Our understanding of why this divide has emerged remains limited as existing studies have not utilised mediation methodologies, which allow detailed examination of how education's shaping effect on electoral behaviour is transmitted. This study addresses this gap in knowledge - providing a more complete picture of why modern British politics divide along educational lines. It applies the Karlson-Holm-Breen method to British Election Study data to explore firstly, what proportion of education's total effect on vote choices, cast in the 2016 referendum, 2017 and 2019 general elections, was transmitted indirectly, and secondly, the relative contribution of economic orientations, cultural attitudes and political cue-taking behaviours as drivers of this divide. Findings show 67-91% of education's total effect on vote choices was transmitted indirectly and crucially, that vote choices divided along educational lines largely because educational groups exhibited divergent economic orientations, cultural attitudes and cue-taking behaviours. Results also highlight that educational division(s) in the referendum and general election voting were driven by different mechanisms.*

## 4.1 Introduction

It is well established that educational attainment influences a plethora of attitudes and outcomes (Hainmueller and Hiscox, 2007; Surridge, 2016; Weakliem, 2002; van de Werfhorst and de Graaf, 2004). In Western democracies, education is not only a potent source of social division but an emergent source of political division. Across Europe, nationalist and populist support comes primarily from the least educated and most green and social liberal party voters are graduates (Bovens and Wille, 2017). In 2016, Clinton held a 20-percentage point lead over Trump amongst graduates in the US (Pew Research Center (PRC), 2018) and just 22% of UK graduates voted to Leave the EU, compared to 72% of those with no qualifications (Curtice, n.d.). Despite an explosion of scholarly interest in why this 'new' educational divide has come to bear, our understanding of this phenomenon remains limited as existing empirical work has employed regression-based methods, which cannot provide a complete picture of the ways education shapes electors' vote choices.

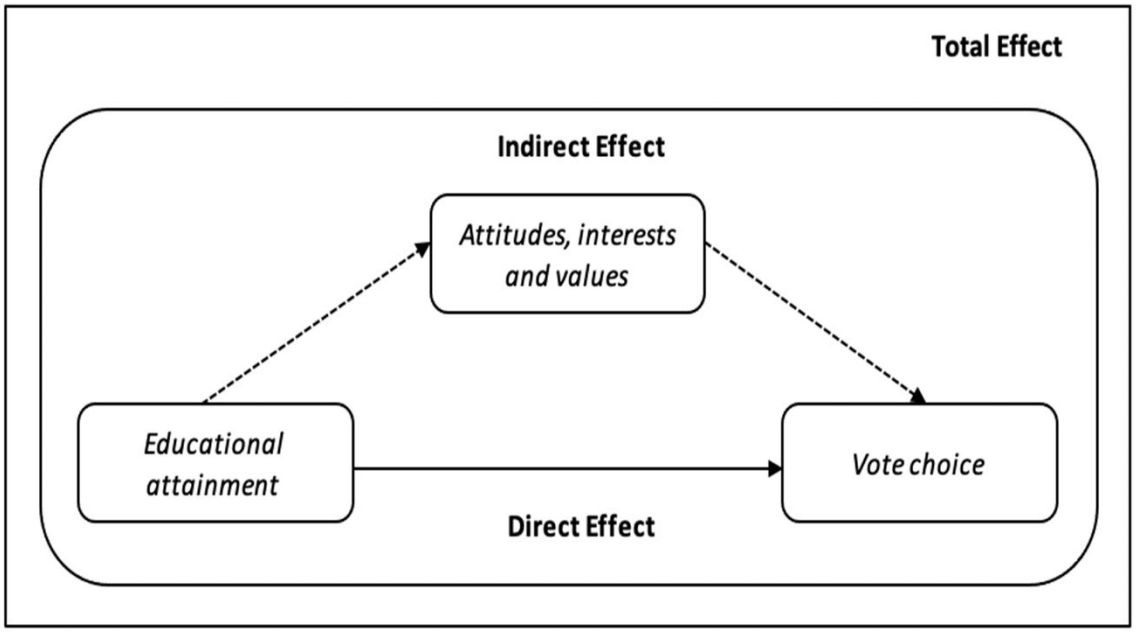
This paper addresses this gap in the literature by using a mediation technique, capable of decomposing educational attainment's total effect on electoral behaviour into direct and indirect portions, to analyse 2016-2019 British Election Study data. It goes beyond the scope of existing works by examining precisely what share of education's total effect on vote choice is transmitted (in)directly and exploring the relative contribution of economic orientations, cultural attitudes and political cue-taking behaviours as drivers of this divide. Undertaking a comprehensive investigation of the ways in which education shapes electoral behaviour allows this paper to make its central contribution - providing a more complete picture of why British electors' vote choices divide along educational lines today. Insights produced will strengthen our understanding of the sources and dynamics of educational polarisation in ways that not only provide a basis for taking action to reconcile this stark educational divide, which has the potential to threaten the very functioning of British democracy, but allow calculated predictions to be made about how this divide may shape future political landscapes.

## 4.2 The Educational Divide in Western Democratic Politics

Education's powerful effect in shaping vote choices has recently been highlighted in many Western democracies. As a widespread consensus that politics divide starkly along educational lines has developed, so too has our knowledge of why this divide exists. Works by Bovens and Wille (2017), Fieldhouse *et al.* (2019a), Goodwin and Heath (2016a), Hooghe and Marks (2018) and Stubager (2010, 2013) have stressed this divide must be viewed through the lens of influential vote choice theories - particularly Campbell *et al.'s* (1960) Michigan model and Lipset and

Rokkan's (1967) cleavage theory - which argue socio-structural variables shape group-based attitudes, interests and values, which in turn influence vote choices. They propose that much of education's effect on electoral behaviours is transmitted indirectly, with educational divisions in voting being driven by differently educated persons' asymmetric attitudes, interests and values, rather than by any direct consequences of experiencing more education (Figure 4-1 offers an illustration). Exploring how education's effect on electoral behaviours is decomposed into direct and indirect components holds the key to revealing how education shapes electoral behaviour, and therefore to developing fuller understandings of why politics divide along educational lines.

**Figure 4-1 - (In)Direct and Total Effects in the Education-Vote Choice Association**




Western democratic politics are structured along two ideological dimensions, and electors' positions along these determine their vote choices (Dalton, 2018; Häusermann and Kriesi, 2015; Wheatley, 2016). The first is an economic conflict, driven by competing self-interests, relating to income, inequality and views of the state's role in resolving such tensions (Dalton, 2018). The second is a cultural conflict between those with liberal stances on issues such as environmentalism and egalitarianism, promoted by social movements conceived in the 1970s, and immigration and integration, which achieved salience through globalisation, and those who oppose the changing 'status quo' and thus, express conservative reactions to these issues (Norris and Inglehart, 2019).

Interestingly, research conducted across various temporal and geographical contexts has shown education structures opinions along both dimensions - highly educated persons are, on average, considerably more culturally liberal, and somewhat more economically conservative, than their less educated counterparts (Hainmueller and Hiscox, 2007; Surridge, 2016; Weakliem, 2002; van

de Werfhorst and de Graaf, 2004). Through becoming more educated and particularly attending university, individuals internalise liberal cultural attitudes via socialisation processes (Surridge, 2016). This 'liberalising' function could explain education's linkage with voting - more and less educated persons vote for different parties because of their distinctive cultural attitudes. Given educational attainment performs a 'stratification' function in globalised Western democracies - affording the highly educated well-paid, high-status jobs and economic security whilst exposing the lesser educated to competition for scarce lower-skilled job opportunities (Kriesi *et al.*, 2008) - it also seems plausible that education-based variation in voting is explained by educational groups' asymmetric economic attitudes and interests.

Hakhverdian *et al*. (2013) suggest that educational attainment has a broader set of functions in modern societies; it not only stratifies and liberalises but also shapes individuals' internalisation of political messages. Citizens receive cues from news media (Reeves, McKee and Stuckler, 2016) and political elites (Hobolt, 2016), which influence their vote choices. As education structures the volume and type of news consumed (Chan and Goldthorpe, 2007), and populist, anti-establishment attitudes, which have been cued by elites in recent years and are linked to disruptions in traditional voting patterns seen across Western democracies (Geurkink *et al.*, 2020), it seems plausible that accounting for educational groups' differential internalisation of political cues could explain why politics divide along educational lines.

That our economic orientations, cultural attitudes and the political cues we internalise are all associated with vote choice, and education structures these attitudes, interests and behaviours, suggests it is reasonable to expect these factors may explain (or more technically, mediate) education's effect on voting. Despite this, just a few pioneering studies have conducted empirical tests that explore whether, and to what extent, these 'funnels of causality' (Campbell *et al.*, 1960) contribute to explaining why modern Western democratic politics divide along educational lines. Studying British and Danish contexts, respectively, Fieldhouse *et al.* (2019a), Goodwin and Heath (2016a) and Stubager (2013) have shown that introducing measures of electors' cultural attitudes (and to a lesser extent, economic attitudes, status and/or political disillusionment) into vote choice regression models greatly reduces the magnitude of education's effect, and in some cases renders this statistically insignificant. In doing so, these studies have advanced our knowledge of why politics divide along educational lines. Firstly, by confirming that a substantial portion of education's total effect on electoral behaviours is indeed transmitted indirectly, and secondly, by indicating that asymmetry in educational groups' cultural attitudes is likely a key driver of educational division over vote choices.

This said, our understanding of why educational divisions have formed remains limited. Existing studies have all adopted logistic regression-based analytical strategies, which involve inferring the overall size of education's indirect effect(s) on electoral behaviour from a comparison of total and direct effects. Consequently, they have not shed light on precisely what portion of education's total effect on vote choices is transmitted indirectly or identified how much of the 'educational gap' in voting is explained by each indirect mechanism - leaving us with only a partial understanding of how education shapes electoral behaviour. Only by using specialist mediation methodologies can scholars address these gaps in knowledge. For example, providing insight into whether the direct effect of becoming more educated, or the indirect effects of education transmitted via cultural attitudes, economic orientations and cue-taking behaviours, carry more weight in shaping electors' vote choices. Doing so will not only better get to the roots of this educational divide and thus provide a basis for developing the much-needed, more detailed picture of why politics divide along educational lines but is imperative in a methodological sense. This is because regression-based effect decomposition methods, of the type used to estimate non-linear models in existing works, only provide accurate results for linear models (Karlson, Holm and Breen, 2012).

## 4.3 Advancing Understandings of the Educational Divide

Scholars must identify mediation techniques capable of decomposing education's total effect on vote choices into (in)direct effects, and quantifying the strength of each of these pathways, and apply these in empirical work if we are to develop a complete picture of why politics divide along educational lines. This will not only allow exploration of whether existing studies' conclusions hold under more robust tests of the education-vote choice linkage but also generate novel findings.

This study takes up precisely this research agenda by asking: how can the educational divide observed in electoral behaviour be explained? This question is explored by testing two hypotheses. Firstly, that: a statistically and numerically significant portion of education's total effect on electoral behaviours is transmitted indirectly, via attitudinal, interests-based and behavioural mechanisms (H1). This paper then goes significantly beyond the scope of existing works, which have largely focused on testing the role played by education's 'liberalising' function in explaining education-vote choice associations, by performing a test of the novel, and more expansive, hypothesis that politics divide along educational lines, at least partly, because educational groups have asymmetric economic orientations, cultural attitudes and political cue-taking behaviours, which shape their vote choices (H2).

Failure to consider this more expansive set of indirect mechanisms, through which education may shape vote choices, could not only preclude the development of a comprehensive explanation of this phenomenon but also jeopardise the accuracy of conclusions drawn. This is because, by definition, direct effects denote the effect of an independent variable, on a dependent variable, remaining unexplained by specified mediators (Karlson, Holm and Breen, 2012).

### 4.3.1 The British Case

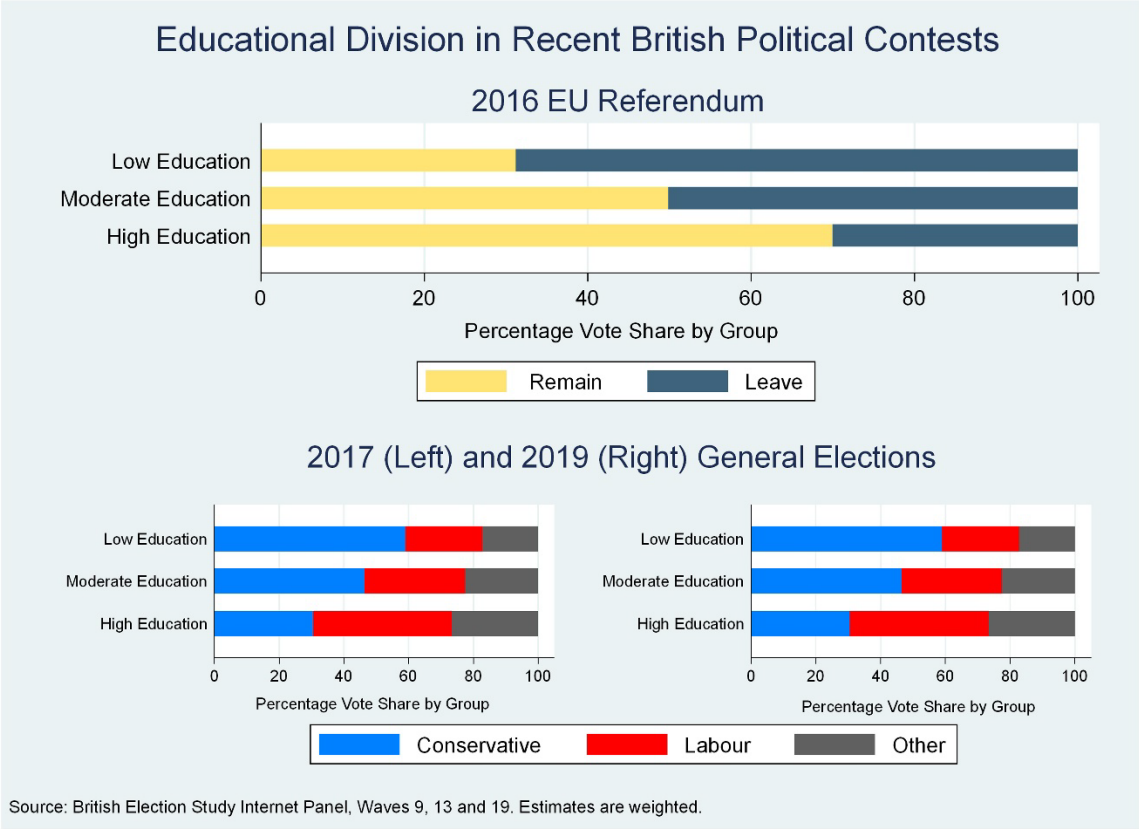
The British context stands out as an interesting case for exploration. Britain has not only experienced dramatic growth in the (relative) size of its highly educated population, over the past half century[13], which has rendered educational attainment a meaningful point of socio-demographic division (Bovens and Wille, 2017; Ford and Jennings, 2020), but also is a context in which education's striking shaping effect on politics has recently been highlighted. Whilst prior to 2016, an educational divide in British politics was neither widely discussed nor observed (see Appendix A), this changed with the 2016 EU Referendum campaign when it became apparent that educational attainment marked the deepest gradient in Brexit support (Curtice, n.d.). Education's importance in shaping the contours of British public opinion has been at the forefront of debate since then. Figure 4-2 clearly illustrates the stark educational divide in electoral behaviour has not subsided post-2016. Whilst politicians, commentators and scholars alike have sought to understand the drivers of this emergent divide, important gaps in knowledge remain. This study addresses these by exploring its hypotheses in the British context.

## 4.4 Materials and Methods

This study uses nationally representative BESIP data (Fieldhouse *et al.*, 2020), which includes measures of vote choice, socio-demographic characteristics and political attitudes, interests and behaviours, unrivalled by other UK survey data sets, to test its hypotheses in three recent national political contests, which are considered first-order elections[14]. It utilises data on 23,716, 18,885 and 24,526 English and Welsh electors who reported voting in the 2016 referendum, 2017 and 2019 general elections, respectively. Scots are excluded as the dominance of the Scottish National Party and issues of Scottish independence means their political behaviour cannot be compared with English and Welsh electors' (Cutts *et al.*, 2020). See Appendix B for analyses including Scots.

[13]25% of UK residents aged 25-34 and 16% aged 55-64 held tertiary educational qualifications in 1997, compared to 51% and 37%, respectively, by 2018 (OECD, 2021).
[14]While EU referendums are often regarded as second-order elections, Glencross and Trechsel (2011) demonstrate these are better conceptualized as first-order contests.

**Figure 4-2 - Educational Division in the British Electorate 2016-2019**




### 4.4.1 Dependent Variables

As this paper seeks to explain why British electors' vote choices have divided along educational lines, it was deemed non-sensical to include non-voters and those who could not recall or did not report, their vote choices (Appendix B shows results including non-voters).

This study employs three dependent vote choice variables - one for each political contest considered. A binary measure of EU Referendum voting records whether respondents reported opting to Leave or Remain in BESIP Wave 9. Both 2017 and 2019 general election vote choice measures take three-category formats, recording whether BESIP Wave 13 and 19 respondents[15], respectively, reported voting for the Labour Party, the Conservative Party or another party. The loss of detail caused by grouping parties receiving marginal vote shares (<10% of valid votes) was deemed a necessary trade-off to avoid sparse data biases.

[15]Only responses to vote choice items from BESIP waves immediately post-contest are included to prevent recall issues distorting conclusions.

### 4.4.2 Independent Variables

The National Vocational Qualification (NVQ) framework is a convenient schema for classifying educational attainment, which equivalises academic, vocational and international qualifications and accounts for temporal variation in qualifications offered (Connelly, Gayle and Lambert, 2016). This study uses a modified variant of the NVQ framework. NVQ Levels 1 and 2, which represent the lowest educational levels (not exceeding secondary school qualifications), are combined as BESIP coding does not allow distinction between these. Persons with no qualifications are included in this low education category. NVQ Levels 3 and 4 were pooled, as few BESIP respondents held Level 4 qualifications. This category represents 'moderate' educational attainment (post-secondary but below degree level). In the traditional NVQ framework, Level 5 encompasses both academic, namely 'first' and 'higher' degrees, and vocational qualifications, including professional institute membership (see: Dearden *et al.*, 2002). Here, only those with academic degrees are classified in the high education category, as BESIP coding does not distinguish Level 4 and 5 vocational qualifications. As education is central to testing this study's hypotheses, analyses exclude respondents with missing educational information.

Including socio-demographic control variables associated with voting and educational attainment ensures education's true, unconfounded, shaping effect on electoral behaviour is uncovered and therefore, that reliable conclusions are drawn in relation to this study's hypotheses. Age, gender, ethnicity, country of residence, class background and interest in politics are included as controls. Age is continuous whilst gender and ethnicity are binary coded (male/female and white British/other, respectively). Country of residence, class background and political interest are categorical variables. Appendix C provides additional information on coding and descriptive statistics.

Indicators of economic orientations, cultural attitudes and political cue-taking were carefully selected to ensure all theorised mechanisms by which education might indirectly shape vote choices were captured and thus, that a fully comprehensive understanding of why vote choices divide along educational lines in modern Britain was produced. Three measures of economic orientations (annual household income, occupational class and left-right attitudes) are used. They encompass both economic interests and attitudes and capture that educational groups are not only afforded divergent economic opportunities and securities in modern economies but also have alternative views of the state's role in resolving economic issues. The occupational class measure is a modified version of the three-class analytical National Statistics Socio-Economic Classification; including separate categorisations for intermediate and self-employed occupations, as Evans and Mellon (2020) show these groups exhibited disparate voting behaviours in recent British political contests.

Eight indicators of attitudes towards social hierarchy and tolerance of non-conformity, which Stubager (2013) argues represent the essential tenets of the cultural ideological divide, capture cultural attitudes. These are British and European identity, views on equal opportunities for ethnic minorities and gays and lesbians, libertarian-authoritarian attitudes, and views on the amount of, and economic and cultural 'threats' posed by, immigration[16]. Finally, two political cueing measures (on- and offline news readership[17] and populist attitudes[18]) are included to account for the fact educational groups are exposed to varying messages from political elites, interpret these differently and rely on them to dissimilar extents, in determining their vote choices[19]. Whilst one cueing indicator captures information received and the other a more general political orientation, both constitute 'informational shortcuts' which help electors decide how to vote.

This study's independent variables typically represent item responses from the wave of vote choice data collection. As BESIP data were used cross-sectionally, readers should be cautious about inferring causal conclusions from this study.

### 4.4.3 Missing Data

Item non-response is common across the BESIP. Ignoring this by analysing only complete cases may engender bias (Graham, 2009). Two strategies were combined to tackle this. Where BESIP items displayed high proportions of missing data in a given wave, respondents' values from earlier waves were substituted. A multivariate imputation by chained equations (MICE) approach estimated values for non-substitutable missing cases and items with less missing data. For details of this procedure and diagnostics, see Appendices D and E.

### 4.4.4 Analytical Approach

The effect decomposability properties of linear models do not straightforwardly extend to non-linear models. In non-linear models, both mediating effects and coefficient re-scaling effects will engender changes in the reported coefficient(s) of a given independent variable, as mediators are added - making it impossible to identify the 'true' size of independent variables' indirect effects (Karlson, Holm and Breen, 2012). Clearly then, using a standard logistic regression-based method

[16]While immigration's 'economic threat' may be thought to capture the economic political dimension, Häusermann and Kriesi (2015) and Wheatley (2016) show this actually loads on the cultural dimension - driven by distrust of 'others' and nation-based conceptions of deservingness.
[17]Outlets' political leaning was coded using an *ad hoc* process guided by endorsements of political parties (see: McKee, 2017).
[18]Populist attitudes are captured by the item: 'politicians [do not] care about what people like me think.'
[19]Including leadership evaluations, which Clarke *et al.* (2009) show determine vote choices, was considered but ultimately ruled out, owing to endogeneity concerns outlined by Holmberg and Oscarsson (2013).

(either as in existing studies or as part of a structural equation model) would prevent this study from drawing accurate inferences around how education's total effect on vote choice is decomposed into (in)direct components and to what extent particular mechanisms mediate this association. This study, therefore, uses the KHB methodology, which was explicitly designed to eliminate this identification problem, to test its hypotheses. See Appendix F for discussion of alternative methodologies.

H1 is tested by adding all controls and mediators to three KHB vote choice models simultaneously - to reveal precisely how much of education's total effect on voting in the 2016 referendum, 2017 and 2019 general elections was direct and indirect. H2 is then tested by producing KHB statistics which record the portion of education's total effect on vote choice transmitted via each set of hypothesised mediators. As the KHB Stata package (Kohler and Karlson, 2010) is not fully compatible with imputed data, disentanglement statistics used to test H2 were calculated separately for each imputed data set and then combined to form single-point estimates, using Rubin's (1986) rules. Sensitivity analyses confirm that results vary little when estimated on complete and imputed data (see Appendix G).

The results of three, sequentially built, logistic vote choice regression models are also presented to illustrate how conclusions drawn about why politics divide along educational lines are distorted if this oft used but sub-optimal technique is used, rather than the KHB method.

## 4.5 Results

Preliminary analyses explored the nature of the educational divide in British electors' vote choices. Table 4-1 presents educational odds reported across three logistic, vote choice, regression models and demonstrates how educational odds change as different combinations of variables are included in each model block (full results in Appendix E). This analysis replicates the regression-based strategies existing studies have used to explain the 'educational gap' in voting.

Block 0 captures the 'raw' education-vote choice association. It shows moderately and highly educated electors had statistically significantly lower odds of voting to Leave the EU, in 2016, or voting Conservative, in the 2017 and 2019 general elections, than the least educated. A stark educational divide is observed in all contests, although vote choices divided more strongly along educational lines in the 2019 election, than in the 2017 contest. Taking the most dramatic example, highly educated Brits had over three times the odds of voting Labour, rather than Conservative, than the least educated. This educational divide shows gradation. The moderately educated always vote more like the least educated than the highly educated.

**Table 4-1 - Educational Odds in Logistic Vote Choice Regressions**

| ***Reference: Low Education*** | | **2016: Leave versus Remain** | **2017: Labour versus Conservative** | **2017: Other versus Conservative** | **2019: Labour versus Conservative** | **2019: Other versus Conservative** |
|---|---|---|---|---|---|---|
| (0) Education | Moderate | 0.438*** (0.400-0.479) | 1.480*** (1.346-1.628) | 1.343*** (1.185-1.522) | 1.712*** (1.541-1.903) | 1.695*** (1.529-1.880) |
| | High | 0.204*** (0.184-0.225) | 2.254*** (2.034-2.501) | 2.276*** (1.984-2.611) | 3.596*** (3.232-4.001) | 3.213*** (2.859-3.610) |
| (1) Education + Controls | Moderate | 0.533*** (0.486-0.584) | 1.229*** (1.113-1.357) | 1.263*** (1.109-1.439) | 1.391*** (1.243-1.556) | 1.478*** (1.333-1.639) |
| | High | 0.286*** (0.257-0.318) | 1.886*** (1.684-2.112) | 2.065*** (1.772-2.408) | 2.862*** (2.546-3.217) | 2.620*** (2.319-2.961) |
| (2) Education, Controls + Economic Orientation | Moderate | 0.566*** (0.515-0.622) | 1.499*** (1.326-1.694) | 1.431*** (1.249-1.639) | 1.551*** (1.369-1.757) | 1.571*** (1.408-1.753) |
| | High | 0.310*** (0.278-0.345) | 2.413*** (2.092-2.783) | 2.370*** (2.016-2.787) | 3.100*** (2.720-3.533) | 2.740*** (2.403-3.125) |
| (3) Education, Controls + Cultural Attitudes | Moderate | 0.828*** (0.733-0.935) | 0.911 (0.815-1.018) | 0.993 (0.863-1.142) | 0.939 (0.825-1.069) | 1.092 (0.974-1.224) |
| | High | 0.622*** (0.537-0.719) | 0.965 (0.847-1.099) | 1.179* (0.995-1.396) | 1.286*** (1.118-1.480) | 1.397*** (1.222-1.597) |
| (4) Education, Controls + Political Cues | Moderate | 0.540*** (0.490-0.594) | 1.234*** (1.110-1.372) | 1.276*** (1.117-1.456) | 1.329*** (1.177-1.499) | 1.449*** (1.304-1.609) |
| | High | 0.309*** (0.277-0.346) | 1.701*** (1.505-1.924) | 1.945*** (1.662-2.276) | 2.417*** (2.128-2.746) | 2.350*** (2.076-2.659) |
| (5) Education, Controls + all Mediators | Moderate | 0.851** (0.751-0.963) | 1.105 (0.965-1.264) | 1.131 (0.976-1.311) | 1.048 (0.911-1.207) | 1.210*** (1.071-1.367) |
| | High | 0.662*** | 1.149* | 1.311*** | 1.424*** | 1.556*** |

| ***Reference: Low Education*** | | **2016: Leave versus Remain** | **2017: Labour versus Conservative** | **2017: Other versus Conservative** | **2019: Labour versus Conservative** | **2019: Other versus Conservative** |
|---|---|---|---|---|---|---|
| | | (0.571-0.769) | (0.978-1.351) | (1.093-1.573) | (1.217-1.667) | (1.343-1.802) |
| ***Observations*** | | 23,716 | 18,885 | | 24,526 | |

*Note: Weighted odds ratios are shown with 95% confidence intervals in parentheses. *p < 0.1. ** p < 0.05. ***p < 0.01.*

After accounting for socio-demographic controls (Block 1), the strength of all education-vote choice associations was considerably reduced. This indicates that politics divide along educational lines in Britain today partially because high and low educated persons are 'different types' of people. However, education's total effect on electors' vote choices remained strong, and statistically significant, after controls. This unconfounded total educational effect is now dissected using results obtained via the KHB methodology and presented in Table 4-2 and Table 4-3. In each political contest considered, KHB statistics describe the education-vote choice association for the moderately and highly educated compared to the low education reference group.

Table 4-2 shows that educational attainment had large and highly statistically significant indirect effects on electoral behaviour in all contests. Fully 67-91% of education's total effect on British electors' vote choices was transmitted indirectly. Across all contests, and educational contrasts, after accounting for controls and hypothesised mediators, education's direct effect on vote choice constituted no more (and often much less) than 33% of its total effect. This provides clear support for H1.

For six of the 10 education-outcome combinations, Table 4-2 shows that net of controls and mediators, education had a statistically significant direct effect on British electors' vote choices, at the 5% threshold. These six cases where the 'educational gap' in voting could not be explained entirely by indirect effects are concentrated in high-low education contrasts and the starkest cases of educational division observed. It, therefore, seems fair to conclude that whilst this study's hypothesised mechanisms explain much of the educational divergence in the British electorate's recent vote choices, they cannot explain the full extent of this in all contests. These same general conclusions can be drawn from Table 4-1.

These findings provide implicit support for H2, demonstrating that more educated British electors made different vote choices to the least educated, in recent political contests, largely because they exhibited different economic orientations, cultural attitudes and political cue-taking behaviours. The KHB method's ability to disentangle mediating effects is now utilised to examine H2 in detail.

Table 4-2 shows the portion of education's total effect on vote choice transmitted indirectly via economic, cultural and cue-taking mechanisms. In the referendum model, and for the high-low contrast in the 2019 Labour versus Conservative model, Table 4-2 shows indirect economic, cultural and cue-taking effects all make positive contributions to the total effect, meaning they narrow the 'education gap' in vote choices. Accounting for the varying educational distribution of these attitudes, interests and behaviours explains why more educated British electors less often voted Leave in 2016, and more often for the Labour Party in 2019, than the least educated.

**Table 4-2 - Decomposing Education's Effect on Vote Choices**

| *Reference: Low Education* | 2016: Leave versus Remain | 2017: Labour versus Conservative | 2017: Other versus Conservative | 2019: Labour versus Conservative | 2019: Other versus Conservative |
|---|---|---|---|---|---|
| **Moderate Education** | | | | | |
| Total Effect | -0.894*** (0.062) | 0.336*** (0.067) | 0.374*** (0.074) | 0.504*** (0.071) | 0.587*** (0.061) |
| Direct Effect | -0.162** (0.063) | 0.099 (0.069) | 0.123 (0.075) | 0.047 (0.072) | 0.190*** (0.062) |
| Indirect Effect | -0.732*** (0.065) | 0.236*** (0.080) | 0.250*** (0.061) | 0.457*** (0.077) | 0.397*** (0.056) |
| % of Total which is Direct | 18.10% | 29.55% | 32.98% | 9.33% | 32.37% |
| % of Total which is Indirect | 81.90% | 70.45% | 67.02% | 90.67% | 67.63% |
| Total via Economic Orientation | 4.44% | -54.23% | -27.53% | -22.78% | -12.54% |
| Total via Cultural Attitudes | 73.74% | 122.03% | 93.82% | 104.74% | 75.77% |
| Total via Political Cues | 3.71% | 2.66% | 0.73% | 8.71% | 4.40% |
| **High Education** | | | | | |
| Total Effect | -1.843*** (0.074) | 1.050*** (0.077) | 1.083*** (0.087) | 1.742*** (0.080) | 1.533*** (0.074) |
| Direct Effect | -0.412*** (0.076) | 0.139* (0.082) | 0.271*** (0.093) | 0.354*** (0.080) | 0.442*** (0.075) |
| Indirect Effect | -1.431*** (0.072) | 0.911*** (0.085) | 0.812*** (0.070) | 1.388*** (0.085) | 1.091*** (0.066) |

| ***Reference: Low Education*** | **2016: Leave versus Remain** | **2017: Labour versus Conservative** | **2017: Other versus Conservative** | **2019: Labour versus Conservative** | **2019: Other versus Conservative** |
|---|---|---|---|---|---|
| % of Total which is Direct | 22.35% | 13.24% | 25.02% | 20.32% | 28.83% |
| % of Total which is Indirect | 77.65% | 86.76% | 74.98% | 79.68% | 71.17% |
| Total via Economic Orientation | 3.60% | -11.51% | -4.97% | 0.01% | -2.50% |
| Total via Cultural Attitudes | 68.62% | 87.82% | 74.31% | 69.16% | 65.56% |
| Total via Political Cues | 5.43% | 10.46% | 5.65% | 10.51% | 8.11% |
| **Observations** | 23,716 | 18,885 | | 24,526 | |

*Note: Weighted coefficients are shown with constituency-clustered standard errors in parentheses. *p < 0.1, **. p < 0.05, ***p < 0.01.*

In all other election models, Table 4-2 shows the indirect effect of education transmitted via economic mechanisms makes a substantial negative contribution to education's total effect on vote choice. Net of all other influences, education shapes British electors' economic orientations in ways that make the highly and moderately educated slightly more likely to vote Conservative than their less educated counterparts. This indirect 'economic' education effect generally has a different, and counteracting, explanatory power to the others in election voting. It acts to dilute the overall, and far larger, positive mediating effects of cultural and cue-taking mechanisms, whereby more educated voters are considerably less likely to vote Conservative than the least educated.

This economic suppression effect, seen in most election models, is masked in the logistic regression results presented in Table 4-1. As the educational odds of voting for Labour, or another party, versus the Conservatives, are only subtly larger in Block 2 (after economic variables are added), than in Block 1 (controls only), and both sets of coefficients exhibit identical significance levels and overlapping confidence intervals, Table 4-1 suggests education may either have a small negative indirect effect on voting transmitted via economic mechanisms or that this is merely a chance finding. If the contribution of indirect economic mechanisms was ignored, and only positive indirect paths considered, the true size of education's total (positive) shaping effect on voting would be concealed. If underestimated, understandings of precisely how this shaping process occurs would be distorted. Clearly then, relying on the results presented in Table 4-1 would lead to mistaken inferences about the reasons why politics divide along educational lines. Using the KHB method, which resolves the issue of conflating mediation effects with variable re-scaling effects in logistic regression analyses (Karlson, Holm and Breen, 2012), holds the key to producing fuller, and more accurate, understandings of the modern British educational divide.

The relative strength of economic, cultural and cue-taking mechanisms' indirect roles in explaining the education-vote choice association, across contests and educational contrasts, is now explored. Table 4-3 reports the absolute contribution each mediator makes to the total indirect effect to facilitate this comparison. These figures are used, rather than the KHB statistics presented in Table 4-2, as the presence of counteracting indirect effects in some models, and not others, means the size of total effects transmitted via indirect mechanisms are not comparable across models, as their sum does not always equal 100%.

**Table 4-3 - Absolute Contribution of Mediators to Indirect Effect(s)**

| ***Reference: Low Education*** | **2016: Leave versus Remain** | **2017: Labour versus Conservative** | **2017: Other versus Conservative** | **2019: Labour versus Conservative** | **2019: Other versus Conservative** |
|---|---|---|---|---|---|
| **Moderate Education** | | | | | |
| Economic Orientation's Contribution to Indirect Effect | 5.42% | (-)30.31% | (-)22.55% | (-)16.72% | (-)13.55% |
| Cultural Attitudes' Contribution to Indirect Effect | 90.05% | 68.20% | 76.85% | 76.88% | 81.73% |
| Political Cues' Contribution to Indirect Effect | 4.53% | 1.49% | 0.60% | 6.39% | 4.75% |
| **High Education** | | | | | |
| Economic Orientation's Contribution to Indirect Effect | 4.64% | (-)10.48% | (-)5.85% | 0.01% | (-)3.28% |
| Cultural Attitudes' Contribution to Indirect Effect | 88.37% | 79.99% | 87.50% | 86.80% | 86.07% |
| Political Cues' Contribution to Indirect Effect | 6.99% | 9.53% | 6.65% | 13.19% | 10.65% |

In the referendum, cultural attitudes accounted for 88-90% of education's indirect effect on voting - explaining much of the reason why highly, and moderately, educated Brits voted Remain more often than the least educated. In comparison, economic orientations and cue-taking had lesser roles, capturing just 5-7% of education's indirect effect. In the general elections, we see a different pattern. Whilst cultural mechanisms had the greatest explanatory power in these contests too - capturing 68-88% of education's indirect effect on voting - other mechanisms also typically had considerable power in explaining why voting divided along educational lines. For example, economic mechanisms accounted for as much as 30% of education's indirect effect on voting Labour, over the Conservatives, and political cue-taking behaviours accounted for over 10% of education's indirect effect in the 2019 election's high-low contrasts. In relation to H2, this highlights that whilst the educational divide in EU Referendum voting was predominantly driven by educational groups' divergent positions along a single, cultural, dimension, the educational divide in general election voting was more complex, driven by multiple mechanisms.

In the elections studied, there was considerable consistency in the way each mechanism drove the education-vote choice relationship. Firstly, in both contests, political cues accounted for a greater portion of the indirect education-vote choice association seen for the high-low education contrast, than for the moderate-low contrast - 7-13% of the former indirect effect compared to just 1-6% of the latter. This suggests British electors' vote choices divided along educational lines in recent elections to a small, but non-negligible, extent because educational groups, and particularly the low-high groups, exhibited asymmetric political cue-taking behaviours[20]. Secondly, Table 4-3 highlights that economic mechanisms almost always had stronger effects in mediating the educational divide over Labour/Conservative voting, than Other/Conservative voting, with the reverse true of cultural attitudes. The only exceptions were the 2019 high-low contrasts. Finally, Table 4-3 shows economic mechanisms always carried more power in explaining why low and moderately educated electors' vote choices varied, than for low and high educated persons, with the reverse again true for cultural attitudes. Illustratively, economic mechanisms accounted for 14-30% of education's indirect effect on general election vote choice in the low-moderate contrast and just 0-10% in the high-low contrast. For cultural attitudes, these same figures stood at 68-82% and 80-88%, respectively.

All considered, it seems fair to conclude that the educational divisions observed in 2017 and 2019 general election voting can generally be explained in the same way - being driven broadly to the same extent by educational groups' divergent economic orientations, cultural attitudes and political cue-taking behaviours.

## 4.6 Discussion and Conclusion

This paper goes beyond the scope of existing work firstly, by specifying an encompassing theoretical model of educational attainment's shaping effects on voting, which includes roles for economic orientations, cultural attitudes and political cue-taking as mediators, and subsequently, by conducting a robust empirical test of this model, using mediation analysis. Results hold regardless of the subset of cases used for analyses (with or without Scots, non-voters and imputation, see Appendices B and G, respectively) and offer novel insights - providing a more complete picture of the reasons why British politics divide starkly along educational lines today.

Firstly, this study reveals a large and statistically significant portion of educational attainment's total effect on British electors' recent vote choices (67-91%), was transmitted indirectly. This

[20]Except for the moderate-low education contrasts of 2017 election voting, where cues accounted for <2% of education's indirect effect.

finding not only corroborates the broad conclusions drawn by existing studies, which indicate that 'much of' education's total effect on electoral behaviours is conveyed through indirect attitudinal pathways but also expands on these by documenting the relative magnitude, and statistical significance, of education's direct and indirect effects on British electors' vote choices, for the first time. In doing so, this study lends some credence to Bovens and Wille's (2017) and Stubager's (2010) theories that education cleavage-style explanations of electoral behaviour are fitting across Western Europe. Findings verify this is indeed the case in contemporary Britain and confirm that the works of Fieldhouse *et al.* (2019a) and Goodwin and Heath (2016a), which implied the same, did not draw this conclusion simply because they had used analytical tools not explicitly designed for effect decomposition.

Intriguingly, this paper finds education had statistically significant direct effects on electors' vote choices in just over half of the education-outcome combinations studied. In these cases, accounting for socio-demographic controls and hypothesised mediators could not provide a full account of why more educated British electors voted differently to their less educated counterparts. That this pattern occurred in instances where the initial 'educational gap' in voting was starkest is unsurprising, as it seems logical that a wider range of factors would need to be accounted for to explain larger gaps in electoral behaviours.

Social network effects might constitute the 'missing link' in explaining why the most educated members of the British electorate vote differently to the least educated. Given that social contacts influence voting (Newcomb, 1978; Sinclair, 2012) and universities are ideal sites for forming strong, new friendships (Brooks, 2002), it stands to reason that graduates may have disproportionately voted to Remain, and for the Labour and Other parties, as they experienced greater influences to do so from within their networks, than the least educated. Thinking of the referendum specifically, this result might be explained by Allport's (1954) contact theory. Given Meleady, Seger and Vermue (2017: 804-5) found 'positive intergroup contact [with EU immigrants] was associated with increased support for Britain remaining in the EU…as a consequence of its prejudice-reducing effects', it seems possible that graduates more often voted Remain, than the least educated, as attending university exposed them to, and allowed them to interact (positively) with, EU students. Future work should assess such possibilities.

This study's other key discoveries are that cue-taking behaviours generally have relatively small, but non-negligible, (indirect) effects in explaining education-vote choice associations and that economic orientations typically have negative mediating effects in general elections (in contrast to other mechanisms' positive mediating effects). Failure to account for either of these indirect pathways in analyses of education's influence on electoral behaviours would produce a distorted picture of the extent to which, and reasons why, education shapes vote choices. These findings

clearly imply that a broader theoretical framework of the education-vote choice association, which includes indirect effects of political cues and economic orientations, as well as cultural attitudes, must be adopted, and tested robustly using effect decomposition methods, if deeper understandings of the educational (re)alignment of modern Western democratic electoral politics are sought.

Perhaps most interestingly, this article shows no single pattern of educational division exists in modern British politics. Whilst cultural attitudes explained the largest portion of the 'educational gap' in voting in all contests considered - a fact expected given that Häusermann and Kriesi (2015) stress cultural, rather than economic, concerns dominate support for mainstream parties in Western Europe - only in the referendum could this divide in voting be explained by educational groups' possession of asymmetric cultural attitudes alone. In recent general elections, multiple indirect educational mechanisms exhibited considerable explanatory power, and did so in consistent ways. For example, in both elections, economic drivers had a relatively larger role in explaining the 'educational gap' between low and moderately educated electors' vote choices, than for the high and low educated groups, whilst cultural drivers always carried relatively more explanatory power in the latter contrast. The reason for this is simple and is illustrated clearly when considering the gulfs in educational groups' left-right (economic) and libertarian-authoritarian (cultural) attitudes. The economic orientations of moderately and low educated British electors are, on average, somewhat less similar than high and low educated British electors', whilst their cultural attitudes are far more similar (see Appendix H). As would be expected, each mechanism explains a relatively larger portion of education's indirect effect on general election vote choices for educational contrasts in which a deeper initial divide in these orientations is observed.

Taken together, these discoveries considerably advance our understanding of the educational divide in modern British politics - demonstrating that, at least when it comes to general elections, educational divisions in vote choices are not only observed because educational groups possess divergent cultural attitudes, which shape their vote choices. Rather, education's 'liberalising', 'stratifying' and 'information internalisation' functions all play roles in explaining why modern British politics divide along educational lines. The weight carried by indirect economic and cue-taking mechanisms in driving the educational division of British electors' general election vote choices may reflect a specific national character of this conflict. For example, the former result may have materialised only as the British class cleavage was historically stronger than other Western democracies' (Goldberg, 2020). Exploring whether these patterns continue in upcoming British elections, and can be generalised to other Western democratic contexts, will be fruitful areas for further research.

This paper's novel findings have the potential to be impactful beyond the academic setting. Only now we have a more comprehensive understanding of how educational attainment has shaped British electors' recent vote choices and developed a detailed explanation of why British politics divide along educational lines today, can we consider this divide's future impact. Insights from this study, for example, allow speculation about how shifts in parties' policies could alter educational allegiances, whether new parties might emerge to cater for unmet education-based preferences and how this divide will impact aggregate party support as graduates come to represent a greater share of the electorate. In furthering our knowledge of the sources and dynamics of educational polarisation, this study also provides a basis for acting to reconcile these stark educational divisions.

To conclude, this study demonstrates that using mediation techniques, and fully encompassing theoretical models of education's shaping effects on voting, hold the key to gaining comprehensive understandings of why politics divide along educational lines. It forms a roadmap for future works seeking to explore how, and why, socio-demographic characteristics constitute bases for political division. More substantively, this paper provides novel insights, showing that a large portion of education's shaping effect on vote choices was transmitted indirectly in recent British political contests and that educational divisions over EU Referendum and general election voting were driven by different mechanisms. In doing so, it provides provisional evidence to suggest an education cleavage-style understanding of the modern British educational divide over politics is appropriate. Scholars should now explore whether these findings are generalisable to other Western democracies and thus, are indicative of a wider educational realignment process.

# Chapter 5 Paper 2. Demystifying the Link Between Higher Education and Liberal Values: A Within-sibship Analysis of British Individuals' Attitudes from 1994-2020

*The link between university graduation and liberal values is well-established and often taken as evidence that higher education participation causes attitudinal change. Identification of education's causal influence in shaping individual preferences is notoriously difficult as it necessitates isolating education's effect from self-selection mechanisms. This study exploits the household structure of the Harmonised British Household Panel Study and Understanding Society data to tighten the bounds of causal inference in this area and ultimately, to provide a more robust estimate of the independent effect of university graduation on political attitudes. Results demonstrate that leveraging sibling fixed-effects to control for family-invariant pre-adult experiences reduces the size of higher education's effect on cultural attitudes by at least 70%, compared to conventional methods. Significantly, within-sibship models show that obtaining higher education qualifications only has a small direct causal effect on British individuals' adult attitudes, and that this effect is not always liberalising. This has important implications for our understanding of the relationship between higher education and political values. Contrary to popular assumptions about education's liberalising role, this study demonstrates that the education-political values linkage is largely spurious. It materialises predominately because those experiencing pre-adult environments conducive to the formation of particular values disproportionately enrol at universities.*

## 5.1 Introduction

Recent years have seen public discourse become increasingly critical of HE. Right-leaning commentators have claimed, with increasing frequency, and ferocity, that professors at 'woke' HE institutions 'indoctrinate' students with 'leftist agenda[s]' and 'liberal madness' (Hopkins, 2016; Torres, 2020). Such assertions are grounded in research which has, since the 1950s, found with remarkable geographical and temporal consistency that people with higher levels of educational attainment, and particularly graduates, hold more liberal cultural views than their less educated counterparts (Weakliem, 2002). These findings have widely been interpreted as evidence that HE participation *causes* attitudinal change.

However, a growing body of literature authored by scholars including Campbell and Horowitz (2016), Kam and Palmer (2008), Persson (2014) and Sieben and de Graaf (2004) challenges this interpretation. It argues that research which controls only for measured pre-adult characteristics will report biased effects of education on socio-political orientations, as these variables, which are highly related to educational enrolment, are often measured poorly, or omitted, in survey data. As most existing empirical works utilise precisely this strategy, they tend to overestimate the magnitude, and statistical significance, of education's effect on attitudes. This makes it difficult to ascertain whether the education-liberal values associations reported in past research represent genuine causal, as opposed to spurious, effects. The question of whether HE study is the cause of graduates' distinctive attitudes therefore remains an open one.

This paper applies a within-sibship design to Harmonised BHPS and Understanding Society data (University of Essex, Institute for Social and Economic Research, 2021) from 1994 to 2020 to explore how HE participation shapes individuals' economic, environmental and gender-role attitudes. This data's household structure affords a unique opportunity to better identify the causal effect of university graduation on attitudes. Exploiting the fact that siblings experience symmetrical pre-adult environments, and modelling this within-family invariance through fixed-effect estimation, allows this study to go beyond the scope of existing works. Its central contribution is conducting a more robust empirical test of HE's causal effect on British individuals' attitudes and thus, advancing our knowledge of why graduates exhibit distinctive political values. Findings will not only indicate how the growth of HE might impact mass opinion, but also bring important empirical evidence to bear on claims, popular among right-leaning commentators, that universities are hotbeds of left-liberal bias.

## 5.2 Higher Education and Liberal Values: Understanding the Link

Decades of political socialisation research has concluded that 'political learning is a lifelong process, starting at an early age' (Neundorf and Smets, 2017: 3). Socio-political attitudes are developed through encounters with socialising agents including families, peers, the media, education systems, and political and geographical contexts, in the 'impressionable years' of childhood and early adulthood, and reach stability in adulthood (Alwin and Krosnick, 1991; Jennings and Niemi, 1981; Neundorf, Smets and García-Albacete, 2013). However, these orientations are not then entirely fixed - remaining subject to some degree of change throughout the adult life-course (Miller and Sears, 1986). This greater malleability of attitudes in the 'impressionable years' occurs as individuals more often experience environmental changes known to alter orientations, like entering HE or the workforce, leaving home or participating in social movements during early adulthood (Sears and Brown, 2013).

The association of educational attainment with socio-political attitudes is one of the most robust social scientific findings (Weakliem, 2002). This well-documented education effect has increasingly become regarded as a HE effect - with a plethora of studies demonstrating that the general education-values linkage is predominantly driven by a marked graduate/non-graduate attitudinal divide (Hainmueller and Hiscox, 2007; Stubager, 2008; Surridge, 2016). While it is evident that graduates typically possess a distinctive set of attitudes, less is known about whether HE participation, which constitutes one of the most profound environmental changes many individuals will experience during their life-course, actually *causes* the development of these attitudes. This gap in knowledge largely stems from the fact that estimating education's causal effect on political outcomes is fraught with methodological difficulty (Persson, 2014, 2015).

While it is possible that exposure to the educational content, or some other direct experiential aspect, of HE might lead students to develop distinctive political values[21], it seems equally plausible that this education effect is not causal but simply a proxy for other factors. Existing literature indicates that two key 'proxy' education effects shape adult outcomes - these are the pre-adult socialisation and sorting models (Persson, 2015). The former contends that, at least part of, the education-liberal values association represents a self-selection effect, as the same pre-adult factors which shape attitudes - like intelligence, parental values and family socio-economic status - also determine educational attainment (Campbell and Horowitz, 2016; Sieben and de Graaf, 2004). In this view, the non-random selection of individuals into universities, rather than

[21]Dey (1996), Paterson (2009, 2014), Stubager (2008) and Surridge (2016) suggest processes of (in)formal socialisation experienced on educational campuses drive the direct education-attitudes linkage.

any direct educational or experiential university effect, drives the education-liberal values association.

The sorting model proposes it is the social position conferred upon us by virtue of being educated to a given level, rather than the experience of being educated, that determines adult attitudes (Stubager, 2008). Persons with high levels of educational attainment, and particularly graduates, typically achieve higher earnings, find more secure employment and occupy more central social network positions, than less educated persons (Bovens and Wille, 2017). For proponents of the sorting model, attitudinal asymmetry between educational groups is driven by these stratification-based experiences. Graduates might, for example, be more supportive of immigration and tolerant toward ethnic minorities, than non-graduates, because they are less exposed to job competition from low-skilled migrant workers (Hainmueller and Hiscox, 2007) or because they are more often embedded in networks endorsing these attitudes.

Clearly then, estimating education's causal effect on attitudes necessitates fully isolating education's influence from the highly related effects of pre-adult, and stratification-based, experiences. Existing studies have typically sought to do this by using multiple regression techniques to estimate education's effect on attitudes, net of controls for these confounders (Dey, 1996; Hainmueller and Hiscox, 2007; Paterson, 2009, 2014; Phelan *et al.*, 1995; Stubager, 2008; Surridge, 2016; van de Werfhorst and de Graaf, 2004). Though conducted across several decades, and various advanced Western democratic contexts, these studies' conclusions are remarkably consistent. Generally, they find that even after controls for education-as-a-proxy explanations, persons with high educational attainment, and particularly graduates, exhibit considerably more liberal cultural attitudes and somewhat less liberal economic attitudes[22], than their less educated counterparts.

While this field of enquiry has advanced our knowledge of the education-liberal values linkage - by demonstrating that some educational or experiential aspect of HE study *is related to* developing distinctive attitudinal profiles - the extent to which this education effect is *causal* remains unclear. This is because causal conclusions cannot be inferred from 'conventional' regression-based studies, which only identify associations. An emerging line of research makes this point clearly. It contends that because surveys inevitably cannot collect data on all important pre-adult characteristics, and often measure those collected with error, education's effect on adult outcomes will be overestimated in observational studies which control only for measured pre-adult characteristics, as effects will remain subject to further confounding

[22]Contrastingly, van de Werfhorst and de Graaf (2004) find education is unrelated to economic preferences.

influences (Campbell and Horowitz, 2016; Kam and Palmer, 2008; Persson, 2014; Sieben and de Graaf, 2004). This makes it impossible to ascertain whether the education-liberal values associations reported in past research represent genuine causal, as opposed to spurious, effects.

To tackle this causal identification issue, pioneering studies have used sophisticated quantitative techniques including regression discontinuity, fixed and random-effect and matched designs which control for unmeasured and poorly measured (as well as measured) pre-adult characteristics. This body of work has explored education's *causal* effect on two broad types of adult outcomes: political engagement - including participation, citizenship and voting (Kam and Palmer, 2008; Marshall, 2016; Mayer, 2011; Perrin and Gillis, 2019; Persson, 2014) - and socio-political attitudes (Campbell and Horowitz, 2016; Kunst, Kuhn and van de Werfhorst, 2020; Scott, 2022; Sieben and de Graaf, 2004). While attitudinal research has typically found the strong and statistically significant education effects reported in 'conventional' studies are greatly reduced in size, and sometimes entirely nullified, under more robust testing, the picture has been more mixed in studies of political engagement. Marshall (2016), Mayer (2011) and Perrin and Gillis (2019), for example, all find education has a *substantial causal effect* on political engagement, even after controls for spurious effects. Nevertheless, these studies all demonstrate that 'conventional' regression designs considerably overestimate education's 'true' effects and thus, that the methodological limitations of past research may have prevented us gaining an accurate understanding of how precisely education shapes political outcomes.

Despite substantial advances in our knowledge of how best to obtain unbiased estimates of education's effect on adult outcomes, and thus tighten the bounds of causal inference in this area, few studies have put these into practice. As yet, only a single study conducted in the British context (see: Scott, 2022) has employed this kind of sophisticated quantitative technique to identify education's independent effect on liberal values. Therefore, it remains a relatively open question as to whether the association of HE and liberal socio-political attitudes, observed in Britain, is genuinely causal. This study seeks to advance our knowledge of the mechanisms driving this well-established association, by asking: *does studying for a degree cause British graduates to develop distinctive (il)liberal economic and cultural attitudes?* It is hypothesised that the effect of HE on attitudes reported using 'conventional' methods will reduce in size, and potentially be nullified, when estimated under more stringent tests of causality.

### 5.2.1 The British Case

Britain is an interesting case for exploration, not only because education has been a major driver of attitude formation and political behaviour, in this context, in recent years (Ford *et al.*, 2021; Simon, 2022a), but because it is likely to become increasingly so in the future - as decades of

educational expansion alter the educational composition of the population (Sobolewska and Ford, 2020). Exploring this study's research question in the British context will not only provide novel evidence regarding whether HE plays an un-anticipated societal function, in shaping graduate attitudes, but will also have important wider implications. Firstly, it will provide insight into how expanding HE enrolment, and growth in the graduate population, may alter aggregate British public opinion. Secondly, it will allow assessment of the validity of claims, popular among right-leaning commentators, that universities are centres of left-liberal indoctrination. Given that educational polarisation threatens societal cohesion and the functioning of British democracy, evidence about the nature of the education-liberal values association is needed now more than ever.

## 5.3 Data

This study draws on high-quality, nationally representative data from the BHPS and Understanding Society surveys to quantify the effect of graduation on socio-political attitudes, net of the confounding influences of pre-adult characteristics and adult stratification-based experiences. It exploits that data collection from eligible BHPS respondents (1991-2008) continued from 2009 as part of Understanding Society (Fumagalli, Knies and Buck, 2017) to conduct longitudinal analysis spanning over 30 years.

The combined panel dataset contains data collected at 28 annual intervals from all individuals aged 16 and over residing in originally sampled BHPS households, and all those who subsequently came of age, or to reside with original sample members (Fumagalli, Knies and Buck, 2017). By virtue of its longitudinal household design, this data not only contains repeated measures of individual-level variables, including educational attainment, socio-demographics, and attitudes, but also provides details of how respondents are related and therefore facilitates matching of individuals within households. This allows the shared backgrounds of siblings to be leveraged in analysing education's effect on attitudes, and thus for both the unmeasured and measured pre-adult characteristics which confound this relationship to be controlled. Such detailed information affords a unique opportunity to better identify education's causal effect on attitudes.

While this longitudinal dataset is ideal for exploring the extent to which education fosters value change, versus value reinforcement due to self-selection (Surridge, 2016), as it allows pre-adult and adult environments to be controlled when estimating attitudinal change over a period, doing so requires that response attrition is addressed. Attrition is problematic for two reasons. Firstly, it reduces the size of samples for analysis and therefore the precision of estimates. Secondly, because if attrition is selective (the characteristics of (non-)respondents vary) inferences drawn

from analyses will not be generalisable to the intended target population. As decades of study into attrition in large-scale panel studies has generally concluded this 'rarely seems to introduce substantively important bias' (Lynn *et al.*, 2005: 20), the former issue is the primary concern.

### 5.3.1 Measurement Intervals

To avoid reduction in sample size the indicators constructed utilise multiple waves of data. Generally, adult measures are recorded for graduates in the wave they first report obtaining a HE qualification, or in any of the nine subsequent waves, if this information is missing at earlier waves. Because socio-political attitudes are associated with age (Peterson, Smith and Hibbing, 2020), and there is a strong age-gradient in educational attainment (Sobolewska and Ford, 2020), non-graduates' adult attitudes needed to be measured so as to ensure reported educational differences in attitudes were not a product of the groups' varying age profiles. As exploratory analysis revealed the median age of sampled graduates was 23[23] (see Appendix I), non-graduates' attitudes were recorded in the wave they turned 23, or at any of the nine subsequent waves - mirroring the graduate adult data collection window. Although data collection windows used for pre-adult characteristics vary, all use multiple waves to maximise response, and collect data no later than when respondents were aged 20, or three waves prior to HE graduation. This collection period reflects that adult reporting begins at 23, and obtaining a degree requires at least three years full-time study. Table 5-1 provides details of all variables, data collection periods and valid responses.

**Table 5-1 - Operationalisation, Measurement and Valid Observations**

| **Classification** | | **Variable** | **Data Collection Window** | **Observations** |
|---|---|---|---|---|
| *Dependent variables* | | Adult gender attitude scale | 0-9 wave(s) post-graduation or ages 23-31, for non-graduates | 11,048 |
| | | Adult economic attitude scale | | 3,108 |
| | | Adult environmentalism scale | | 7,353 |
| *Key independent variable* | | HE graduation status | First report | 59,942 |
| *Control variables* | *Socio-demographic variables* | Gender | | |
| | | Cognitive ability | | |
| | | Psychological security | | |

[23]The median was used as the age at graduation distribution was strongly skewed right-wards.

| Classification | | Variable | Data Collection Window | Observations |
|---|---|---|---|---|
| | | Occupational class | 0-9 wave(s) post-graduation or ages 23-31 (non-graduates) | 15,449 |
| | *Pre-adult characteristics: family variant* | Membership of community groups | Age 20 or younger | 59,942 |
| | | Membership of sports groups | | |
| | | Participation in cultural activities | | |
| | | Birth order | Derived for sibling respondents using first report of birth year | 38,802 |
| | *Pre-adult characteristics: early attitudes* | Pre-adult gender attitude scale | 3-12 waves pre-graduation or age 20 or younger (non-graduates) | 9,597 |
| | | Pre-adult economic attitude scale | | 2,274 |
| | | Pre-adult environmentalism scale | | 6,103 |
| | *Pre-adult characteristics: family invariant* | Parental occupation | Reported by parent when respondent was aged 20 or younger | 10,879 |
| | | Parental education | | 10,768 |
| | | Parental income | | 10,926 |
| | | Parental engagement in parent-teacher associations (PTA) | | 59,942 |
| | | Parental gender attitude scale | | 6,305 |
| | | Parental economic attitude scale | | 1,369 |
| | | Parental environmentalism scale | | 3,829 |

*Note: Those with missing educational information are excluded.*

While it would have been preferable to account for the differing lengths of time taken by full- and part-time students to graduate, by varying the time elapsed between (pre-)adult reporting windows, a 3-year study duration was assumed for all graduates, as the data contained no reliable, or consistent, indicator of study mode. While this means pre-adult measures for part-time students will have been recorded in the early stages of their undergraduate study, and therefore renders controls for spurious effects somewhat imperfect, it is not believed this will significantly bias conclusions drawn. Firstly, because part-time students make up just 15% of UK undergraduates (Hubble and Bolton, 2021), and secondly, because (Mintz, 1998: 32) indicates that just '2 years of university education is insufficient to have a discernible effect on [the

attitudes of] young adults'. Nevertheless, a sensitivity analysis was conducted to explore whether conclusions about HE's effect on attitudes varied depending on the gap between reporting pre-adult and adult measures. Results presented in Appendix J show 3- and 4-year reporting periods yield similar estimates. Subsequent analyses use the 3-year specification, as larger sample sizes afford greater statistical power.

### 5.3.2 Dependent Variable(s) - Liberal Values

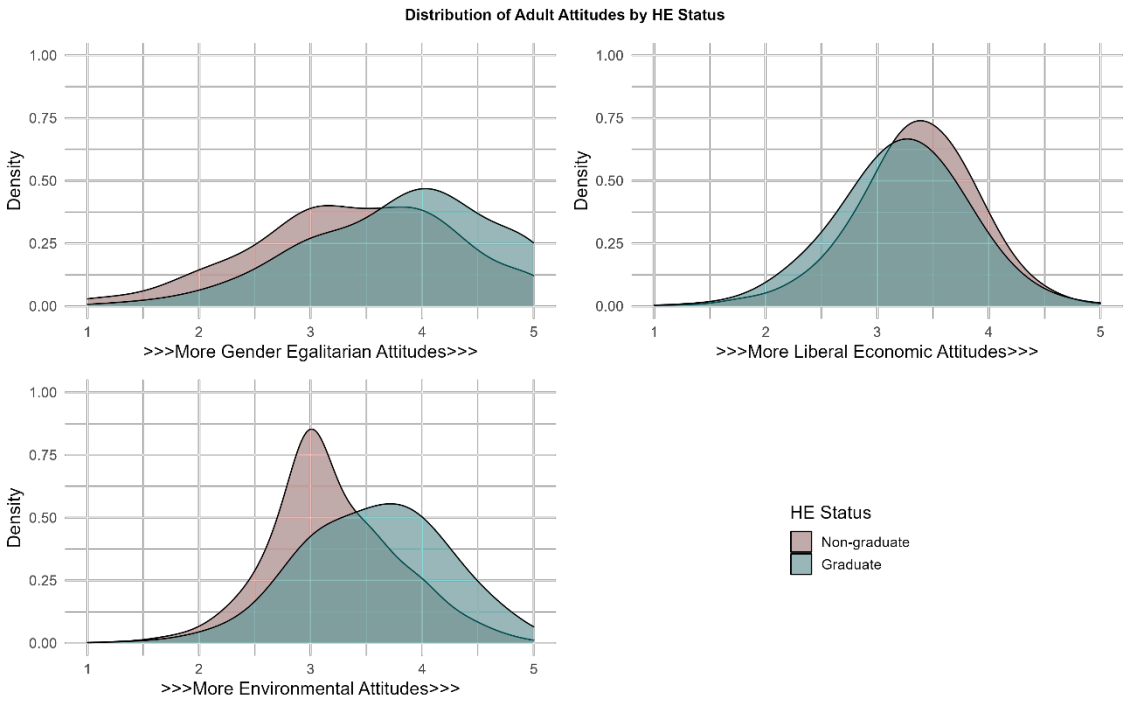
This study uses three attitudinal dependent variables which measure adult attitudes toward gender roles, the economy, and the environment. These capture respondents' positions on the two core ideological dimensions which define the UK's political space - the economic, or left-right, dimension and the cultural, or new politics, dimension (Evans, Heath and Lalljee, 1996). The economic attitudinal measure corresponds to the former dimension and covers issues of inequality, exploitation, and government regulation. The other measures capture the cultural dimension, which encompasses 'issues concerned with lifestyle, ecology, cultural diversity, nationalism and immigration' (Hooghe, Marks and Wilson, 2002: 976).

Multi-item indicators measure attitudinal positions with considerably less error than individual survey items, and produce measures which are highly stable over time (Ansolabehere, Rodden and Snyder, 2008). Therefore, each attitudinal measure used comprises a multi-item scale, constructed by averaging Likert response-scale items across the three issue areas. All individual attitudinal items included had five response categories representing: strong agreement, some agreement, neutrality, some disagreement and strong disagreement. Responses were coded so high values indicated 'liberal' positions: left-wing economic attitudes, environmental concern, and support for gender egalitarianism. Explanatory factor analysis ensured all items selected for each measure captured the same, single attitudinal dimension. All items contributing a rotated factor loading exceeding 0.2 on factors with eigenvalues greater than one were selected for use.

As slightly different batteries of questions on environmentalism were used in the BHPS and Understanding Society data, this process yielded four separate scales - two for environmentalism, and one each for economic and gender attitudes. These separate environmentalism scales were combined. Although this means inferences drawn about one of the three attitudinal outcomes relies on responses measured across subtly different scales, combining these was necessary to preserve sample size, and should not prove problematic given preliminary analysis showed these scales' distributions were near identical (see Appendix K). Survey items shown to load sufficiently on each attitudinal dimension in factor analysis were summed together and divided by the total number of scale items. This produced three attitudinal scales running from 1-5, with higher values

indicating greater liberalism. Tests indicated these scales were, in general, highly reliable[24]. The educational distribution of each attitudinal dependent variable is shown in Figure 5-1 and Appendix L details the items included in each scale.

**Figure 5-1 - Educational Distribution of Dependent Attitudinal Variables**




### 5.3.3 Key Independent Variable - Higher Education Status

This study aims to ascertain whether HE, specifically, rather than exposure to increased levels of education engenders attitude change. A simple binary measure of educational attainment, which indicates whether respondents have HE qualifications, or not, is therefore appropriate. In the UK, HE typically refers to educational courses undertaken after school leaving. This study uses a more stringent definition, which classifies only those who have achieved at least a Bachelor's degree, or equivalent, as HE graduates.

15,162 of the 75,104 sample respondents either reported obtaining a degree prior to joining the panel, or prior to being a respondent for three years. These respondents were excluded from analysis as, assuming a 3-year minimum study duration, it would have been impossible to observe their pre-HE attitudes - which must be controlled to draw accurate inferences about educations' impact on attitudes. 2,650 of the remaining 59,942 respondents were classified as graduates and

[24]The economic attitudes scale is an outlier with a Cronbach's Alpha (reliability test score) of 0.576, compared to >0.8 for the others. Guidelines suggest values of 0.6 are acceptable. It was therefore felt the economic attitudes scale was reliable enough for use.

57,292 as non-graduates. As respondents were allocated to the 'graduate' condition after obtaining their first university qualification, and the UK's educational system typically requires an undergraduate degree for progression to postgraduate study, it can be assumed that the HE effect captured pertains to gaining an undergraduate degree.

### 5.3.4 Control Variables

Table 5-1 shows all variables used in the analysis (Appendix M contains full details of coding and descriptive statistics). All socio-demographic and pre-adult variables are controls - included either to account for individual differences in attitudes and educational attainment, or as they are known to confound the HE-adult attitudes association. Accounting for these variables ensures spurious and causal education effects are separated in estimation. While all pre-adult variables serve the same purpose statistically, conceptually they can be sub-divided into three categories: respondents' early attitudes, pre-adult characteristics which vary within families and family-invariant pre-adult characteristics, which are effectively measured at the household-level.

All controls, except occupational class, are reported pre-adulthood and designed to capture spurious effects associated with self-selection. Occupational class is reported in adulthood and intended to capture spurious effects linked to stratification-based sorting mechanisms, by acting as a proxy for respondents' labour market situation - for example, income, economic security, and prospects of economic advancement. The fact that adult attitudes are reported up to 9 years post-HE graduation here makes it essential that adult status was controlled. Without such controls, it would have been impossible to ascertain whether it was HE study itself or post-HE stratification-based experiences driving any attitudinal change reported. Given that education opens the door for occupations, this study should be seen as providing a more robust estimate of HE's *direct causal effect* on attitude formation, rather than its *total causal effect*.

Cognitive ability is a composite measure, capturing both literacy and numeracy skills. Literacy is measured using verbal fluency testing which scores respondents on the number of items per category (e.g., 'animal') they can name in 1 minute. Numeracy is measured using 'number series' tests which score respondents' ability to identify missing numbers from sequences. Literacy and numeracy scores were standardised, averaged, summed and this measure then divided into three equally sized groups to demarcate high, medium and low ability. As cognitive ability was only measured in wave 3 of Understanding Society, this variable had a high proportion of missing responses. To prevent loss of sample size, this indicator includes a 'no information' category. While it would have been desirable to include separate literacy and numeracy measures, this was not possible due to collinearity - almost all individuals with no numeracy information also had none for literacy. Psychological security is measured using the statement 'I feel that what happens

in life is often determined by factors beyond my control'. Responses were coded into three categories, representing those who: agreed, disagreed, and did not provide information. The latter was used as this measure, like the previous, draws on responses from a single wave[25].

Studies have shown birth-order influences our pre-adult environment, with first-born children, for example, spending more quality time with their parents (Price, 2008). A dummy variable which reports whether sibling respondents were the first-born in their household, or otherwise, is therefore included to control for the fact that even siblings raised in the same household can experience different family environments[26]. Doing so ensures maximum symmetry in siblings' pre-adult environments and thus, improves this study's ability to identify causal HE effects.

Pre-adult and parental attitude scales were coded identically to the adult attitude scales. The only differences between these variables is that they are recorded at different occasions and by different persons - either by the respondent themselves, or by their parent(s) or guardian(s). Where respondents' mother and father both provided valid responses for an attitudinal scale, their scores were averaged to create a combined parental attitude measure for that dimension.

All family-invariant pre-adult characteristics are reported by respondents' parents. This prevents measurement error associated with proxy reporting leading to overestimation of education's effect on attitudes (Sieben and de Graaf, 2004). Parental income, education, occupation and PTA membership are categorical variables, coded to represent the highest value reported between the respondents' mother and father, or their mothers'/fathers' value, if only one parent is identified, and set to missing, if no parental information was available.

## 5.4 Analytical Strategy

This study's research question is answered by examining results obtained from a series of three, sequentially built ordinary least squares regression models - one for each dependent attitudinal variable. The model building sequence is outlined in Table 5-2.

[25]'Missing' categories were added to the psychological security and cognitive ability variables rather than excluding these from analysis, as doing so would engender omitted variable bias (see Appendix N) and raise theoretical questions, as these are important confounders. Imputation was not used as given the large volume of missing data it was feared even a small misspecification of the imputation model could cause large biases in the complete data. Imputation was therefore not believed to offer clear advantages over the 'missing category' approach.

[26]As the BHPS/Understanding Society data only contains birth year information for *respondents* in sampled households, birth-order can only be classified among siblings who responded during the survey's 28 waves, rather than *all* siblings. While this measure may not always capture 'true' birth-order, it provides the best possible approximation, and nevertheless accounts for important birth-order-based differences in siblings' experiences.

**Table 5-2 - Model Building**

| **Variables Included:** | **(1) Education only** | **(2) Sibling - education only** | **(3) Education and self-selection** | **(4) Education, self-selection and pre-adult attitudes** | **(5) Sibling - matched** |
|---|---|---|---|---|---|
| *Dependent variable* | Adult attitude | | | | |
| *Independent variable(s)* | HE status | | HE status, socio-demographics and all pre-adult characteristics, **except** early attitudes and birth order | HE status, socio-demographics and all pre-adult characteristics **except** birth order[27] | HE status, socio-demographics, family variant pre-adult characteristics, pre-adult attitudes and birth order **plus** sibling fixed-effects |

Block 1 reports the 'raw' HE-liberal values association for the full sample. This model provides a benchmark against which the reduction in the size of HE's effect on attitudes engendered by including various controls, in blocks 3, 4 and 5, can be measured. As there may be limited overlap between respondents in the full and sibling-only samples, it is possible that differences in HE effects estimated between model blocks 1, 3 and 4 and block 5 could be attributed to selection bias, rather than genuine changes engendered by sibling fixed-effects. Block 2 models, which report the 'raw' HE-liberal values association for the sibling-only sample were estimated to explore this possibility. Blocks 3 and 4 replicate 'conventional' analytical strategies employed in existing works - showing the effect of HE on attitudes, after isolating this from measured selection-into education and stratification effects. Block 5 models go beyond the scope of existing analyses by adopting within-sibship designs which simultaneously control for unmeasured and measured aspects of pre-adult experience and therefore, improve our ability to identify HE participation's *direct causal effect* on attitudes.

### 5.4.1 Sibling Matching

Following the approach of Campbell and Horowitz (2016), restrictions were imposed to ensure siblings had experienced similar early socialisation environments, and thus that within-sibship estimation would provide the fullest controls for spurious education effects. Therefore, sibling clusters were created by matching only sibling respondents (natural, half-, step-, adopted and foster siblings) who had reported living together, in the same household, at the first wave in which they were surveyed. Before accounting for missing data, this process of sibling matching

[27]Only pre-adult and parental attitudes corresponding with the attitudinal dependent variable are included.

yielded a sub-sample of 16,093 sibling clusters representing 38,802 individual respondents. While most of these sibling clusters were comprised of just 2 siblings (73% of clusters), around a quarter of all sibling clusters formed ranged from sizes 3 to 5 (inclusive), and just over 1% of sibling clusters included 6 or more siblings. This sibling sample was somewhat more educated, and more active in community, sporting and cultural activities pre-adulthood, than the full sample (see Appendix O).

These sibling clusters not only serve as the unit of analysis in sibling fixed-effects models (models 2 and 5, see Table 5-2), but also form the basis of the sibling cluster-robust standard errors which are calculated across all models, to ensure variance estimates are not biased on account of the fact siblings are likely more similar than unrelated individuals (Cameron and Miller, 2015).

## 5.5 Results

Preliminary analyses explored the average pre-adult and adult attitudinal positions of graduates and non-graduates in the full sample, to ascertain the extent, and direction, of any attitudinal change experienced. Figure 5-2 plots these statistics and shows that graduates' attitudes do, on average, change over this period, and often do so more dramatically than, or in the opposite direction to, non-graduates'. Two sample t-tests confirm all educational differences in attitudes observed in adulthood are statistically significant at the 1% level (see Appendix P). This evidence clearly indicates it is plausible that British graduates could develop their distinctively (il)liberal attitudes as a direct product of HE participation.

The remainder of this section presents regression results. Table 5-3 and Figure 5-3 illustrate how educational coefficients reported across the three attitudinal regression models estimated change with variable additions (blocks 3, 4 and 5), and show the raw education-attitude associations for the full and sibling-only samples (blocks 1 and 2). They present coefficients of the education variable only, as these are the primary statistics of interest in answering the research question (Appendix Q presents full regression results).

Block 1 results indicate that adult gender, economic and environmental attitudes are all associated with HE status, in the full sample (see Table 5-3). Apart from economic attitudes, where graduates take a statistically significantly more conservative position than non-graduates, graduates typically have attitudes which are significantly more 'liberal' than non-graduates - they are more environmentally friendly and gender egalitarian. The strongest 'raw' educational effect observed is for gender-role attitudes, where graduates report being 0.426 points more liberal than non-graduates. The smallest effect is for economic attitudes. Graduates are typically only 0.127 points less economically liberal than non-graduates.

**Figure 5-2 - Change in Graduates' and Non-graduates' Attitudes Over Time**

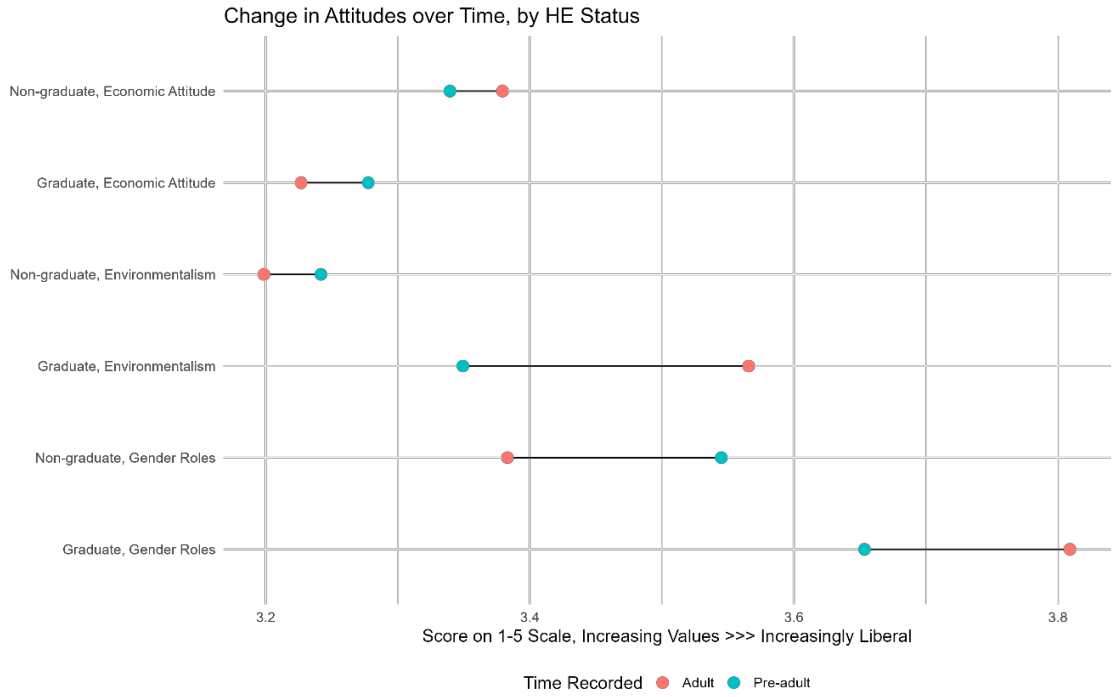
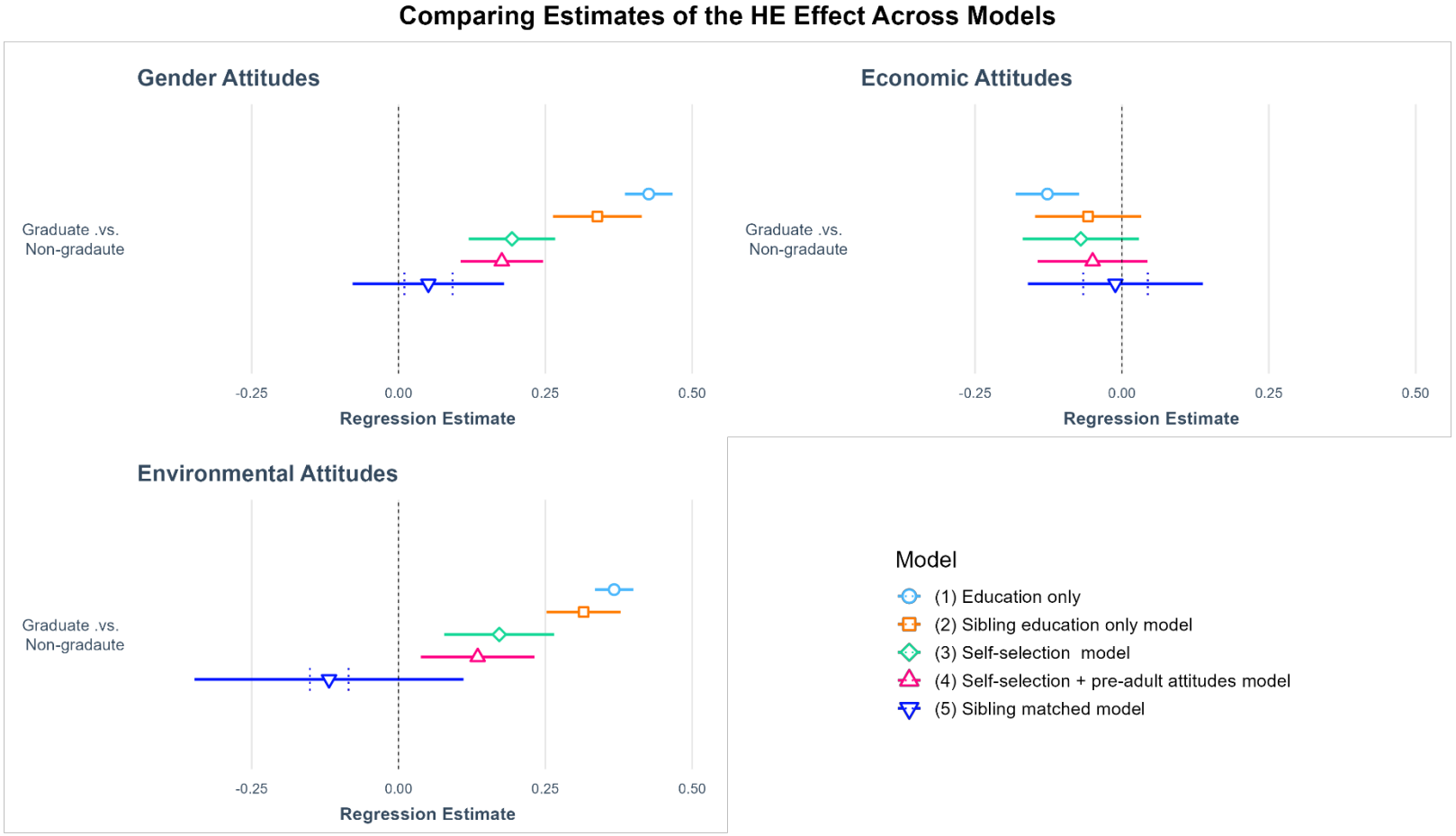



**Table 5-3 - Educational Coefficients Estimated in Regression Models**

| | (1) Education only | (2) Sibling - education only | (3) Self-selection | (4) Self-selection and pre-adult attitudes | (5) Sibling - matched |
|---|---|---|---|---|---|
| **Gender Attitudes** | | | | | |
| HE status: | 0.426*** | 0.338*** | 0.193*** | 0.176*** | 0.051 |
| Graduate | (0.021) | (0.039) | (0.038) | (0.036) | (0.065) |
| Observations | 11,048 | 2,240 | 2,296 | 2,171 | 1,278 |
| **Economic Attitudes** | | | | | |
| HE status: | -0.127*** | -0.058 | -0.070 | -0.050 | -0.011 |
| Graduate | (0.028) | (0.046) | (0.050) | (0.048) | (0.076) |
| Observations | 3,108 | 569 | 652 | 616 | 375 |
| **Environmental Attitudes** | | | | | |
| HE status: | 0.367*** | 0.315*** | 0.172*** | 0.135*** | -0.118 |
| Graduate | (0.017) | (0.032) | (0.048) | (0.049) | (0.116) |
| Observations | 7,353 | 1,769 | 869 | 746 | 268 |

*Note: Regression coefficients are presented with sibling-clustered standard errors in parentheses. Significance is denoted by *** p < 0.01; ** p < 0.05; * p < 0.1. Models 1 and 2 include HE status and adult attitudes. Model 3 includes HE status, adult attitudes, socio-demographics, and all pre-adult characteristics except pre-adult attitudes. Model 4 is as Model 3, except it also includes pre-adult attitudes. Model 5 includes HE status, adult attitudes, socio-demographics, family variant pre-adult characteristics, pre-adult attitudes, birth order, and sibling fixed-effects.*

**Figure 5-3 - Plot of Educational Coefficients Estimated in Regression Models**




Note: Models 1 and 2 include HE status and adult attitudes. Model 3 includes HE status, adult attitudes, socio-demographics, and all pre-adult characteristics except pre-adult attitudes. Model 4 is as Model 3, except it also includes pre-adult attitudes. Model 5 includes HE status, adult attitudes, socio-demographics, family variant pre-adult characteristics, pre-adult attitudes, birth order, and sibling fixed effects.

Comparing block 1 and 2 estimates of HE's effect on adult attitudes highlights that while the magnitude of the 'raw' education-attitudes associations reported are generally smaller in the sibling-only samples, they are broadly similar to those reported for the full samples. This is true of all attitudinal models except the economic attitudes regression, where not only is the HE effect reported in the sibling sample (model 2) less than half the size of that in the full sample (model 1), but this effect ceases to statistically significant in the sibling model. This disparity likely stems from differences in the socio-demographic composition, and pre-adult experiences, of the samples (see Appendix O), and suggests that the sibling-only sample used to estimate the economic attitudes model is somewhat un-representative of the wider sample. Some caution should therefore be expressed when interpreting the results of sibling-only economic attitudes regressions.

The economic attitudes regressions exhibit a different pattern to the cultural attitudes regressions. As soon as even the least stringent controls for spurious education effects are introduced in block 3, the effect of HE on adult economic attitudes is not only dramatically reduced in size (45% smaller than in block 1) but ceases to be statistically significant. Effect sizes reported for gaining a HE qualification, compared to not doing so, are tiny, net of controls - estimated to shift economic attitudes by considerably less than even one tenth of a scale point in the conservative direction, in the block with the largest educational coefficient (block 3). These results provide evidence to suggest studying at university is not the cause of British graduates' distinctively (il)liberal economic attitudes. Rather, self-selection and stratification-based sorting is at play. Differences in graduates' and non-graduates' economic attitudes in Britain are a product of these groups' typically divergent early life and adult status experiences.

In both cultural attitudes models the magnitude of the HE effects estimated in blocks 3, 4 and 5 are considerably smaller than the 'raw' education effects (block 1 and 2), and their size reduces in a linear pattern across blocks 3, 4 and 5 (see Table 5-3). Figure 5-3 makes this point clearly - showing that as each subsequent block introduces more stringent controls for spurious education effects, the education coefficients in cultural attitudes models shrink toward zero (and in one case even become negative). These patterns were expected and suggest controls for proxy effects work as intended. Only once the most stringent controls for self-selection and sorting - the sibling fixed-effects - were introduced to the gender and environmental attitude models did the reported HE effects attenuate sufficiently to become non-significant, at the 5% threshold. The reductions in the size of HE effects engendered by sibling fixed-effects were substantial. In block 5 models the positive, 'liberalising' effect of HE attendance is completely eradicated, and replaced by a small negative effect, for environmental attitudes, and is reduced in size by 71% (compared to the

conventional model with the fullest controls for spurious effects - block 4) in the gender attitudes model.

It should be noted that although the large reductions in effect magnitude observed between block 4 and block 5 estimates (see Figure 5-3) seem to indicate clearly that sibling fixed-effect models provide considerably less biased estimates of education's causal effect on adult cultural attitudes than conventional models, the overlap of these estimates' 95% confidence intervals means we cannot be completely certain this is the case.

Taken at face value, the null block 5 results presented in the gender attitudes and environmentalism models could be interpreted as evidence that HE study *does not cause* British graduates to develop distinctively liberal cultural attitudes. With it being argued that these results instead show that the association of HE participation with liberal cultural attitudes is spurious, driven largely by the fact that those experiencing pre-adult environments which encourage the formation of particular attitudinal profiles disproportionately go on to obtain HE qualifications. However, some further consideration is required.

Sibling fixed-effects models are power-hungry relative to conventional models - with estimates in sibling models being less precise than full sample estimates, due to the relatively smaller size of sibling samples. Judgments must therefore be made about whether null within-sibship findings indicate a genuine absence of causal effect, or simply that estimates are too imprecise to be conclusive (Madsen *et al.*, 2014). This involves considering the extent to which the loss of significance in the HE effects seen in the sibling fixed-effect (block 5) cultural attitudes models comes from attenuating effect sizes, as opposed to larger standard errors[28]. To aid in making this decision, 95% confidence intervals equal to the width of those estimated for the block 1 education effects, which have the largest sample size, were superimposed onto the block 5 effect - see the dashed lines in Figure 5-3.

None of the simulated confidence bounds overlap zero for the cultural attitude models - indicating that the within-sibship estimates of the HE effect *would have* been statistically significant if estimated in larger samples. The null HE effects in Table 5-3 and Figure 5-3, are at least in part, a product of the loss of power engendered by sibling fixed-effect estimation. This suggests a more tentative reading of this study's results is appropriate. Spurious self-selection and stratification-based sorting mechanisms are not the sole drivers of the association between HE study and cultural attitudes. Rather, in Britain, graduating from HE has a small liberalising effect

[28]Effect attenuation in within-sibship analysis could also be driven by measurement error not shared by siblings (Frisell *et al.*, 2012).

on gender-role attitudes, and a small inverse effect on environmentalism - with HE attendees becoming slightly less environmentally friendly, relative to non-attendees, during their studies. Ultimately, this analysis suggests firstly, that university study has a small *direct causal effect* on adult cultural attitudes in Britain, and secondly, that these effects are not always liberalising.

It is important to put the size of these HE effects in context. Consider that even the largest *liberalising* HE effect on adult attitudes reported in the within-sibship (block 5) models is 0.051, for the gender attitudes outcome. Put this way, this study finds that obtaining a HE qualification *causes* graduates to become just over one 20th of a scale point more culturally liberal than those who do not attend HE. Given all attitudinal scales run from 1-5, it seems fair to say that although HE does indeed have a small *direct causal liberalising effect* on gender attitudes, it is unlikely that such subtle liberalising effects will have any dramatic impact on aggregate British public opinion.

## 5.6 Conclusion

This paper goes beyond the scope of existing work by conducting a more robust test of the independent effect of HE participation on political values, through use of a within-sibship design which tightens the bounds of causal inference. In doing so, it advances our understanding of the mechanisms driving this association - revealing that university graduation itself only has a small *direct causal effect* on British individuals' adult attitudes. This finding holds irrespective of the duration between pre-adult and adult measurement used. The remainder of this section discusses the crucial implications of this study's findings both within, and beyond, academia.

Firstly, and perhaps most interestingly, this study provides evidence to suggest that studying at university only has a modest *direct causal effect* on British graduates' attitudes and, importantly, that this effect is only liberalising in the case of gender-role attitudes - HE attendees actually develop slightly more conservative economic and environmental adult attitudes, relative to non-attendees. In doing so, this study finds limited evidence that HE participation *causes* graduates to develop distinctively liberal political values. Rather, it highlights that self-selection and stratification-based sorting are the key drivers of the British education-liberal values linkage. Differences between graduates' and non-graduates' attitudes materialise predominantly because individuals with pre-adult experiences predisposing them to develop particular attitudes disproportionately go on to obtain degrees. The implication of this finding is important. Right-leaning commentators' claims that universities are hotbeds of left-liberal bias are greatly exaggerated - at least in this national context.

It is worth noting that, due to data deficiencies, this study could not account for respondents' social networks - which Persson (2015) argues are an essential mechanism through which 'sorting' effects operate - when estimating the association of HE with adult attitudes. It is therefore quite plausible that the only (modest) 'liberalising' effect of HE study on attitudes detected in this study (for gender egalitarianism) could be driven by interactions amongst peer networks on university campuses, rather than by a top-down process of 'indoctrination' engendered by professors or the official curriculum. This further supports this study's refutation of the 'indoctrination hypothesis' - suggesting that even the modest direct causal HE effect(s) on attitudes identified here cannot straightforwardly be attributed to formal processes of socialisation experienced at university.

Secondly, this study finds that using a within-sibship design, which controls for unmeasured family-invariant pre-adult experiences in addition to measurable pre-adult experiences and adult status indicators, likely provides considerably less biased estimates of HE's effect on adult cultural attitudes than 'conventional' methods. While this finding was expected, and mirrors previous conclusions drawn by Campbell and Horowitz (2016) and Sieben and de Graaf (2004) in US and Dutch contexts, the magnitude of bias reduction was striking. HE effects were at least 70% smaller in within-sibship cultural attitudinal models, than in conventional models. This paper provides persuasive evidence which contributes to a growing consensus that quasi-experimental designs must be employed if accurate estimates of education's effect on attitudes are to be produced. Future works must make wider use of household panel studies, which allow use of within-sibship designs, when seeking to identify causal effects.

This study finds HE graduation has considerably less substantial effect(s) on British individuals' adult attitudes than 'conventional' analyses - see Paterson (2009, 2014) and Surridge (2016). This disparity is unsurprising and highly likely a product of methodological differences - this study found a relatively smaller effect of HE on adult attitudes as it leveraged high-quality, household structured, longitudinal BHPS and Understanding Society data to perform a more robust test of the association of interest. Encouragingly, this study's findings are broadly comparable with those presented by Scott (2022) in a recent analysis which uses sophisticated quantitative techniques to isolate spurious and causal HE effects, in Britain. While both analyses show HE graduation causes more egalitarian (liberal) attitudes (although this study considers gender egalitarianism, rather than racial prejudice), it is worth noting that the causal HE effect reported by Scott is somewhat larger in magnitude than that presented here. There are several explanations for this. Firstly, different attitudinal measures are used across these studies, and secondly, Scott (2022: 8) reports the total causal effect, rather than the direct causal effect, of HE on attitude formation, and so includes within this estimate 'downstream effects such as differences in socio-economic position' which are omitted here.

It is also possible that differences in the conclusions drawn by this study, and the works of Paterson (2009, 2014), Scott (2022) and Surridge (2016) are, at least to some extent, a product of the varying temporal contexts in which these studies were conducted. These existing British analyses largely rely on the British Cohort studies, and thus, explore the HE effect amongst pre-2000 graduates[29]. This study's HE effect reflects that of a later period (graduating from 1994 to 2020). This variation in timing is important as government emphasis on social mobility drove a rapid period of HE expansion during the 1990s (Boliver, 2011). This fundamentally transformed the UK HE sector. New institutions and types of course were created, funding arrangements were altered, and campuses became more diverse spaces, as enrolment of 'non-traditional' HE entrants was encouraged (Bathmaker, 2003; Carpentier, 2018). As a result, studying at university today marks a qualitatively different experience to what it did just two decades ago. It therefore seems possible that the effect of HE participation on British graduates' adult attitudes would vary across cohorts enrolling during different stages of the sectors' development. Acknowledging this not only underlines the importance of not generalising this studies' findings beyond the cohort of graduates to which it applies, but highlights that we cannot simply assume differences in the conclusions drawn by this study, and earlier British studies, are linked purely to methodological differences. Future research should endeavour to disentangle the relative contribution of cohort and methods-based influences to these disparities, for example, by leveraging twin data from the British Cohort studies to re-examine Paterson's (2009, 2014), Scott's (2022) and Surridge's (2016) findings.

The novel findings presented in this paper have crucial implications for scholars of social science. Advancing our knowledge of the mechanisms driving the association of education with liberal values - by showing that British graduates' distinctive adult attitudes are only to a small extent a *direct consequence* of university study, and rather are largely determined by their distinctive pre-adult, and adult status, experiences - provides a better idea of what educational attainment, which is one of the most commonly used controls in social science research (Persson, 2015), is actually controlling for when added to analyses. In doing so, this study facilitates the making of better theoretically informed decisions in model-building across future projects. These findings also have potential to be impactful beyond academia. Firstly, they serve as a basis for rejecting claims that British HE institutions are hotbeds of left-wing bias. Taking steps to challenge such discourse is essential, as failure to do so will not only unduly tarnish the HE sector's reputation - in ways which could impact funding and legitimacy - but may also heighten education-based polarisation in ways which could threaten societal cohesion and the functioning of democracy.

[29]Paterson (2014) also uses the BHPS but does not report a full 'with-controls' HE effect.

Secondly, they indicate - contrary to assumptions made by those in politics and media - that generations of increasing HE enrolment rates, which mean the degree-educated proportion of the British population rises by just under 1% point every year (Sobolewska and Ford, 2020), are unlikely to have any particularly dramatic effects in shifting aggregate British attitudes in the long-term.

The limits of generalisability of this study's findings must be taken seriously. If the HE effect is 'different for people without a sibling,…sibling fixed-effects models may over- or underestimate population-level differences in…attitudes' engendered by university study (Campbell and Horowitz, 2016: 47). Given 45% of all UK families with dependent children have just one child (ONS, 2015), the potential for bias here is not trivial. It should also be considered that this study's results can only be generalised to families where some siblings attend HE and others do not as, by design, only siblings 'who are discordant on exposure, contribute with statistical information to the estimation of education effects in… [within-sibship] analysis' (Madsen *et al.*, 2014: 188). As Western European societies are highly socially-stratified environments in which educational attainment acts as an important status symbol (Bovens and Wille, 2017), it is possible that these types of families may be relatively rare, in Britain, or may differ from families where all siblings attend HE in important ways. Future research should therefore explore whether this study's conclusion can be replicated using alternative quasi-experimental study designs, which produce results generalisable to the entire graduate population.

To conclude, this study provides considerable evidence to suggest that within-sibship designs produce less biased estimates of education's causal effect on adult attitudes than conventional methods, which control only for measured confounders. The paper adds to a growing literature which demonstrates the value of quasi-experimental methods in teasing out causal effects from observational data. More substantively, this paper offers novel insights in showing that obtaining a HE qualification only has a small *direct causal effect* on British individuals' adult attitudes, and that this effect is not always liberalising. Universities are not institutions of left-liberal bias which encourage the development of distinctive political values. Rather, the well-established association of HE with economic and cultural attitudes is largely spurious - materialising mostly because those who experience pre-adult environments conducive to the formation of certain values disproportionately enrol in universities. Scholars should now expand the scope of this enquiry by using novel quasi-experimental methods to identify how, and to what extent, educational attainment is causally linked with a range of adult outcomes.

# Chapter 6 Paper 3. The Geography of Educational Effects: Understanding Where Individuals with Identical Qualifications Vote Differently Across Britain

*This study offers a novel account of spatial variation in the association of educational attainment with electoral behaviour. It applies a multilevel random-coefficient modelling strategy to British Election Study Internet Panel data and data on constituency characteristics to explore how the voting behaviours of individuals with similar qualifications varied across different types of Parliamentary constituency in United Kingdom general elections from 2015-2019. Results show there is considerable spatial variation in the individual-level education-vote choice association and that no single educational group is universally most sensitive to the constituency environment. Results also show constituency left behind-ness (broadly defined) and interaction dynamics are important factors in determining where individuals with similar qualifications have made different vote choices. Ultimately, findings reveal the impacts of the educational cleavage in electoral behaviour have not been felt evenly across Britain in recent years.*

## 6.1 Introduction

Education marks a growing electoral fault line in many advanced Western democracies (Bovens and Wille, 2017; Ford and Jennings, 2020). This has been particularly evident in Britain in recent years. Not only was education the strongest socio-demographic determinant of voting to Leave the EU in 2016, but the 2017 general election saw seismic shifts in education-based voting patterns which only strengthened in 2019. University graduates have for the first time become more likely than non-graduates to vote Labour, and non-graduates now disproportionately vote Conservative, despite these educational groups having historically voted for the party in relatively equal measure (Ford *et al.*, 2021). While existing research has advanced our understanding of the extent to which (e.g., Fieldhouse *et al.,* 2019a; Ford *et al.,* 2021), and reasons why (Simon, 2022a), British individuals with differing qualifications vote for different parties, few studies have explored spatial variation in this individual-level relationship. This is surprising given that a wealth of research shows socio-demographic characteristics, like educational attainment, take on different meanings in different geographical contexts (e.g., Agnew, 1996; Johnston *et al.,* 2004; Johnston and Pattie, 2006; Johnston, Pattie and Allsopp, 1988). Clearly then, there is reason to believe that individuals who possess the same qualifications, but reside in different parts of Britain, might cast their votes differently and, thus, that this 'education effect' may be spatially heterogenous, even after controlling for other socio-demographic (individual or aggregate-level) effects.

This paper addresses this gap in knowledge by investigating spatial variation in the association of educational attainment with voting behaviour. We apply a multilevel random-coefficient modelling strategy to individual-level data from the BESIP (Fieldhouse *et al.*, 2021) and aggregate-level data on constituency characteristics to explore the extent to which individuals with identical qualifications voted differently in different constituencies in the 2015, 2017 and 2019 general elections. Our study goes beyond the scope of existing research by considering the interplay of compositional and contextual effects - treating geography as intrinsic, rather than epiphenomenal, to our understanding of electoral behaviour (Agnew, 1996). Findings not only shed light on the spatial distribution of the education-vote choice association but reveal how constituency characteristics moderate this individual-level relationship.

## 6.2 The Geography of the British Educational Cleavage

An education-based cleavage is emerging in Britain. Studies show a stark, and growing, educational divide has come to characterise British electoral behaviour since 2015 (Fieldhouse *et al.,* 2019a; Ford *et al.*, 2021). While it is now well established that educational attainment influences individuals' political preferences, there has been limited exploration of spatial variation

in this individual-level association. As a result, we know little about whether the impacts of this emerging educational cleavage in electoral behaviour are felt (un)evenly across Britain, or which constituency characteristics might be associated with spatial heterogeneity in the education-vote choice association.

Typically, studies of education's effect on voting adopt *compositional* approaches, assuming that electors' choices are predominantly influenced by their position in society[30]. While compositional effects play an essential part in understanding voting, they do not tell the entire story (Agnew, 1996; Johnston, Pattie and Allsopp, 1988; Pattie and Johnston, 2000). To gain a more complete view, we must consider the interplay of compositional *and* contextual factors, since while:

> *'people occupying particular positions in society are more likely to choose one party over another…that tendency is stronger in some places than others because of the impact of [the] local milieux' (Johnston and Pattie, 2006: 40).*

Social categories, and the divisions demarcated on this basis, are not geographically uniform. Rather, their meaning varies across space, depending upon the socio-cultural, historical and economic particularities of the local context (Agnew, 1996). Given that the experience of being educated to a certain level differs across space (e.g., affording more opportunities in some contexts than others), it seems plausible that individuals with identical qualifications would vote in different ways in different parts of Britain. Incorporating geography into the study of electoral behaviour in this way, by synthesising contextual and compositional approaches, offers a more complete picture of how education shapes individuals' voting behaviour.

While there has been little research into the spatial distribution of the education-vote choice association in Britain, a substantial body of literature has explored this in relation to social class. Andersen and Heath (2002), Butler and Stokes (1969), Johnston *et al.* (2004), MacAllister *et al.* (2001) and Miller (1978) show the strength of the individual-level association between social class and vote choice varies from place to place, and that social class effects tend to be consensual, in that individuals come to vote like those they live alongside (i.e., working-class people vote more like middle-class people in middle-class areas and vice versa). We thus know that the impact of the class cleavage is not felt evenly across space. Given voting in Western democracies now tends to be more strongly linked with education than class (Bovens and Wille, 2017; Ford and Jennings, 2020), it is imperative that this focus on spatial heterogeneity is extended to the study of educational effects.

[30]Goodwin and Heath (2016a) do, however, consider how different educational groups' vote choices in the 2016 EU referendum varied across (Westminster) Parliamentary constituencies.

Goodwin and Heath's (2016a) influential analysis of 2016 EU referendum voting takes crucial first steps in tackling this agenda. Their study confirms the vote choices of educational groups do indeed vary spatially across Britain. It finds that those with General Certificate of Secondary Education (GCSE), A-level and degree qualifications who lived in Parliamentary constituencies where less than 10 per cent of the population had university degrees were, 16, 35 and 31-percentage points more likely, on average, to have voted Leave than otherwise identical individuals residing in areas where 60 per cent were degree-educated. Goodwin and Heath (2016a: n.p.) argue those with A-levels were most sensitive to the constituency environment because:

> *'depending on the local opportunities they face[d], [they] either f[e]ll into the 'left behind' group and bec[a]me more supportive of Brexit or [were] able to get ahead in life and thus, like the high-skilled, bec[a]me less likely to support Brexit.'*

Although Goodwin and Heath's (2016a) findings undoubtedly advance our understanding of the spatial distribution of education-based voting in Britain, much remains unknown. Their analysis, for example, focusses on a single, highly specific political contest - the EU referendum - in which traditional predictors of vote choice e.g., partisan identification and approval of government performance had far weaker effects than usual (Hobolt, 2016). It also considers only a limited number of constituency contextual factors when modelling spatial variation in Leave and Remain voting[31]. The scope of this study must be broadened if we are to gain a more complete understanding of how, and to what extent, the voting behaviours of individuals with similar qualifications vary across different types of places in Britain.

While researchers have not yet developed theoretical arguments to explain why education might have spatially heterogenous effects on voting, potential insights can be drawn from the electoral geography literature. For example, there may be an education-based contextual effect, analogous to the class effect identified in existing studies (e.g., Andersen and Heath, 2002; Butler and Stokes, 1969; Johnston *et al.*, 2004; MacAllister *et al.*, 2001; Miller 1978). Educational attainment is by definition a relative concept: the meaning ascribed to educational credentials stems only from the ways these distinguish us from those who are more/less qualified (Bourdieu, 1984; Collins, 1979). The experience invoked by being educated to any given level is therefore likely to be qualitatively different in areas characterised by different *educational environments*. The strength of the individual-level education-vote choice association may therefore vary depending on the educational context. It is intuitive, for instance, that non-graduates who live amongst many

[31]The only constituency-level characteristics included are: % of persons with degree-level qualifications, aged 65+ and UK-born.

graduates (i.e., in university towns) may vote more like their graduate neighbours, on average, than those who do not - as processes of homophily lead people living in close proximity to adopt shared identities and values (Enos, 2017)[32].

It is possible that simply living close to a university, or many graduates, is sufficient to influence educational groups' voting behaviours. However, it may also be that living in a particular educational context only gives rise to spatial variation in the individual-level education-vote choice association to the degree that different educational groups directly interact with one another. This argument draws on the well-established idea that people who talk together vote together (Miller, 1977). Much research shows that conversation leads to conversion; individuals may switch their vote in a particular direction if those with whom they discuss politics support that direction (Huckfeldt and Sprague, 1995; Pattie and Johnston, 1999, 2000) or if they live in close-knit communities characterised by distinctive local political subcultures (Agnew, 1996). Such *interaction dynamics* may moderate the education-vote choice association in Britain. Consider, for example, the connections between education, ideology and vote choice. While graduates are, on average, less likely to vote Conservative than people without degrees, owing to their more liberal cultural attitudes (Simon, 2022a), it is possible that graduates who live in tight-knit communities which have historically strong ties to the Conservative Party, or where many hold culturally conservative views, would through interaction with their neighbours become relatively more inclined to vote Conservative[33]. Only by isolating the moderating effects of constituency *educational environments* and *interaction dynamics* on the individual-level education-vote choice association can we begin to understand the mechanisms which may drive any spatial variation observed in the British educational cleavage.

The fact that educational qualifications help individuals 'get ahead' in life only to the extent they are presented with opportunities to use these to achieve well-paid and secure employment (Capsada-Munsech, 2017), may also drive spatial heterogeneity in education's effect on voting. Not all areas have prospered equally under globalisation and this has contributed to geographical polarisation in British politics - with places 'left behind' by these developments increasingly supporting the Conservatives and 'cosmopolitan' areas, which have flourished, moving towards Labour (Ford and Goodwin, 2014; Jennings and Stoker, 2016, 2017). Individuals with degrees and

[32]This is essentially the effect Goodwin and Heath (2016a) find for referendum voting, although they interpret 'graduate concentration' as a measure of constituencies' left behind-ness rather than their educational environment.

[33]It is also possible this effect is driven by selective in-migration i.e., graduates with more culturally conservative attitudes, who are more inclined to vote Conservative, may simply disproportionately choose to live in areas which reflect their beliefs. This study does not explore this possibility so findings must be interpreted as correlational rather than causal.

A-level qualifications living in these declining, left behind areas, which are dominated by low-skill, low-pay jobs have fewer opportunities to prosper than identically qualified individuals in cosmopolitan centres, where high-skill, high-pay jobs have been created by the global knowledge economy (Moretti, 2013). It therefore seems plausible that area *left behind-ness* would moderate the individual-level education-vote choice association[34].

Although left behind places have traditionally been defined as rural areas with older populations, low levels of ethnic diversity and many workers employed in manufacturing and routine occupations (Ford and Goodwin, 2014), recent studies have highlighted that this conceptualisation fails to capture important differences in place-based economic conditions - like economic deprivation and precarity - which determine vote choices (Furlong, 2019; Jennings and Stoker, 2017; Watson, 2018). They have also shown that when left behind-ness is defined economically - as areas characterised by high levels of insecure work, unemployment, social housing and economic deprivation - left behind areas no longer appear to have become less supportive of the Labour Party over time (Furlong, 2019). Investigations of how living in *left behind* places moderates the individual-level education-vote choice association must take these definitional differences into account.

Based on these theoretical insights, our study seeks to develop an empirical answer to the question of how the individual-level education-vote choice association is distributed spatially in Britain. Due to the exploratory nature of our analysis, this research question is addressed through a series of open-ended sub-questions rather than the formulation and testing of specific hypotheses. These questions are: does the voting behaviour of individuals with identical educational attainment vary across Parliamentary constituencies? (RQ1) Assuming that education-based spatial variation is observed at this initial stage, two supplementary questions will be considered. Which educational groups vote is most sensitive to contextual effects? (RQ2) And which constituency characteristics moderate the individual-level education-vote choice association? (RQ3).

## 6.3 Data and Methods

This study draws on several data sources. Individual-level survey data comes from the nationally representative BESIP (Fieldhouse *et al.*, 2021) which not only contains high-quality measures of education and vote choice but includes data on the socio-demographic and attitudinal confounders of this relationship unrivalled by other comparable surveys. The BESIP also includes

[34]Selective in-migration may also be at play.

information on respondents' place of residence at a more fine-grained level than region - which is essential for our analysis, as the large size and internal heterogeneity of regions makes these spatial units ill-suited to detecting contextual effects (Johnston *et al.*, 2018). Data on the 21,726, 21,240 and 21,072 *English and Welsh* respondents who reported voting at the 2015, 2017 and 2019 general elections is analysed.[35] Scots are excluded as the distinct Scottish political context makes it difficult to compare their voting behaviour with English and Welsh electors' (Cutts *et al*., 2020) and merits study in its own right.

Data on constituency characteristics are drawn from various sources, including the British Election Study Constituency Results File (Fieldhouse *et al.*, 2019b), the 2011 Census of England and Wales (ONS, 2021a), the ASHE (ONS, 2021b) and the UCAS database (UCAS, 2016, 2017, 2018).

Efforts were made to ensure all data was collected *prior* to each election of interest so that only characteristics genuinely capable of shaping voting were included. Generally, this meant using individual-level data from BESIP waves 5, 12 and 18 (fielded immediately prior to the 2015, 2017 and 2019 elections, respectively), or the closest earlier wave if items were not included at these waves, and using constituency data collected no earlier than the year of each contest. Although this was not possible in a handful of cases (see asterisks in Table 6-1 and Table 6-2, presented subsequently), this is unlikely to have any tangible effect on results as this study covers such a short time span (2015-2019) that we would not expect dramatic changes in respondent or constituency characteristics to occur in this time.

### 6.3.1 Selecting the Spatial Scale for Analysis

The BESIP records the local authority, Parliamentary constituency and MSOA within which respondents reside. There were 365, 573 and 7,201 of these in England and Wales in 2021, respectively. Although there is a consensus in electoral geography that the lowest spatial level (here MSOAs) is generally the most appropriate for studying contextual effects - as smaller areas are more 'commensurate in scale to the neighbourhoods within which many people socially interact' (Johnston *et al.*, 2018: 174) - this study uses constituencies as its unit of spatial analysis (see Appendix R for justification). There are two reasons for this. Firstly, given that MSOA data was not collected until BESIP wave 10 (November/December 2016), it would have been impossible to identify where respondents resided when they cast their 2015 general election vote (May 2015). Accurate inferences could therefore not be drawn about the spatial distribution of

[35]While the BESIP contains retrospectively reported information on 2010 and 2005 general election voting, these contests are not studied because it is impossible to ascertain which constituencies respondents resided in when they cast these votes as BESIP data collection did not begin until 2014.

the educational cleavage in 2015 using MSOA data. Secondly, using the MSOA-level would lead to a drastic reduction in sample sizes for analysis as this data was not recorded for approximately 60% of BESIP wave 12 and 18 respondents[36].

Given that *accurate* information on respondents' constituency of residence is required if robust conclusions are to be drawn, individuals for whom constituency identifiers were not reported in BESIP waves 5, 12 and 18 were excluded from analysis[37]. Data from seats held by the Speaker of the House were also omitted, as convention dictates that candidates representing the main parties do not stand in these constituencies. This study therefore provides an analysis of how, and to what extent, the 2015, 2017 and 2019 general election vote choices of individuals with identical qualifications differed across 572 English and Welsh Parliamentary constituencies with varying contextual characteristics, after controlling for other socio-demographic and compositional variables.

### 6.3.2 Dependent Variables

This study uses binary vote measures which record whether BESIP respondents who voted in the 2015, 2017 and 2019 general elections report voting Conservative, Labour or Liberal Democrat or otherwise. Three variables are therefore used for each election and nine models estimated in total. Specifying these measures so that the same respondents are included in all dependent variables for each contest is advantageous as it allows us to identify which parties' votes were subject to the most and least education-based spatial variation at each election.

### 6.3.3 Individual-level Independent Variables

This study's key independent variable is educational attainment. Operationalising this measure involved a trade-off between creating enough categories to provide a sufficiently detailed picture of the hierarchical structure of qualifications, but not so many that data risked becoming sparse in outcome/exposure combinations (Greenland, Ali Mansournia and Altman, 2016). This could not only cause model convergence issues, which would prevent estimation of spatial variation in the education-vote choice association but engender bias in any results produced. Therefore, a three-category education variable was ultimately selected (see Table 6-1 for details of coding and Appendix S for descriptive statistics - including details on missing observations - for all individual-level variables).

[36]Exploratory analysis also shows there was no statistically significant MSOA-level variation in 2017 and 2019 voting once constituency-level variation was considered (see Appendix R).
[37]No more than 0.02% of observations had missing constituency identifiers.

**Table 6-1 - Individual-level Independent Variables**

| **Variables** | | **Coding** | **Wave(s) Collected** |
|---|---|---|---|
| *Key independent variable* | Educational attainment | 1) GCSE (or equivalent) or less† 2) A-level or equivalent 3) at least a Bachelor's degree. *Included as 'A-level' and 'degree' dummies.* | 5, 12, 18 |
| *Socio-demographic controls* | Age (years) | Continuous | |
| | Occupational social class | 1) managerial and professional occupations† 2) intermediate occupations 3) manual and routine occupations 4) unclassified | 1-5, 6-9, 16-18 |
| *Political behaviours and attitudes* | Attention paid to politics | 0-10 scale from low-high attention | 4, 11, 17 |
| | Economic attitudes | 0-10 scale from left-right. Derived by adding and scaling five economic attitudinal items | 1-5, 10-12, 17 |
| | Cultural attitudes | 0-10 scale from libertarian-authoritarian. Derived by adding and scaling five cultural attitudinal items | |
| | News readership (on and offline) | 1) does not regularly read paper† 2) reads left-leaning paper 3) reads right-leaning paper 4) reads another paper | 5, 12, 18 |
| | Orientation to populism | Based on statement 'Politicians don't care what people like me think'. 1) agree† 2) disagree 3) neither | 4, 11, 17 |
| | Talks to neighbour or co-workers about politics | Talks to neighbour or co-workers about politics† *or otherwise* | 4, 12 |
| | Belonging to local community | Feels they belong to local community or otherwise† | 11* |
| | Educational identity | Feels education is important to sense of self or otherwise† | 14* |

*Note: Table only shows variables included in final analysis. We considered other individual-level variables e.g., ethnicity and income but these were ultimately excluded to ensure parsimony, as they were not statistically significant in models estimated. †=reference category.*

Educational attainment and vote choice are not only related to a host of respondent socio-demographics (e.g., age and class) and political behaviours (e.g., attention paid to politics and news readership), but a large part of the association between these variables is driven by the fact that people with different qualifications exhibit divergent economic and cultural attitudes (Simon, 2022a). All such cofounders must be accounted for if the 'true' education-vote choice association is to be estimated. Table 6-1 contains information on all individual-level controls used here.

### 6.3.4 Constituency-level Independent Variables

This study's constituency-level independent variables capture key characteristics of the contexts in which British electors reside: the constituency *educational environment*, *interaction dynamics* and *left behind-ness* (see Table 6-2). As research shows the aggregate-level association of left behind-ness and voting depends on how the former is conceptualised (Furlong, 2019), this study employs two alternative definitions of this concept. One is the *traditional* definition, as proposed by Ford and Goodwin (2014), and the other is an *economic* measure, which captures socio-economic disadvantage and precarity. To avoid confusion between these measures the former is henceforth termed *left behind-ness* and the latter *economic scarcity*.

Table 6-2 shows the aggregate-level variables which comprise each constituency context measure employed and details the source and collection dates for all constituency data (see Appendices S and T for additional details of variable construction and descriptive statistics). These variables were combined to form constituency context indices where possible both to ensure parsimony and that correlated characteristics could be used. This strategy was pursued for three of the four context measures but could not be used for interaction dynamics as the indicators comprising this measure all capture qualitatively different things. Seven constituency-level variables are therefore used here - three indices representing constituencies' *educational environments* and their levels of *left behind-ness* and *economic scarcity* and four separate variables representing their *interaction dynamics*.

Reliability and dimensionality testing ensured all characteristics in each constituency context index were closely related and loaded on a single dimension. Results confirmed this was the case (see Appendix U) and therefore that these indices were suitable for analysis. Indices were created by ranking constituencies on each characteristic - such that high values represented more *educational environments*, greater *left behind-ness* and *more economic scarcity* - summing all rankings per dimension and dividing by the number of contributing variables, to give an 'average ranking' for each constituency on each dimension. Data was then re-ranked based on averaged measures, and values of 1 through 572 assigned to each constituency, to provide an overall constituency ranking at the time of each election. Variants of these indices using averaged standardised scores and factor analysis were also created, but the ranked versions were ultimately used as analysis showed results were not sensitive to index specification and that models using ranked versions 'fit' better than those using other types (see Appendix V).

**Table 6-2 - Constituency-level Independent Variables**

| **Variables** | | **Source** | **Year(s) Collected** |
|---|---|---|---|
| *Educational Environment* | % level 4 (post-18) qualifications | BES constituency results file | 2011 |
| | University application rate | UCAS | 2016*, 2017, 2018 |
| | Distance to closest university (kilometres) | Database compiled using postcodes of institutions with degree-awarding powers[38] | 2015, 2017, 2019 |
| | % feel education important to identity | Aggregated into constituency average measure from individual-level BESIP data | 2018* |
| *Left behind-ness* | % working in manufacturing | BES constituency results file | 2011 |
| | % aged 65+ | | |
| | % UK born | | |
| | Urbanity (0-100 scale)[39] | | |
| *Economic scarcity* | % precariat (economically insecure workers) | Derived from 2011 Census[40] | |
| | % social housing | BES constituency results file | |
| | % unemployed (working age population) | | |
| | Median gross annual income (all workers) | ASHE | 2015, 2017, 2019 |
| *Interaction dynamics* | Average authoritarian-libertarian position | Aggregated into constituency average measure from individual-level BESIP data | |
| | Average left-right position | | |
| | % talk to neighbours and co-workers about politics | | 2015, 2017 |
| | % identifying with local community | | 2017* |

For consistency, constituency-level variables capturing interaction dynamics were also coded as ranked values. High values represent constituencies where more electors engage in political discussions with neighbours and co-workers, identify with their local community and have economically right-leaning and culturally authoritarian attitudinal profiles, respectively.

[38]See Appendix T for details.
[39]Calculated as 100-% of workers employed in agriculture. 100=most urban, 0=most rural.
[40]See Appendix T for details.

### 6.3.5 Missing Data

Missing values were imputed pre-analysis. Ignoring missing data, by analysing only complete cases, would have produced biased results - this would have been particularly problematic in the case of the higher-level data (van Buuren, 2018), as listwise deletion could have engendered selection effects by removing entire constituencies from analysis.

Missing data in individual-level variables was imputed using MICE with a fully conditional multi-level specification (van Buuren, 2018). Five imputed datasets were produced (Appendix W contains details of this procedure and diagnostics). At the constituency-level, only the income variable contained missing data. These missing income values were handled, prior to using MICE, using mean imputation - replacing all missing constituency income figures with the average median annual income reported across all constituencies with non-missing data, in the relevant year. This ad-hoc method was used as, given that constituency income figures are omitted from ASHE data where they are so imprecise as to be statistically unreliable (ONS, 2021b), replacing these missing values via MICE would clearly have violated the missing-at-random assumption which underpins this procedure (Grund, Lüdtke and Robitzsch, 2016).

Constituency-level variables aggregated from individual-level variables (see Table 6-2) were calculated post-imputation, as this process required complete data. These aggregates were constructed by computing constituency averages for each individual-level measure of interest and averaging these across the five imputed sets using Rubin's (1986) rules.

### 6.3.6 Analytical Approach

This study uses a multilevel random-coefficient modelling strategy to address its research questions. The first reason for this is methodological. A standard regression method would not account for the hierarchical data structure (electors nested in constituencies) and hence would underestimate coefficient standard errors and artificially inflate statistical significance (Snijders and Bosker, 2012). This modelling choice was also substantively motivated. Multilevel random-coefficient modelling offers a unique opportunity to explore how the relationships of outcomes (vote choice) with individual-level variables (education) vary across clusters (constituencies) (Sommet and Morselli, 2017).

RQs1-2 are addressed by estimating multilevel models which contain individual-level independent variables, constituency identifiers, random intercepts and random coefficients on the *A-level* and *degree* dummies. The statistical significance of random coefficients (indicated by multivariate Wald testing) will reveal whether electors with identical qualifications voted differently in

different constituencies and comparing the relative sizes of between-constituency variances estimated across educational groups will show which groups' voting behaviours are most influenced by constituency context. Constituency-level independent variables, and all cross-level interactions of educational attainment and constituency characteristics, are then added to the models to investigate RQ3. Interpreting these cross-level interactions will reveal how the individual-level education-vote choice association varies across constituencies with differing characteristics.

As Simpson's Paradox states relationships which do not exist at the population level can emerge within subgroups (Tu, Gunnell and Gilthorpe, 2008), it was felt necessary to test all possible education-constituency context cross-level interactions, regardless of whether their component constituency characteristics had significant effects in the models tested. All cross-level interactions were added simultaneously so the effects of each separate interaction could be disentangled, and robust conclusions could therefore be drawn about constituencies' effects in moderating the education-vote choice association (as per RQ3).

Nine multilevel logistic regressions - one each for Conservative, Labour and Liberal Democrat voting at the 2015, 2017 and 2019 general elections - were run in R using the R2MLwiN extension (Zhang *et al.*, 2016). Including weights at the individual-level ensured results were representative of the entire population of English and Welsh electors. While models were initially estimated using 1$^{st}$ order marginal quasi-likelihood (MQL1), these values were then used as starting values in a 2$^{nd}$ order penalised quasi-likelihood estimation procedure, as MQL1 is known to produce downwardly biased estimates (Rodríguez and Goldman, 2001). Final results were generated by using Rubin's (1986) rules to average estimates produced by models estimated on each of the five imputed datasets generated.

## 6.4 Results

The first stage of analysis estimated multilevel models, which included only individual-level variables, constituency identifiers, random intercepts and coefficients, to confirm whether individuals who possessed the same qualifications but resided in different constituencies indeed voted differently at recent general elections. Table 6-3 summarises the results obtained (see Appendix X for full results).

**Table 6-3 - Summary of Model Results: Random Effects Across Nine Multilevel Models of Vote Choice in England and Wales**

| | | Random Intercept | Random Coefficients | | Between-Constituency Variance in Voting | | | Correlation Between Random Coefficients |
|---|---|---|---|---|---|---|---|---|
| | | | *A-level vs other* | *Degree vs other* | *GCSE* | *A-level* | *Degree* | |
| 2015 | Conservative | 116.86*** (0.000) | 9.51*** (0.001) | 9.99*** (0.000) | 0.325 | **0.596** | 0.486 | 0.45*** (0.000) |
| | Labour | 185.13*** (0.000) | 13.19*** (0.000) | 9.66*** (0.000) | 0.433 | **0.678** | 0.555 | 0.46*** (0.000) |
| | Liberal Democrat | 161.81*** (0.000) | 11.73*** (0.000) | 9.25*** (0.000) | **2.497** | 2.242 | 1.181 | 0.61*** (0.000) |
| 2017 | Conservative | 82.79*** (0.001) | 8.38*** (0.001) | 4.63*** (0.006) | 0.212 | **0.437** | 0.319 | 0.35*** (0.000) |
| | Labour | 114.98*** (0.000) | 8.05*** (0.001) | 7.29*** (0.000) | 0.266 | 0.410 | **0.502** | 0.03 (0.540) |
| | Liberal Democrat | 87.17*** (0.000) | 1.83 (0.172) | 0.04 (0.959) | | | | |
| 2019 | Conservative | 109.49*** (0.000) | 8.38*** (0.002) | 7.03*** (0.000) | 0.470 | **0.533** | 0.265 | 0.43*** (0.000) |
| | Labour | 108.74*** (0.000) | 8.35*** (0.004) | 9.70*** (0.000) | 0.505 | 0.693 | **0.747** | 0.23*** (0.000) |
| | Liberal Democrat | 161.15*** (0.000) | 5.16** (0.013) | 4.65*** (0.004) | **1.218** | 1.085 | 0.454 | 0.76*** (0.000) |

*Note: The multivariate Wald procedure was used to test the significance of random effects (test statistics reported here with p-values in parenthesis). Correlation coefficients are reported (p-values in parentheses). Results calculated based on weighted analysis of imputed data. Figures in bold represent the largest between-constituency variance for each educational group per vote outcome and election year. ***= significant at 1% level, **=5% level and *=10% level.*

All random intercepts were statistically significant at the most stringent 1% level. This shows that, even after controlling for individual-level characteristics, the odds of voting Conservative, Labour and Liberal Democrat differed across constituencies in 2015, 2017 and 2019. The random coefficients fitted to the education dummies were highly statistically significant in all models, except for 2017 Liberal Democrat voting where this coefficient did not achieve significance even at the 10% threshold. These findings address RQ1 directly - evidencing that, in general, the 'education effect' on voting was spatially heterogenous at recent elections. Electors who possessed identical qualifications but resided in different areas of England and Wales clearly voted in different ways in 2015, 2017 and 2019. As no education-based spatial variation was observed in 2017 Liberal Democrat voting, no further modelling of this outcome was undertaken.

Another interpretation of the A-level and degree random coefficients is provided by considering these in relation to the omitted GCSE category. Through this lens, the statistical significance of these coefficients confirms that the level of divergence observed in the 2015, 2017 and 2019 vote choices of the A-level and GCSE, and degree and GCSE, groups, respectively, varied across constituencies. This provides clear evidence to suggest that the impacts of the British educational cleavage have not been felt evenly across space in recent years. The level of education-based vote polarisation has differed considerably across constituencies - with some experiencing considerably larger- or smaller-than-average levels of educational division in voting.

The magnitude of the constituency-level residuals produced in estimating these multilevel regressions reveal which constituencies had the most extreme A-level and degree random coefficients, for each vote outcome. Maps were created, with constituencies shaded according to residual size, to explore the spatial distribution of the educational divide in voting (see Appendix Y). These maps revealed no obvious geographical patterning in education-based vote polarisation - no areas of England and Wales were characterised by highly-concentrated clusters of larger, or smaller, than-average levels of education-based polarisation in 2015, 2017 and 2019 general election voting.

An interesting geographical pattern was, however, identified during residual analysis. For all but one vote choice model (2017 Labour voting), there was a moderate to strong positive correlation between random coefficients (see Table 6-3). Generally, constituencies which saw large (small) differences in the voting behaviours of individuals with A-level and GCSE qualifications, in recent elections, also tended to see greater (lesser) divergence in the vote of degree- and GCSE-educated electors. Although this correlation was seen for all vote choices studied (bar one), this pattern was considerably stronger in Liberal Democrat models (where correlation coefficients ranged from 0.61-0.76), than Conservative (0.35-0.45) and Labour (0.03-0.46) models.

Table 6-3 also provides details of how between-constituency variance in 2015, 2017 and 2019 voting depended on educational attainment. In half of the models, between-constituency variance was largest for those with A-level qualifications. While it would be easy to conclude, on this basis, that constituency effects have a stronger influence on the vote choices of individuals with A-levels, than all other educational groups, doing so would miss vital patterns in the data. Although the A-level group exhibited the greatest between-constituency variance in four of eight regressions, three of these were Conservative models. Table 6-3 shows the degree group had the highest between-constituency variance in two of three Labour models and that the GCSE group did so in both Liberal Democrat models. The most appropriate conclusion regarding RQ2 is therefore that no single educational groups' voting behaviours are universally strongly influenced by the constituency environment. Rather, the relative strength of constituency effects on GCSE, A-level and degree-educated individuals varies systematically according to vote type.

As the first stage of analysis has shown, clear spatial variation was observed in education-based voting in the 2015-2019 general elections. We thus turn to the second stage of analysis and consider how constituency characteristics are associated with this variation by adding constituency-level variables and all cross-level interactions of these with individual-level education dummies simultaneously to the models. A statistically significant cross-level interaction indicates that the individual-level education-vote choice association is moderated by a particular constituency characteristic. These cross-level interactions hold the key to answering RQ3 - revealing the types of constituencies in which electors with the same qualifications vote differently. The remaining discussion focusses on these findings.

Table 6-4 shows ten cross-level interactions proved statistically significant, at the 5% threshold, across all models. All constituency characteristics, except the educational environment, featured in at least one interaction. This means individuals with identical educational qualifications were voting in different ways in English and Welsh constituencies characterised by varying *interaction dynamics*, levels of *left behind-ness* and *economic scarcity* in the 2015, 2017 and 2019 elections. It should be noted that eight of these interactions were found in 2015 models and no significant interactions were detected in three models (2017 Conservative and 2019 Labour and Liberal Democrat voting).

**Table 6-4 - Summary of Cross-level Interactions Across Nine Multilevel Models of Vote Choice in England and Wales**

| | | Educational Environment | Left Behind-ness | Economic Scarcity | Interaction Dynamics |
|---|---|---|---|---|---|
| | | *A-level versus GCSE* | | | |
| 2015 | Conservative | | | | |
| | Labour | | x | | x |
| | Liberal Democrat | | | x | x |
| 2017 | Conservative | | | | |
| | Labour | | | | x |
| | Liberal Democrat | | | | |
| 2019 | Conservative | | | | |
| | Labour | | | | |
| | Liberal Democrat | | | | |
| | | *Degree versus GCSE* | | | |
| 2015 | Conservative | | x | | x |
| | Labour | | | | x |
| | Liberal Democrat | | | x | |
| 2017 | Conservative | | | | |
| | Labour | | | | |
| | Liberal Democrat | | | | |
| 2019 | Conservative | | | x | |
| | Labour | | | | |
| | Liberal Democrat | | | | |

*Note: Cells marked 'x' indicate a statistically significant (5% level) cross-level interaction while filled cells indicate no cross-level interactions were tested due to a lack of significant constituency-level variation in that education-vote choice association. Reference category=GCSE (or equivalent) or less.*

Constituency left behind-ness moderates the individual-level association of educational attainment with Labour and Conservative voting in 2015. Figure 6-1 shows that while constituency left behind-ness had a subtle positive effect on GCSE-educated individuals' probability of voting Conservative in 2015, it had a fairly strong negative effect for the other groups. Those with A-levels and degrees living in the most left behind constituencies were approximately 10% less likely to vote Conservative in 2015 than those in the least left behind (although this effect is slightly stronger for the degree group). This patterning means that although individuals with A-levels voted most like those with degrees in the least left-behind constituencies, they voted more like the GSCE group in left behind

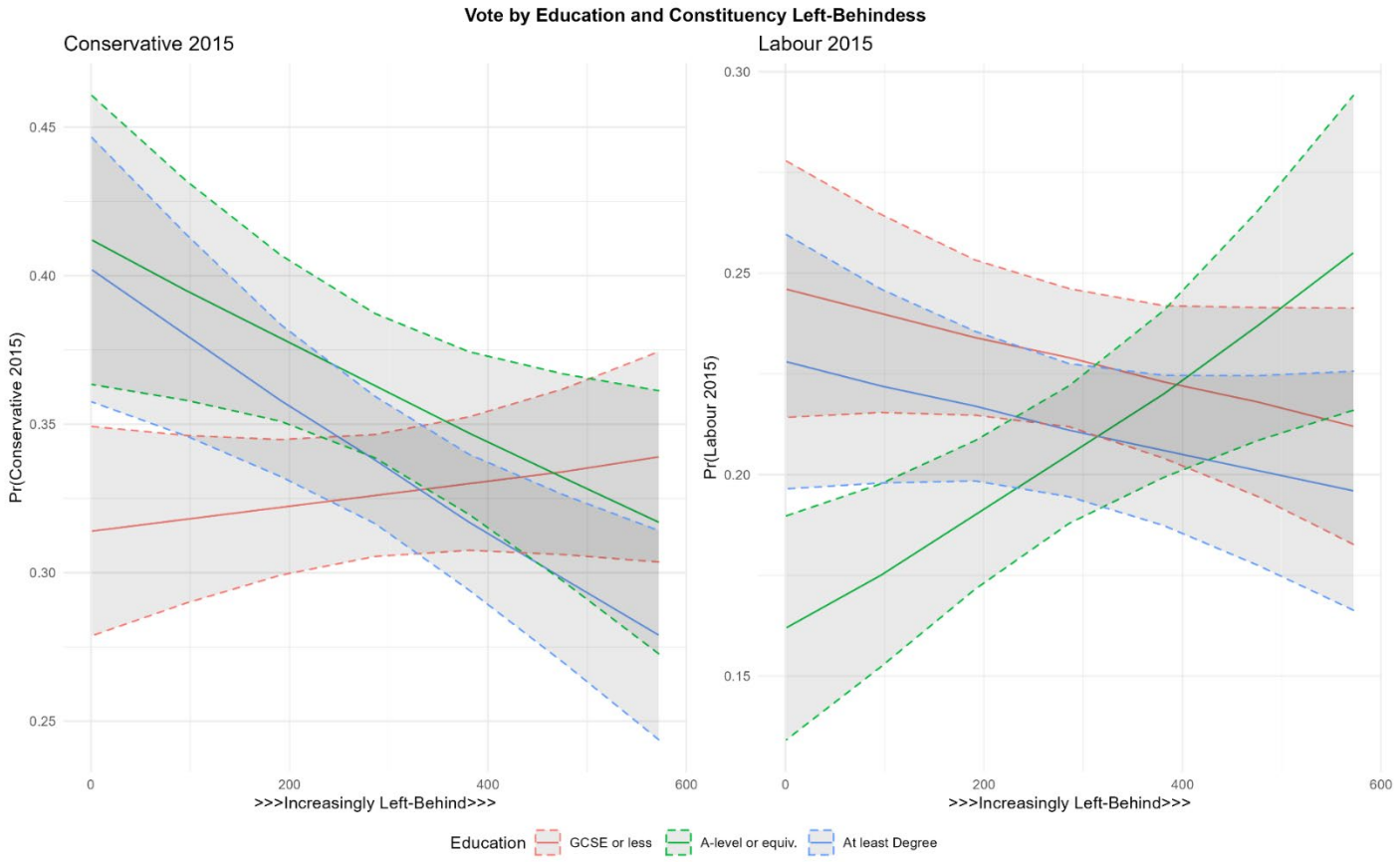
places. Clearly then, the educational cleavage was not felt to the same extent across space at the 2015 election.

Figure 6-1 shows clearly that the effect of left behind-ness on the A-level group's 2015 Labour voting propensity works is the opposite way to the 2015 Conservative model - those with A-levels were around 10-percentage points more likely to vote Labour in the most left behind constituencies than in the least. Otherwise identical electors who possessed at least degree-level and no more than GCSE-level qualifications, on the other hand, were slightly less likely to vote Labour in 2015 in left behind constituencies. As with 2015 Conservative voting, it is only in the 200 or so least left behind constituencies that statistically significant differences in the voting behaviours of those with A-levels and GCSEs are detected. For all other educational group and left behind-ness combinations, almost no significant differences in Labour or Conservative 2015 voting are detected (see the overlapping confidence intervals in Figure 6-1). The exceptions are in the degree-GCSE and degree-A-level contrasts in Conservative and Labour 2015 voting, respectively, in the 75 or so least left behind constituencies.

Accounting for constituencies' economic scarcity helps explain why electors who possessed identical qualifications, but lived in different constituencies, voted Conservative and Liberal Democrat to different extents in the 2019 and 2015 elections, respectively. Constituency economic scarcity had a negative effect on Conservative 2019 voting for all electors (see Figure 6-2), i.e., those with GCSEs, A-levels and degrees who lived in the most economically scarce constituencies were, on average, less likely to vote Conservative than identically educated individuals in more economically prosperous areas. While this effect is more subtle for the degree group, it is fairly, and roughly equally, strong for the A-level and GCSE-educated.

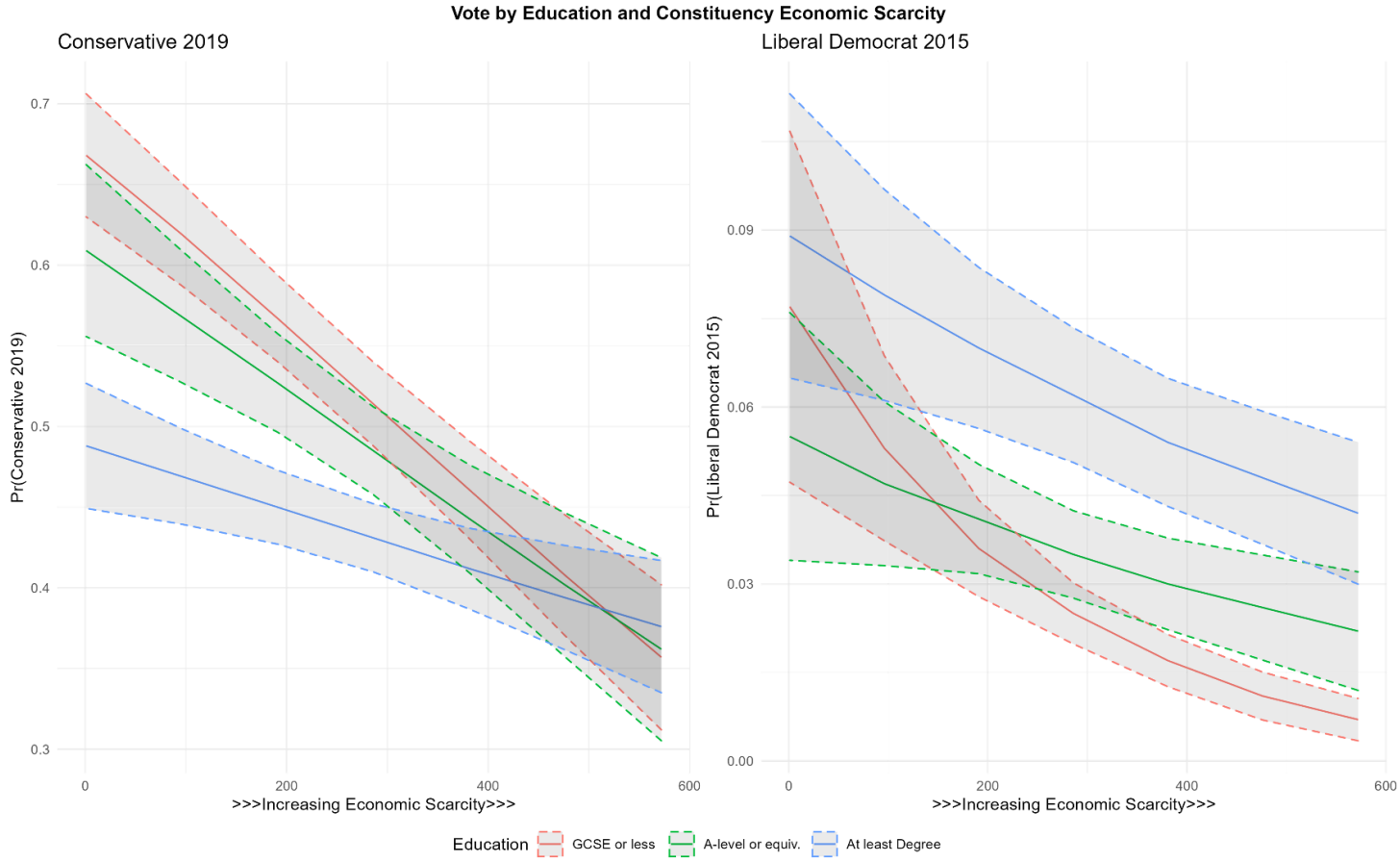
Statistically significant differences between the educational groups' propensity to vote Conservative in 2019 persist across much of the economic scarcity spectrum - demonstrating the profound link of this constituency characteristic with the spatially heterogeneous 'education effect' on voting. Those with GCSEs, and A-levels, were more likely to vote Conservative in 2019 than those with degrees only in the 400, and 300, or so least economically scarce constituencies, respectively. In the most economically scarce areas, no important differences were observed in education-based voting.

**Figure 6-1 - Average Predicted Vote Choice Probabilities for English and Welsh Electors, by Educational Group and Constituency Left Behind-ness**




*Note: Average predicted probabilities are shown with 83% confidence intervals in parentheses. 83% intervals are presented as they provide a more accurate indicator of whether non-overlapping quantities are significantly different at the 5% level, than 95% intervals* (Goldstein and Healy, 1995)*. Predicted probabilities hold all variables included in the regression models (except education and relevant constituency characteristics) constant at their mean (continuous variables) and modal (categorical variables) values.* ***Y axes are not constant.***

**Figure 6-2 - Average Predicted Vote Choice Probabilities for English and Welsh Electors, by Educational Group and Constituency Economic Scarcity**




*Note: Average predicted probabilities are shown with 83% confidence intervals in parentheses. 83% intervals are presented as they provide a more accurate indicator of whether non-overlapping quantities are significantly different at the 5% level, than 95% intervals* (Goldstein and Healy, 1995)*. Predicted probabilities hold all variables included in the regression models (except education and relevant constituency characteristics) constant at their mean (continuous variables) and modal (categorical variables) values.* ***Y axes are not constant.***

Although the economic scarcity of constituencies had a statistically significant moderating effect on the individual-level education-2015 Liberal Democrat vote association, this effect is relatively subtle. Those living in economically scarce constituencies were somewhat less likely to vote Liberal Democrat in 2015 than those in more prosperous areas - although the rate of decline was steeper for GCSE-educated individuals (see Figure 6-2). On average, those with GCSEs became approximately 5-percentage points less likely to vote Liberal Democrat in 2015, across the full spectrum of economic scarcity, compared to the figure of around 2-percentage points for A-level and degree-educated electors. What is particularly striking is the educational 'gap' which appears in 2015 Liberal Democrat voting in the 400 or so most economically scarce constituencies - only in these areas were electors with degrees significantly more likely to vote Liberal Democrat than their less educated counterparts. This provides clear evidence to suggest the impacts of the British educational cleavage have not been felt evenly across all constituencies in recent years.

Constituency interaction dynamics also contributed to spatial variation in the education-vote choice associations modelled (see Table 6-5). For example, average constituency left-right (economic) attitudinal position moderated the relationship of educational attainment with both 2015 Labour and Liberal Democrat voting. While the average constituency economic position had no effect on the 2015 Liberal Democrat vote propensities of individuals with GCSEs, this influenced all more educated electors. Table 6-5 shows that those with A-levels and degrees, residing in the most right-leaning constituencies were, on average, 2- and 5-percentage points, more likely to vote Liberal Democrat in 2015 than otherwise identical individuals in the most left-leaning. The converse was true for Labour 2015 voting. In this case, the least educated were most impacted by constituency economic position. While approximately 29% of GCSE-educated electors voted Labour in the most left-leaning constituencies in 2015, just 18% did so, on average, in the most right-leaning. This 11-percentage point Labour voting difference seen for the GCSE group across the spectrum of constituency economic position in 2015 stands in stark contrast to the 1 to 2-point differences observed among A-level and degree groups.

**Table 6-5 - Predicted Vote Choice Probabilities, by Educational Group and Constituency Interaction Dynamics**

| Constituency Rank | GCSE | A-level | Degree |
|---|---|---|---|
| *Liberal Democrat 2015: Left-right Position* | | | |
| 1 (left) | 0.023 (0.013-0.032) | 0.026 (0.016-0.036) | 0.044 (0.031-0.057) |
| 286 (average) | 0.025 (0.020-0.030) | 0.035 (0.028-0.042) | 0.062 (0.051-0.073) |
| 572 (right) | 0.026 (0.016-0.036) | 0.048 (0.031-0.065) | 0.085 (0.066-0.104) |
| *Labour 2015: Left-right Position* | | | |
| 1 (left) | 0.287(0.256-0.318) | 0.195 (0.165-0.225) | 0.100 (0.072-0.128) |
| 286 (average) | 0.229 (0.212-0.246) | 0.202 (0.188-0.222) | 0.091 (0.074-0.108) |
| 572 (right) | 0.179 (0.157-0.201) | 0.214 (0.183-0.245) | 0.083 (0.057-0.109) |
| *Labour 2015: % who Identify with Local Community* | | | |
| 1 (least) | 0.226 (0.199-0.252) | 0.228 (0.196-0.260) | 0.264 (0.233-0.295) |
| 286 (average) | 0.229 (0.212-0.246) | 0.205 (0.188-0.222) | 0.211 (0.194-0.228) |
| 572 (most) | 0.232 (0.205-0.259) | 0.183 (0.155-0.211) | 0.166 (0.145-0.187) |
| *Conservative 2015: % who Identify with Local Community* | | | |
| 1 (least) | 0.371 (0.337-0.405) | 0.351 (0.307-0.395) | 0.305 (0.270-0.340) |
| 286 (average) | 0.326 (0.305-0.347) | 0.363 (0.339-0.387) | 0.338 (0.317-0.359) |
| 572 (most) | 0.285 (0.254-0.316) | 0.376 (0.335-0.417) | 0.372 (0.335-0.409) |
| *Labour 2017: % who Talk to Co-workers and Neighbours about Politics* | | | |
| 1 (least) | 0.406 (0.370-0.442) | 0.358 (0.319-0.397) | 0.378 (0.342-0.414) |
| 286 (average) | 0.397 (0.373-0.421) | 0.413 (0.389-0.437) | 0.403 (0.384-0.422) |
| 572 (most) | 0.388 (0.354-0.422) | 0.470 (0.430-0.510) | 0.428 (0.393-0.463) |

*Note: Predicted probabilities hold all variables constant at their average values and are shown with 83% confidence intervals in parentheses.*

The extent to which constituencies are comprised of residents who feel attached to their local area also moderates the association of educational attainment with 2015 Conservative and Labour voting. For individuals with A-levels and degrees, constituency 'local-ness' had opposite effects on Labour and Conservative voting. While those who lived in constituencies where a high proportion of residents felt attached to the local area were, on average, 5- and 9-percentage points less likely to vote Labour, respectively, than those in the constituencies with the least local feeling, they were 3- and 6-points more likely to vote Conservative (see Table 6-5). Interestingly, while constituency local-ness had no effect on the 2015 Labour voting propensities of GCSE-educated individuals, this had a strong negative effect on Conservative voting in the same year - the least educated were, on average, 8-percentage points less likely to vote Conservative in the most local constituencies than in the least local. For all English and Welsh electors, except the GCSE group, the level of constituency local attachment had a negative effect on Labour, and a positive influence on Conservative, voting in 2015.

The proportion of residents in constituencies who discussed politics with their neighbours and co-workers also moderated the education-2017 Labour vote choice association. Table 6-5 reveals that while those with GCSE, A-level and degree qualifications who lived in constituencies characterised by greater levels of political discussion were all, on average, more likely to vote Labour in 2017, than those in areas where neighbours and co-workers less often conversed about politics - this moderating effect was by far strongest in the A-level group. Moving across the full spectrum of constituency political discussion led to an 11-percentage point uplift in Labour voting for the A-level group, compared to the relatively moderate 2- and 5-point shifts seen for those with GCSEs and degrees.

## 6.5 Discussion and Conclusion

This paper goes beyond the scope of existing work not only by building an encompassing theory of educational attainment's shaping effect on British electors' vote choices, but by testing this model empirically. Through treating geography as intrinsic, rather than epiphenomenal (Agnew, 1996), in its analysis, this study considerably advances our knowledge of the spatial distribution of the individual-level education-vote choice association. Results offer an exceptionally detailed account of how, and to what extent, English and Welsh individuals who possessed similar educational qualifications voted differently across different types of constituencies at the 2015, 2017 and 2019 general elections.

Firstly, this study reveals that the individual-level education-vote choice association has exhibited statistically significant constituency-level variation at the 2015, 2017 and 2019 general elections

(except 2017 Liberal Democrat voting). It confirms that electors with identical levels of educational attainment have voted differently in different constituencies in recent political contests and therefore that the impacts of the educational cleavage are not felt evenly across England and Wales - in that some constituencies have experienced considerably smaller- and larger-than-average levels of education-based vote polarisation. In doing so, this study provides empirical evidence to suggest that educational attainment, like social class (e.g., Andersen and Heath, 2002; Butler and Stokes, 1969; Johnston *et al.*, 2004; MacAllister *et al.,* 2001; Miller, 1978), has spatially heterogenous effects on British general election voting. Given that these studies of class effects are somewhat outdated, and that the educational divide is supplanting the class divide in many Western democracies (Bovens and Wille, 2017; Ford and Jennings, 2020), a productive agenda for future research would be to compare the relative magnitude of class- and education-based spatial variations observed in voting today.

This paper also shows that the same English and Welsh constituencies which exhibited the largest differences in voting between individuals with A-levels and GCSEs at recent general elections also generally tended to see the largest degree/GCSE divides, and vice versa. This positive correlation in education-based vote polarisation was particularly strong for Liberal Democrat voting. This finding was expected. We know that highly educated individuals comprise the Liberal Democrats 'core vote' (Curtis and McDonnell, 2019). We also know that the Liberal Democrats are a more local party than most - they have not only formed a highly geographically-concentrated 'yellow halo' of electoral strength around the home counties in recent years (Bale, Cheung and Wager, 2022), but have long been known as a party capable of tailoring their offering to suit the local context and exploit incumbent discontent (Cutts, Russell and Townsley, 2021). The patterns of correlation observed here simply reflect that the Liberal Democrats tend to do well in a highly specific set of constituencies, where local conditions facilitate (and draw most of their votes from the more educated electors residing there) and have less presence in others. This compares to the more national Labour and Conservative Parties, who draw relatively more steady support from all educational groups, across most constituencies.

Intriguingly, this analysis shows there is no single educational group whose vote choices are universally strongly influenced by the constituency environment. While the Conservative vote propensities of A-level educated individuals exhibited the greatest variation across constituencies in recent general elections, the degree and GCSE groups respectively, generally had the largest between-constituency variances in Labour and Liberal Democrat voting. This finding provides clear evidence to suggest the meaning of educational attainment is locally constructed (Agnew, 1996). People with identical qualifications vote differently across constituencies because the experience of 'being educated' is not uniform across space. Advancing our understanding of the

spatial distribution of education-based vote preferences, by synthesising contextual and compositional effects in this way, promises to improve our ability to predict electoral behaviour - it allows us to see, for example, that although party X generally does well amongst Y educational group, this may not hold in constituency A but be exacerbated in constituency B.

Perhaps most importantly, this study finds two key constituency characteristics contribute to explaining the education-based spatial variation observed in recent British general election voting. The first is constituency left behind-ness. Results show that although the average 2015 Labour and Conservative vote propensities of individuals with A-levels were closer to the degree-educated groups in the *least traditionally left-behind* constituencies, they were more like the GCSE-educated groups in the *most traditionally left-behind areas*. This intermediate educational group's 2015 general election vote choices were particularly sensitive to local opportunity structures - those living in 'left-behind' areas where they had few chances to use their qualifications to get ahead voted like those with less education and those living in areas which afforded better prospects voted like the highly educated. Although this corroborates the conclusions drawn by Goodwin and Heath (2016a), in their study of 2016 EU referendum voting, an entirely different view of the way *left behind-ness* moderates the education-vote choice association was provided by the economic conceptualisation of this variable (referred to as *economic scarcity* throughout). This finding adds weight to the growing body of scholarship which demonstrates that our understanding of British electoral geography is highly contingent on the ways we define 'left behind-ness'.

Constituency interaction dynamics also helped account for education-based spatial variations in recent general election voting. For example, the average economic position of constituency residents mattered in 2015. Not only were individuals with GCSEs who lived in the most left-leaning English and Welsh constituencies, on average, 11-percentage points more likely to vote Labour, than those in the most right-leaning areas, but Liberal Democrat voting also increased by 2- and 5-percentage points among those with A-levels and degrees as constituencies moved rightwards. While this pattern is interesting, in suggesting that consensual social interaction effects may explain the uneven spatial distribution of the education cleavage - with people surrounded by individuals who possess economic views congruent to those of a particular party becoming more likely to vote for that party themselves - they must not be over-interpreted. Clear evidence for consensual interaction effects is found only in two of this study's vote choice models and even then, is only observed for a sub-set of educational groups. Moreover, given that British individuals who move from one constituency to another tend to move to places with economic values which better match their own (Gallego *et al.*, 2016), it seems equally likely that these patterns are driven by selective in-migration. Future studies must analyse longitudinal data to

disentangle the extent to which self-selection and interaction-based mechanisms have driven British electors with similar educational qualifications to vote differently across constituencies at recent general elections.

Although this study was able to identify constituency characteristics which moderated the individual-level education-vote choice association in many cases, its explanatory power is not fully encompassing. The constituency characteristics considered were considerably more effective in explaining education-based spatial variations observed in voting at the 2015 election, than the more recent contests, and did not account for this patterning in 2017 Conservative, and 2019 Labour and Liberal Democrat, voting at all. Given that much of this study's data on constituency characteristics was collected during the 2011 Census, it is possible these variables were less able to explain between-constituency variation in 2017 and 2019, than 2015, because they had become outdated - providing too poor an idea of what these constituencies really looked like in the run-up to these later contests. While future work should replicate this analysis using constituency data derived via interpolation of 2011 and 2021 Census figures to test this possibility, it seems improbable that constituency characteristics would change sufficiently enough over such a short time span to be the sole driver of such considerable differences. Given that British politics have experienced considerable realignment in recent years (Ford *et al.*, 2021; Kanagasooriam and Simon, 2021), it seems more likely that the education-vote choice association would simply be moderated by different constituency characteristics in 2015, than in 2017 and 2019, and that some constituency-level variable which has become particularly important post-Brexit was omitted here.

This paper's novel findings have the potential to be impactful beyond the academic setting. Armed with the more comprehensive understanding of education's shaping effect on recent British general election vote choices, provided by treating geography as intrinsic, rather than epiphenomenal (Agnew, 1996), pollsters, psephologists and academics alike can begin to consider how the emerging educational divide in British politics is likely to alter the electoral map in future contests. Knowing the impacts of the educational cleavage in electoral behaviour are felt unevenly across England and Wales and being able to pinpoint how, and to what extent, this relationship varies depending on constituency characteristics, for example, allows us to begin forming rules about areas in which 'standard' educational effects do and don't apply. In furthering our knowledge of the spatial distribution of education-based vote-polarisation in the 2015, 2017 and 2019 elections - showing which constituencies experienced greater- and smaller- than average levels of this - this study also provides evidence as to where action designed to reconcile these stark educational divisions, which not only jeopardise social cohesion but present a real threat to the effective functioning of British democracy, would best be targeted.

To conclude, this study finds that individuals with similar educational qualifications voted differently in different Parliamentary constituencies in the 2015, 2017 and 2019 general elections, and that constituency left behind-ness (broadly defined) and interaction dynamics, can in many cases, help explain these education-based spatial variations in voting. In doing so, this study not only provides an exceptionally detailed account of education's shaping effect on English and Welsh electors' voting behaviours but presents empirical evidence to suggest the impacts of the educational cleavage are felt unevenly across space. Scholars should now seek to confirm whether the link between constituency left behind-ness and interaction dynamics and the effect of education on voting, identified in this analysis, is *causal*. Do these constituency contextual differences drive electors who possess identical levels of educational attainment to vote differently, or is this linkage driven instead by residential self-selection?

# Chapter 7 Conclusion

Over the course of the past decade or so, the established order of advanced Western democratic politics has been seriously disrupted (Abou-Chadi and Hix, 2021; Bornschier *et al.*, 2021; Evans, de Geus and Green, 2021; Ford and Jennings, 2020; Hooghe and Marks, 2018). One of the defining features of this period of political turbulence, which has been particularly visible since 2016, has been the emergence of a stark educational divide in public opinion and electoral behaviour (Curtice, 2016; Dalton, 2018). While it is clear that individuals with different levels of educational attainment think and vote in very different ways today, our understanding of this new educational divide remains limited. For example, we know relatively little about why this educational conflict has emerged, whether its effects are felt evenly across space and whether this is likely to become an enduring political fault line. This is because although there has been an explosion of interest in this new phenomenon, with scholars, politicians, commentators and psephologists alike all seeking to understand why it is that education divides us, few existing studies have really 'got to the roots' of this emerging educational divide.

Building a better understanding of the extent to which, and reasons why, politics divide along educational lines in advanced Western democracies today requires advancing our knowledge of the complex association of educational attainment with public opinion and electoral behaviour through empirical study. While a significant body of research has sought to ascertain how, and why, it is that individuals with differing levels of educational attainment have come to think and vote in different ways, many of these studies have relied on methods which are not well-suited to the task of identifying the mechanisms through which education's effect on these outcomes is transmitted[41], and thus, are likely to have produced findings that offer an incomplete picture of the *causes* of these educational divisions. Those which have used more sophisticated methodological strategies have been conducted in a limited range of country contexts and have not always tested the roles played by all theoretically important *mediators* of these associations. The question of why individuals with differing levels of educational attainment think and vote differently today therefore remains a relatively open one. Moreover, very little research[42] has moved beyond the individual-level of analysis to explore whether the association of educational attainment with electoral behaviour is distributed evenly across space. This is problematic

[41]See Attewell's (2022) recent study for a notable exception to this rule.
[42]Except for work conducted by Goodwin and Heath (2016a) and Zingher (2022).

because given that the meaning of social categories - like educational attainment - are locally constructed (Agnew, 1996), it seems reasonable to assume that identically educated individuals who live in different kinds of places would choose to vote in different ways. Only once we understand the interplay of these *compositional* and *contextual* forces can a fully comprehensive understanding of the educational divide in politics be developed.

The three distinct, but highly linked, empirical papers presented in this thesis have explicitly addressed the shortcomings of existing research and contributed to providing a deeper understanding of the complex association of educational attainment with public opinion and electoral behaviour in the modern British context. This concluding chapter proceeds, firstly, by summarising the research objectives of this thesis and outlining how these have been addressed by the papers presented in Chapters 4-6 of this thesis. Section 7.1 clearly explains how these papers have contributed to advancing our understanding of how, and why, educational attainment has come to shape the way individuals think and vote in Britain today. In Section 7.2, this chapter moves on to highlight the key conclusions that can be drawn from the body of work presented in this thesis and to discuss how these advance our understanding of the nature and causes of the educational divide which has emerged in Britain. Sections 7.3 and 7.4 then present some reflections on the implications of these novel findings - both for the academic community and beyond - and on the strengths and limitations of the empirical work presented in this thesis. Section 7.5 follows naturally from Section 7.4, in presenting a series of recommendations for future research that must be undertaken if we are to gain a fully comprehensive understanding of the stark educational divide which appears to be emerging in advanced Western democracies today. This discussion is informed by the limitations of the work presented here. Some final concluding remarks are then presented in Section 7.6.

## 7.1 Revisiting the Research Design

The overarching aim of this thesis was to provide a deeper understanding of the complex association of educational attainment with public opinion and electoral behaviour. Each of the three empirical papers presented in Chapters 4-6 contributed to achieving this goal, in that they explored research questions, and tested hypotheses, which facilitated the development of a deeper understanding of the factors that *mediate* and *moderate* the association of British individuals' educational attainment with their socio-political attitudes and vote choices. The novel research findings presented in this thesis have therefore offered a significant advance in our

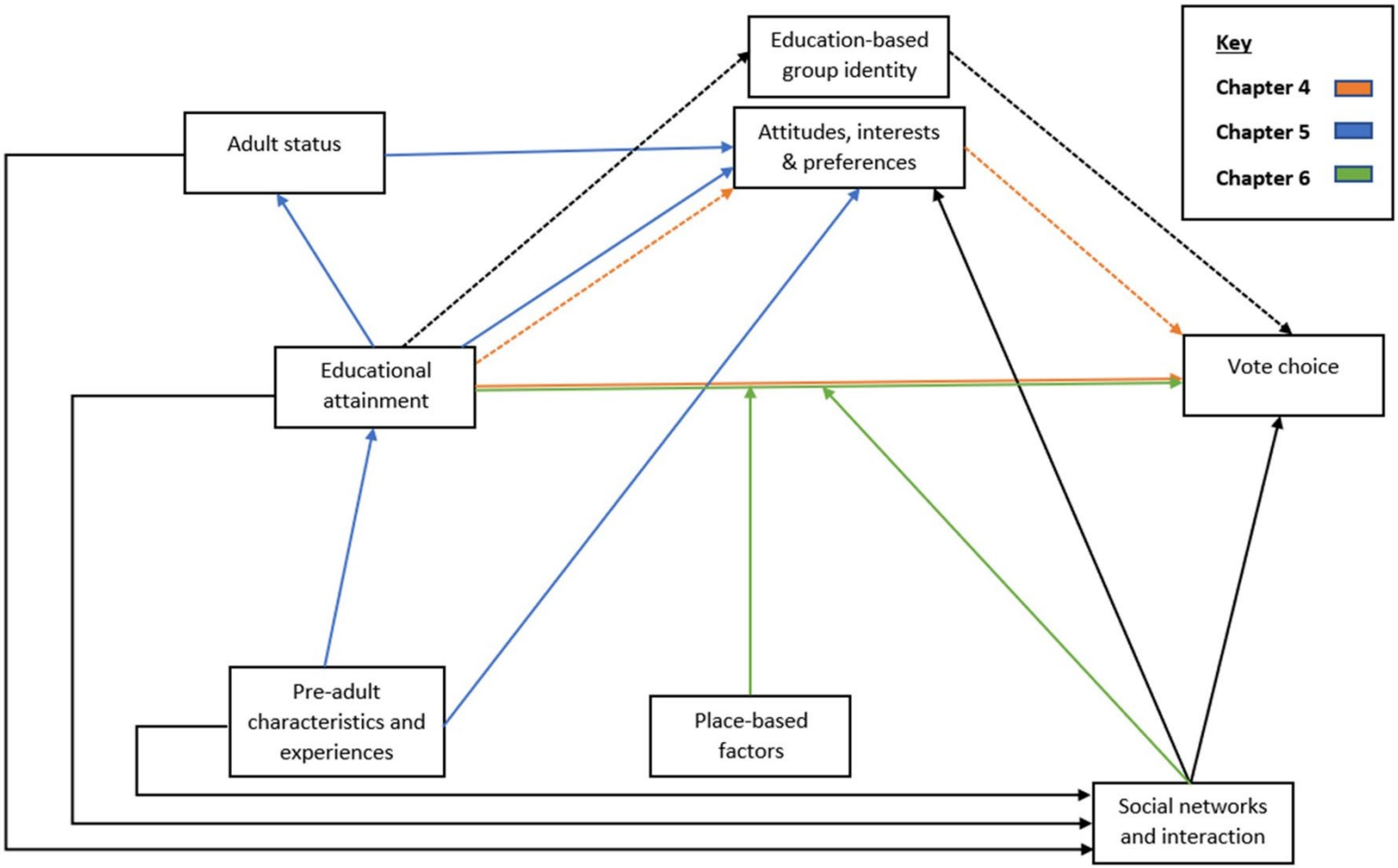
understanding of how, and why, educational attainment has come to shape the way individuals think and vote in Britain today.

The first two papers presented in this thesis (Chapter 4 and Chapter 5) 'got to the roots' of the stark educational divide that has emerged in British politics, by considering what *mediates* the complex association of educational attainment with public opinion and electoral behaviour. They furthered our knowledge of the reasons why individuals with different levels of educational attainment have tended to exhibit divergent socio-political attitudes and to cast their votes in different ways, in recent British political contests. Chapter 4 not only identified the proportion of education's *total effect* on electoral behaviours that was transmitted *indirectly*, via attitudinal, interests-based and behavioural mechanisms, at British general elections and referendums in the period 2016-2019, but also quantified the relative strength of each of these mediators of the education-vote choice association. In doing so, the analysis in Chapter 4 provided the first robust test of the association illustrated by the orange arrows in Figure 7-1, in the modern British context.

The analysis presented in Chapter 4 suggested that the stark educational divide observed in voting at recent British elections and referendums was largely a product of the fact that individuals with different levels of educational attainment tend to have asymmetric attitudes, which motivate them to vote in different ways. It demonstrated that if we were to identify what had *caused* this educational divide in voting to emerge in Britain, we needed to understand how gaining additional educational qualifications actually comes to shape our attitudes in the first place. Addressing this important question was the central objective of Chapter 5, which considered whether the experience of studying for a degree causes British graduates to develop distinctively (il)liberal economic and cultural attitudes. The analysis presented in this chapter leveraged the unique household structure of the BHPS and Understanding Society panel data to tease out the *direct causal effect* of HE on British individuals' attitudes. Doing so allowed Chapter 5 to provide a less biased estimate of the independent effect of university study on individuals' socio-political values (depicted in blue in Figure 7-1) than has typically been provided in existing British studies[43].

[43]A notable exception to this rule is the recent work of Scott (2022).

**Figure 7-1 - The Contribution Made by this Thesis in Understanding the Complex Association of Educational Attainment with Public Opinion and Electoral Behaviour**



The final paper of this thesis (Chapter 6) extended the scope of the first two, both theoretically and empirically, in that it moved beyond the individual level of analysis. It started from the premise that the individual-level association of educational attainment with vote choice was unlikely to be spatially homogenous, as the experience of being educated to a given level is likely to be qualitatively different in different local contexts, and, ultimately, sought to understand whether the impacts of the educational divide in electoral behaviour have been felt (un)evenly across Britain, in recent years. The analysis presented in Chapter 6 explored the *moderators* of the education-vote choice association. It not only identified the extent to which the voting behaviours of individuals with identical levels of educational attainment varied across Parliamentary constituencies at the 2015, 2017 and 2019 British general elections, but also explored which educational groups were most sensitive to constituency context effects and pinpointed the kinds of constituencies in which individuals with the same qualifications were most prone to voting differently at these contests. In doing so, Chapter 6 provided a novel account of the geography of educational voting at recent British general elections and an exceptionally detailed understanding of the association shown in green in Figure 7-1.

All three of the empirical papers presented in this thesis applied advanced quantitative methodologies to high-quality, nationally representative sources of British secondary data. The selection of data and methods used in each was guided by their suitability for answering the research questions, or testing the hypotheses, posed. Table 7-1 provides an overview of the research questions and hypotheses that guided the enquiry of each paper presented in this thesis and details the gaps in knowledge they sought to address, the data and methods used in each case and gives a concise summary of the key findings produced by each paper.

**Table 7-1 - Summarising the Key Findings of this Research, in Relation to the Questions Posed and Existing Gaps in Knowledge**

| Paper | Research Questions | Gaps in Knowledge | Data and Methods | Key Findings |
|---|---|---|---|---|
| Paper 1 (Chapter 4) | How can the educational divide in voting at recent British general elections and referendums (2016-2019) be explained?<br><br>Has a statistically and numerically significant portion of education's total effect on vote choice been | Most studies of what drives the education-vote choice association have used methods that are not well-suited to assessing mediation in non-linear regression models. This may have led them to produce incomplete understandings of this association. | BESIP data, primarily from waves 9 (June to July 2016), 13 (June 2017) and 19 (December 2019)<br><br>Mediation analysis, using the KHB method for identifying mediators in non-linear regression frameworks (Kohler, Karlson and Holm, | A large and statistically significant portion (67-91%) of education's total effect on electors' recent vote choices was transmitted indirectly.<br><br>Education also had small direct effects on voting in some |

| Paper | Research Questions | Gaps in Knowledge | Data and Methods | Key Findings |
|---|---|---|---|---|
| | transmitted indirectly?<br><br>How important are economic orientations, cultural attitudes and political cue-taking behaviours in mediating this divide? | Many studies have focussed exclusively on the role played by cultural attitudes in mediating this association.<br><br>This has been studied in a very limited range of advanced Western democratic contexts. | 2011). Each regression model uses vote choice as the dependent variable and contains identical independent variables so the relative strength of mediators can be compared over the contests studied. | recent British political contests.<br><br>Cultural attitudes explained the largest portion of the 'educational gap' in voting in all contests considered.<br><br>Cue-taking behaviours and economic orientations also had small but non-negligible mediating effects. |
| Paper 2 (Chapter 5) | Does studying for a degree cause British graduates to develop distinctively (il)liberal economic and cultural attitudes? | Many empirical studies have overestimated HE's effect on attitudes because they use data and methods which do not implement full controls for confounding variables in analysis.<br><br>Existing studies which focus on the British context typically use data from somewhat outdated samples, where most respondents graduated pre-1990, so it is unclear how university study shapes British individuals' attitudes today. | Harmonised BHPS and Understanding Society data, spanning from 1994 to 2020<br><br>Multiple linear regression estimating adult attitudes with sibling fixed-effects to control for un-measured family-invariant pre-adult experiences. Controls for measured pre-adult experiences, adult status and early attitudes also included. | Sibling fixed-effects models reduce the size of HE's effect on cultural attitudes by at least 70%, compared to conventional methods.<br><br>Studying at university only has a modest *causal effect* on British graduates' attitudes and this effect is not always liberalising. Rather, the association of educational attainment with (il)liberal attitudes is largely spurious.<br><br>Differences between graduates' and non-graduates' attitudes materialise predominantly because individuals with pre-adult and adult status experiences predisposing them to develop |

| Paper | Research Questions | Gaps in Knowledge | Data and Methods | Key Findings |
|---|---|---|---|---|
| | | | | particular attitudes disproportionately go on to obtain degrees, in Britain. |
| Paper 3 (Chapter 6) | Does the voting behaviour of individuals with identical levels of educational attainment vary across British Parliamentary constituencies?<br><br>Which educational groups' vote choices are most sensitive to constituency effects?<br><br>In which types of constituencies do identically qualified individuals vote differently in Britain? | There has been very little consideration of how the individual-level association of educational attainment and vote choice is distributed across space in Britain (which is surprising given a plethora of studies explore the geography of social class voting).<br><br>The few studies which have considered where identically educated electors vote differently tend not to include a full range of contextual moderators of this association in their analyses. | Individual-level data from the BESIP and aggregate-level data from an array of sources including the 2011 Census of England and Wales and the UCAS and ASHE databases<br><br>Multilevel models of individuals nested within constituencies, which explore when, where and to what extent individuals with identical educational qualifications voted differently at the 2015, 2017 and 2019 British general elections. Each regression model uses vote choice as the dependent variable and contains identical independent variables so the relative strength of moderators can be compared over the elections studied. | The impacts of the educational cleavage have not been felt evenly across England and Wales at recent general elections.<br><br>The individual-level education-vote choice association exhibited statistically significant constituency-level variation at the 2015, 2017 and 2019 general elections (except in 2017 Liberal Democrat voting).<br><br>No single educational group have vote choices that are universally strongly influenced by the constituency environment.<br><br>Two key constituency characteristics - left behind-ness (broadly defined) and interaction dynamics - contribute to explaining the education-based spatial variation observed in recent British general election voting. |

## 7.2 Discussion of the Key Findings of this Research

### 7.2.1 Chapter 4: Individuals with Different Levels of Educational Attainment Vote Differently Largely Because They Think Differently

**Key finding 1: precisely 67-91% of educational attainment's total effect on British electors' recent vote choices was transmitted indirectly**

Research conducted across various Western European contexts has shown that much of education's total effect on voting is transmitted indirectly via attitudinal mechanisms (Attewell, 2022; Evans, de Geus and Green, 2021; Fieldhouse *et al.*, 2019a; Goodwin and Heath, 2016a; Stubager, 2013). The analysis presented in Chapter 4 substantiates this general conclusion, confirming that the stark educational divide observed in electoral behaviour in advanced Western democracies today is largely a product of the fact that individuals with differing levels of educational attainment tend to think differently and vote accordingly. However, it also goes further - providing the first precise estimate of the proportion of educational attainment's *total* effect on voting that flows through *indirect* channels in the modern British context[44]. It found that a large, and highly statistically significant, portion of education's total effect on British electors vote choices (fully 67-91%) was indeed transmitted indirectly at general elections and referendums from 2016-2019.

The analysis presented in Chapter 4 therefore shows that, in Britain today, there exist large, socio-structurally determined educational groups who not only possess shared sets of attitudes and interests but have come to vote for the political parties that best represent these. This finding adds to the growing body of evidence which suggests that a new 'Rokkonian style' education-based cleavage may have emerged in Britain - and indeed in an array of other advanced Western democratic contexts - and may indicate that education is set to become an enduring political fault line (e.g., Bovens and Wille, 2017; Ford and Jennings, 2020).

**Key finding 2: educational attainment had a small but statistically significant direct effect on British electors' vote choices in *some* recent political contests**

Although much of educational attainment's *total* effect on vote choices was transmitted *indirectly* in recent British political contests, Chapter 4 showed that *direct* effects also played an important role in some cases - accounting for up to 33% of education's total effect on voting. It found that

[44]Attewell's (2022) analysis uses the same method as that in Chapter 4 to provide a similarly precise estimate of how education's total effect on voting is decomposed into direct and indirect portions, using pooled data from 15 Western European countries.

education had a statistically significant effect on the way individuals voted, even after controlling for an array of socio-demographic and mediating variables (indirect effects) at the EU referendum, the 2017 general election (although only for the low-high education contrast, in Conservative/Other voting) and the 2019 general election (except for the low-moderate education contrast, in Labour/Conservative voting). This pattern of direct effects broadly corresponds with that identified by Fieldhouse *et al.* (2019a) in their analysis of British electoral behaviour from 2015-2017.

In recent British elections and referendums, education-based voting patterns have followed a fairly linear trend - with members of each subsequently more qualified educational group being more likely, on average, to vote Labour or Liberal Democrat, or to Remain in the EU, than the last (see Figure 4-2). The 'educational gap' observed in voting is therefore larger for the high- and low-education groups, than for the moderate- and low-education groups. It is unsurprising then, that most of the statistically significant direct effects identified in Chapter 4 were in the high-low education constrasts; as it stands to reason that a broader range of indirect mechanisms would need to be accounted for to explain these larger educational divisions in voting.

This highlights that the statistically significant direct effects of educational attainment on British individuals' recent vote choices reported in Chapter 4 should not neccessarily be interpeted as evidence that there is something about the experience of gaining additional qualifications, *in itself*, that influences the way we vote. While this may be the case, it could also be that the size of education's direct effect on voting has been overestimated in the analysis presented in Chapter 4, as important indirect mechanisms through which education's effect on voting may have been transmitted could not be tested. It seems possible, for example, that social networks could constitute the 'missing link' in explaining why British individuals' with differing levels of educational attainment have voted differently at recent elections and referendums. It is well-estbalished that those we socialise with can influence the way we vote (Enos, 2017; Huckfeldt and Sprague, 1995; Newcomb, 1978; Pattie and Johnston, 2000; Sinclair, 2012), that contact with 'others' breeds acceptance (Allport, 1954) and that strong friendships are forged on university campuses (Brooks, 2002). It may well be that British individuals with degrees vote differently to less educated persons because meeting, interacting and forming friendships with students from all over the world while at university instils within them a particularly open and tolerant outlook, which leads them to vote for different parties than their less-educated counterparts (Meleady, Seger and Vermue, 2017).

**Key finding 3: cultural attitudes are consistently the strongest mediators of the education-vote choice association**

The analysis presented in Chapter 4 not only corroborates the findings of existing studies by evidencing that individuals with differing levels of education vote differently primarily because they hold diverging cultural attitudes (e.g., Evans, de Geus and Green, 2021; Fieldhouse *et al.,* 2019a; Goodwin and Heath, 2016a; Stubager, 2013) but goes beyond the scope of these works by quantifying the precise magnitude of this mediating effect. It showed that as much as 90%, and no less than 68%, of educational attainment's entire indirect effect on voting at recent British political contests was transmitted via cultural attitudes; in comparison to largest effect sizes of 30% and 13% observed for the other hypothesised indirect mechanisms.

This finding - that cultural attitudes were consistently the strongest mediators of the education-vote choice association observed in Britain in the period 2016-2019 - was expected. The 2016 EU referendum triggered a profound shock to the structure of electoral competition in Britain (Fieldhouse *et al.*, 2019a). European integration became the central issue in British politics soon after campaigning for this referendum began, in 2015, and both general elections held since the 2016 vote have effectively been 'Brexit elections' - with most major political parties standing on platforms relating to their vision of the UK's future relationship with the EU (Cutts *et al.*, 2020; Prosser, 2021). Not only have issues along the cultural ideological dimension become highly salient in British politics in recent years, but political parties have also come to develop highly polarised cultural issue positions. It is unsurprising then, given that Green and Hobolt (2008: 473) have shown 'questions of ideological positioning…be[come] more important in determining electors' vote choices…when there is a large degree of party polarisation on an issue dimension', and the fact that there exists a large 'educational gap' in the average cultural attitudinal positions of British individuals, that the educational divide which has emerged in British politics in recent years is largely a product of education-based differences in electors' cultural orientations. It follows from Green and Hobolt's (2008) work that the shape of this educational divide over voting may then change considerably if economic issues were to become a more salient feature of political contestation, as they appear to be in Britain today - owing to the emerging cost of living crisis (YouGov, 2022).

While the results presented in Chapter 4 showed that cultural attitudes were always the strongest mediators of the education-vote choice association which has been observed in Britain in recent years, they also showed important variation in this patterning. Its findings demonstrated that cultural attitudes always had relatively more explanatory power in explaining the 'educational gap' observed in high- and low- educational groups' voting at recent British general elections, than that seen for the moderate- and low- educational groups. This finding was not surprising, as the average cultural attitudinal positions of the former pair of educational groups were considerably further apart than those of the latter pair (see Appendix H). It makes sense that

cultural attitudes would have larger mediating effects in cases where there was more initial variation in cultural attitudes to account for.

**Key finding 4: political cue-taking behaviours and economic orientations have non-negligible mediating effects on the education-vote choice association**

Existing empirical studies have tended to focus on testing the role played by cultural attitudes in mediating the association of educational attainment and vote choice. The analysis presented in Chapter 4 showed that while cultural attitudes explained the largest portion of the 'educational gap' in voting in all recent British elections and referendums considered, economic orientations and political cue-taking behaviours also had non-negligible mediating effects - these factors accounted for as much as 30% and 13% of education's (absolute) total indirect effect on voting, respectively.

Interestingly, while Chapter 4 showed that accounting for differences in differently educated individuals' political cue taking behaviours (e.g., their news readership and orientation to populism) helped explain away the educational divide in voting at recent British elections, accounting for economic orientations actually tended to have the opposite effect. Unlike for EU referendum voting, where economic orientations had a positive mediating effect, the analysis presented in Chapter 4 showed that the educational divide in 2017 and 2019 general election voting actually became larger after controlling for economic orientations. This is an important finding, as it demonstrates that specifying a fully encompassing theoretical model of education's shaping effect on voting - which includes roles for indirect mechanisms other than cultural attitudes - is essential if we are to build a fully comprehensive understanding of why it is that such a stark educational divide has emerged in voting across advanced Western democracies in recent years.

### 7.2.2 Chapter 5: Educational Attainment's Liberalising Effect is Likely to Have Been Overstated

**Key finding 5: sibling fixed-effects models reduce the size of HE's effect on British graduates' cultural attitudes by at least 70%, compared to conventional methods**

Most empirical research that has sought to estimate HE's effect on British individuals' socio-political attitudes relies on standard regression-based designs, which are not well-suited to teasing out causal effects, due to the problem of omitted variable bias (e.g., Paterson, 2009, 2014;

Surridge, 2016)[45]. The analysis presented in Chapter 5 demonstrated that the estimated effects of university study on British graduates' economic and cultural attitudes were much reduced when sibling fixed-effects were used to control for all unmeasured family-invariant pre-adult experiences (e.g., parental socialisation) shared by siblings who grew up in the same household, in addition to standard controls for measured confounders. In fact, Chapter 5 showed that the within-sibship model produced estimates of HE's effect on British graduates' attitudes that were at least 70% smaller in the cultural attitudinal models (gender egalitarianism and environmentalism) and approximately 80% smaller in the economic attitudes model than would have been estimated using conventional models.

While this finding was expected, and mirrors the conclusions drawn by Campbell and Horowitz (2016) and Sieben and de Graaf (2004) regarding the effectiveness of the within-sibship design as a tool for reducing bias when estimating the extent to which education shapes individuals' attitudes, the sheer size of this bias reduction was striking. Chapter 5 not only provides evidence to suggest that the effect of HE on British graduates' attitudes is likely to have been overestimated in existing work but clearly demonstrates that sibling matching offers a productive and highly intuitive method for teasing out causal effects when working with observational data. Where the structure of data allows, within-sibship analyses should be used more widely in studies seeking to identify causality.

**Key finding 6: HE has only a small direct causal effect on British graduates' cultural attitudes and this effect is not always liberalising**

Ultimately, Chapter 5 showed that HE had no statistically significant *causal* effect on British individuals' economic attitudes, after controlling for a range of education-as-a-proxy explanations. It also found that graduating from university in the period 1994-2020, on average, had only a very small direct *causal* effect on British graduates' cultural attitudes, and that, even then, this effect was not always liberalising. Point estimates from cultural attitudinal within-sibship models indicated that studying at university made British graduates just 0.051 points more liberal than non-graduates on the gender egalitarianism measure and 0.118 points less liberal in terms of environmentalism. Given that the attitudinal scales used were measured from 1-5, this means that even the largest liberalising effect of HE identified in Chapter 5 corresponds to just 1/20$^{th}$ of a scale-point increase in gender egalitarianism. This research provides clear evidence to suggest that the experience of studying at university in recent decades, *in itself*, has had almost no *causal* effect on British individuals' attitudes.

[45]See Scott's (2022) recent research for a notable exception.

This finding represents a considerable departure from the conclusions of earlier British studies of this association, which relied on standard regression methods (e.g., Paterson, 2009, 2014; Surridge, 2016). It also contrasts, to some extent, with the conclusions drawn in Scott's (2022) more recent and methodologically robust study of this relationship; although there are also notable similarities between these studies (e.g., both find using a quasi-experimental design greatly reduces the magnitude of HE's effect on attitudes and that university study does indeed seem to have a *causal* liberalising effect on cultural attitudes). The main point of difference between the research presented in Chapter 5, and these existing studies, is that this while analysis found studying at university to have only a modest, and not universally liberalising, effect on British individuals' cultural attitudes, other studies have tended to identify relatively larger, liberalising effects of HE on cultural values. Although the differences in the substantive conclusions drawn between this study and the earlier British studies, which did not use quasi-experimental designs, may purely be a product of methodological differences, this cannot explain why the findings presented in Chapter 5 differ somewhat from those presented by Scott (2022).

There are several possible explanations for these differences. One is that these studies used very different measures of cultural attitudes. While this research used gender egalitarianism and environmentalism, Scott (2022) used authoritarianism and racial prejudice. It is therefore possible that these differences simply represent that these studies do not measure the same constructs. Another possibility is that this divergence in findings is driven by differences in the kinds of HE effect estimated. While the analysis presented in Chapter 5 aimed to quantify the *direct causal effect* of HE on British individuals' attitudes (i.e., only the effects of experiences that take place on university campuses), this other recent study estimated the *total causal effect* of HE. Given that Scott's (2022: 8) estimate therefore included 'downstream effects such as differences in socio-economic position, peer socialisation, geographic mobility and family formation', which arise as a result of university study, it is unsurprising that this study found a larger HE effect than that identified here. Finally, the differences in the timing of the university effect measured in these studies should be considered, particularly in light of the dramatic transformation undergone by the British HE sector since the most recent phase of its expansion in the early 1990s (Boliver, 2011; Surridge, 2016). Going to university in Britain today is a qualitatively different experience to what it would have been just a few decades ago - with new courses, new funding arrangements and more diverse student bodies, for example (Bathmaker, 2003; Brennan *et al.*, 2015; Carpentier, 2018; Trow, 2007). It should be expected then that the impact of HE on graduates' attitudes identified by Scott (2022) in an analysis of the 1970 British Cohort Study data, where many will have gone to university in the late 1980s and early 1990s, would differ to that identified in Chapter 5, which quantified the effect of HE from the mid-1990s onward.

**Key finding 7: the association of HE with British individuals' attitudes is largely spurious; differences in graduates' and non-graduates' attitudes materialise predominantly due to selection-into-education effects**

The analysis presented in Chapter 5 demonstrated that the association of HE with British individuals' economic attitudes may well be entirely spurious and that its association with their cultural attitudes is largely spurious. It found that the differences observed in British graduates' and non-graduates' socio-political attitudes materialise predominantly because individuals who possess a distinctive set of liberal cultural values and illiberal economic values disproportionately self-select into university enrolment, and to a lesser extent because university determines our adult-status positions, which also influence our attitudes. Put simply, Chapter 5 provided clear evidence to suggest that universities themselves do little in the way of making graduates' attitudes more (il)liberal but rather, that (il)liberal people more often choose to attend HE. In doing so, Chapter 5 provided clear evidence to suggest that universities are not the centres of 'left-liberal indoctrination' that right-leaning commentators have increasingly claimed them to be (Sachs, 2020; van de Werfhorst, 2020).

### 7.2.3 Chapter 6: Individuals with Identical Educational Qualifications Vote Differently Across Space

**Key finding 8: the impacts of the educational cleavage have not been felt evenly across England and Wales at recent general elections**

While just two existing empirical studies[46] - Goodwin and Heath's (2016a) analysis of 2016 EU referendum voting, in Britain, and Zingher's (2022) analysis of partisan identity, in the US - have explored the geography of educational voting, both have found strong evidence to suggest that individuals with identical educational qualifications vote differently across space. The analysis presented in Chapter 6 corroborates these findings. It showed that the individual-level education-vote choice association exhibited statistically significant constituency-level variation at the 2015, 2017 and 2019 general elections (except for Liberal Democrat voting in 2017), even after controlling for a host of other individual-level characteristics. In doing so, this research not only adds to the growing body of evidence that suggests education, like social class (e.g., Andersen and Heath, 2002; Butler and Stokes, 1969; Johnston *et al.,* 2004; MacAllister *et al.,* 2001; Miller, 1978), has spatially heterogenous effects on voting in advanced Western democratic contexts, but demonstrates the profound importance of Agnew's (1996) belief that geography must be treated

[46]To the best of my knowledge, at the time of writing

as 'intrinsic' rather than 'epiphenomenal' in our understanding of voting behaviours. Educational attainment evidently does not operate as a national social category. It takes on different meanings across space, coming to influence our voting behaviours in different ways depending on the specific local contexts in which we operate (Johnston and Pattie, 2006).

Chapter 6 also provided the first evidence to suggest that the impacts of the educational cleavage have not been felt evenly across England and Wales in recent general election voting, by showing that some constituencies experienced considerably smaller- and larger-than-average levels of education-based vote polarisation during these contests. While there was no obvious geographical patterning to this (i.e., there were no highly clustered areas of higher- or lower-than-average educational polarisation when constituency-level model residuals were mapped); the residual analysis conducted in Chapter 6 did identify that the same constituencies which experienced large (small) differences in the vote choices of individuals with A-levels and GCSEs in recent elections also tended to see greater (lesser) divergence in the voting of degree- and GCSE-educated electors. That this positive correlation was found to be particularly strong for Liberal Democrat voting (0.61-0.76 compared to a maximum of 0.46 for Labour and Conservative voting) was not surprising. Support for the Liberal Democrats is considerably more 'localised' than that of the Conservative or Labour Parties (Bale, Cheung and Wager, 2022; Cutts, Russell and Townsley, 2021). The Liberal Democrats do well in a highly specific set of constituencies, and do poorly or do not stand in others, and in the constituencies where they do stand, they overwhelmingly draw their votes from more educated members of the electorate (Curtis and McDonnell, 2019).

**Key finding 9: No single educational group have voting behaviours which are universally strongly influenced by constituency contextual factors**

In their investigation of the spatial distribution of British EU referendum voting, Goodwin and Heath (2016a: n.p.) found that individuals with A-level qualifications 'seem[ed] to be especially sensitive to their surrounding environment' - the vote choices of this group were influenced far more strongly by constituency contextual factors than the more- and less- educated groups'. Chapter 6 showed that this conclusion does not generalise to recent British general election voting. It demonstrated that there was no single educational group whose vote choices were universally strongly influenced by the constituency environment in the 2015, 2017 or 2019 contests. Interestingly, the analysis presented in Chapter 6 found that the sensitivity of educational groups' voting behaviours to their constituency environment varied systematically depending on the type of party voted for. While the A-level group exhibited the greatest amount of between-constituency variation in their Conservative vote propensities at recent general elections, the degree and GCSE groups were the most sensitive to their constituency environment when it came to Labour and Liberal Democrat voting, respectively. This finding underscores the

importance of undertaking research which synthesises compositional and contextual approaches (Johnston and Pattie, 2006) in seeking to understand why it is that identically qualified individuals vote differently across space in Britain today.

**Key finding 10: individuals with identical qualifications *did not* vote differently in constituencies with differing educational environments at recent British general elections**

There is a consensus in the limited body of research which has explored the geography of educational voting that individuals with identical qualifications vote differently in areas with differing educational profiles (Goodwin and Heath, 2016a; Zingher, 2022). However, because these studies have included few controls for alternative constituency context effects in their analyses it has not been entirely clear whether it is genuinely the educational environment of areas, as opposed to other highly related area-level characteristics (e.g., occupational class composition or economic situation), that are associated with the uneven spatial distribution of 'educational effects' on voting. The analysis presented in Chapter 6 clearly demonstrated that the moderating effect of area's educational environments on the individual-level education-vote choice association, which has been uncovered in existing studies, does not stand up to more robust testing, in this context. It found that none of the cross-level interactions of individual-level educational attainment and constituency-level educational environment reached statistical significance once all controls for alternative constituency context effects were added to the multilevel models of recent British general election voting. Chapter 6 therefore showed that individuals with identical educational qualifications *did not* vote differently in constituencies with differing educational environments at recent British general elections, it simply seems as though this was the case because the educational profiles of constituencies are closely linked with other constituency characteristics which help predict spatial variations in education-based voting patterns.

**Key finding 11: individuals with identical qualifications voted differently in constituencies with differing levels of left behind-ness at recent British general elections**

The analysis presented in Chapter 6 found that accounting for constituency left behind-ness, in some cases, contributed to explaining the fact that individuals with identical qualifications voted differently across space at recent British general elections. When constituency left behind-ness was conceptualised in a demographic sense - based on the age, ethnic, occupational and urban/rural profile of areas - as per Ford and Goodwin's (2014) definition, this study found that although the average 2015 Conservative and Labour vote propensities of individuals with A-levels were more like those with degrees in the *least* left behind constituencies, they were more like those of the GCSE group in the *most* left behind. In finding that the vote choices made by this

intermediate educational group, in the 2015 general election, appear to have been highly dependent on the opportunities they were afforded by virtue of living in particular places, this analysis draws broadly the same conclusion as was seen in Goodwin and Heath's (2016a) analysis of the spatial distribution of EU referendum voting. It should be noted, however, that this finding did not replicate in the other general elections studied in Chapter 6; so this 'opportunities-based' explanation of the spatial distribtion of educational voting at recent British general elections can by no means be considered universal.

Interestingly, when this study used a more economically-focussed definition of left behind-ness, which was informed by the work of scholars including Furlong (2019), Jennings and Stoker (2016, 2017) and Watson (2018), very different conclusions were drawn. Not only was constituency left behind-ness found to have statistically significant moderating effects on different individual-level education-voting associations (Conservative 2019 and Liberal Democrat 2015, *rather than* Labour and Conservative 2015) but these moderating effects operated in different ways. In fact, the analysis presented in Chapter 6 showed that the 2019 Conservative and 2015 Liberal Democrat voting propensities of the GCSE group (rather than the A-level group) were most sensitive to constituency left behind-ness, with GCSE-educated individuals being far less likely to vote for these parties in the most left behind constituencies than they were in the least, when an economic conceptualisation of left behind-ness was employed.

These findings are not only interesting in themselves, but also when taken in comparison to one another. Against the backdrop of Furlong's (2019: 11) work which demonstrates that our 'understanding [of] whether so-called 'left behind' places have left Labour behind for the Conservatives is determined by the definition of 'left behind'…adopted', Chapter 6 can be seen as contributing to the growing body of evidence that suggests our understanding of British electoral geography is highly contingent on the ways in which we conceptualise left behind-ness.

**Key finding 12: individuals with identical qualifications voted differently in constituencies with different kinds of interaction contexts at recent British general elections**

Chapter 6 also presented evidence to show that individuals with identical qualifications have voted differently in constituencies characterised by different kinds of interaction dynamics at recent British general elections. The average left-right position of constituency residents, the extent to which constituents identified with their local communities and talked to their co-workers and neighbours about politics were all found to moderate the individual-level education-vote choice association in some way.

One particularly interesting insight from Chapter 6 was that individuals with GCSE qualifications were approximately 11-percentage points less likely to vote Labour in 2015 in the most right-

leaning constituencies than they were in the most left-leaning. While this finding appears to provide support for the idea of social contagion (e.g., Butler and Stokes, 1969; Huckfeldt and Sprague, 1995; Miller, 1978; Pattie and Johnston, 1999, 2000), in showing that people who are surrounded by individuals who possess economic views congruent to those of a particular party in some cases become more likely to vote for that party themselves, it is important to remember that Chapter 6 presented evidence of associations *not* causality. Although this finding might then indicate that there is something about the experience of living in constituencies with particular kinds of economic orientations that lead GCSE-educated individuals to alter the ways they vote, it is also plausible that this effect could simply be driven by self-selection and selective in-migration. We know that British individuals who move from one constituency to another tend to move to places with economic values which better match their own (Gallego *et al.*, 2016), so it is not unreasonable to expect that educational differences in geographical mobility could be driving this pattern, which was uncovered in Chapter 6.

The strength of the moderating effects of the extent to which constituency residents reported identifying with their local community on the individual-level education-vote choice association, that were identified in Chapter 6, were also striking. Not only were GCSE-educated individuals found to be approximately 8-percentage points less likely to vote Conservative in 2015 in the most 'local' constituencies, compared to the least, but those with degrees were also 9-percentage points less likely to vote Labour in 2015 in the most 'local' constituencies, than in the least. These findings are novel and warrant further investigation to consider what specifically it is about living in areas that have a particularly 'local feel' that might contribute to explaining why individuals with identical educational qualifications would choose to vote differently across space, in Britain, and a host of other advanced Western democracies, today.

## 7.3 Implications of this Research

The emergence of stark education-based social and political divisions has fundamentally altered the political landscapes of advanced Western democracies (Abou-Chadi and Hix, 2021; Bornschier *et al.*, 2021; Bovens and Wille, 2017; Ford and Jennings, 2020; Gethin, Martínez-Toledano and Piketty, 2022; Stubager, 2010). While this is clear, we know relatively little about how this stark educational divide is likely to shape the political space in years to come or how we might best reconcile these education-based divisions. This section outlines how the findings presented in this thesis (see Section 7.2) - which contribute to advancing our knowledge of the complex association of educational attainment with public opinion and electoral behaviour in Britain today - can help us to answer these questions. It also details the implications of this research for academics seeking to study the nature and causes of social and political divisions.

### 7.3.1 Understanding the Future Trajectory of British Politics

The findings presented in Chapter 4 and Chapter 6 have important implications for understanding the extent to which the vote choices of British electors are likely to divide along educational lines in years to come. In showing that members of each of the large educational groups that exist in Britain today possess a shared set of attitudes, interests and preferences and tend to vote in ways that represent these distinct positions, Chapter 4 indicates that an educational cleavage may well have emerged in Britain. Given that cleavages are rooted in highly stable, socio-structural divisions, patterns of cleavage voting often become 'frozen' and will continue to shape party systems and electoral behaviour long after the conflicts they originally stemmed from have ceased to be relevant in society (Bornschier, 2007; Deegan-Krause, 2007; Ford and Jennings, 2020; Lipset and Rokkan, 1967; von Schoultz, 2017). It therefore seems that the educational fault line which has emerged in British politics in recent years could be set to become an enduring feature of political contestation.

However, the analysis presented in Chapter 4 also implies that the strength of the educational cleavage observed in British voting is likely to be highly contingent on the kind of issues that electors consider most important when deciding who to vote for. Cultural issues have been highly salient in British politics since the lead-up to the 2016 EU referendum (Cutts *et al.*, 2020; Fieldhouse *et al.*, 2019a; Norris and Inglehart, 2019; Prosser, 2021; Wheatley, 2016). Chapter 4 showed that individuals with differing levels of educational attainment have voted differently in Britain in recent years largely because they tend to hold different cultural attitudinal positions, which lead them to vote for different parties. However, it also showed that the economic orientations of these different educational groups tend to be relatively much more similar than their cultural attitudes and that economic orientations have weak effects in mediating the education-vote choice association, compared to cultural attitudes. If an economic crisis was to unfold in Britain - as it appears to be at the time of writing this thesis - it seems possible that 'the economic [dimension of ideological] conflict [could] regain strength and diminish the importance of the education cleavage' (Stubager, 2013: 390). This also implies that the exact nature and trajectory of the educational cleavage in voting is likely to vary across advanced Western democratic contexts, depending on the specific historical and political context of each nation and how these particularities shape the issue space.

In showing that the impacts of the educational cleavage have not been felt evenly at recent British general elections, and pinpointing the precise kinds of constituencies where this education-vote choice association has varied, the novel insights presented in Chapter 6 also promise to improve our ability to predict the extent to which British politics are likely to divide along educational lines in the future. The findings presented in this empirical paper should be used by psephologists and

academics alike to build a general set of rules about the areas in which 'standard' educational effects on voting are and are not likely to apply. The same could also be done for a range of different kinds of socio-demographic variables.

The findings presented in Chapter 5 also have implications for understanding how aggregate attitudes are likely to shift in Britain, over time. Because conventional wisdom suggests that studying at university is the *cause* of graduates' distinctively liberal cultural attitudes, it has widely been held that aggregate attitudes will steadily become more liberal as decades of increasing HE enrolments and generational replacement culminate to produce increasingly educated populations in advanced Western democracies (e.g., Scott, 2022; Sobolewska and Ford, 2020). The findings presented in Chapter 5 provide a different picture. They suggest that the extent of any such aggregate value change in Britain is likely to be modest, because the experience of studying at university in the period 1994-2020 had only a very small direct *causal* effect on British graduates' cultural attitudes, which was not always liberalising.

Interestingly, when considered together, the insights provided in Chapter 4 and Chapter 5 of this thesis appear to suggest that while politics do indeed divide starkly along educational lines in Britain today *this divide is not strictly a product of educational differences*. Individuals with differing levels of educational attainment are motivated to vote in different ways largely because they possess diverging sets of attitudes (Chapter 4) and the direct experience of gaining additional educational qualifications, in itself, has only a very small direct effect in driving these education-based attitudinal divisions (Chapter 5). The complex association of educational attainment with modern British public opinion and electoral behaviour appears to be largely spurious. Educational attainment, in itself, can then only to a relatively small extent be considered the root cause of the stark educational divide that has emerged in British politics. Rather, this educational divide appears primarily to be a manifestation of status-based differences - politics divide along educational lines in Britain largely because graduates and non-graduates have very different pre-adult and adult experiences, in terms of social stratification. It follows then that changes in the status make-up of the British population may be more consequential in terms of aggregate attitudinal change than educational shifts.

### 7.3.2 Reconciling the Educational Divide in British Politics

Since Brexit, there has been a real sense that Britain has become increasingly polarised, with politics now more tribalised and divided than ever before (Duffy *et al.*, 2019). At the heart of this new, divided Britain is the emerging 'education gap' which threatens to 'tear politics apart' (Runciman, 2016: n.p.). Any strengthening of this already stark educational divide, whether real or imagined, could have damaging consequences. If the average attitudinal positions - and therefore

voting behaviours - of British graduates and non-graduates were to become less similar, for example, this diminishing educational 'middle ground' could lead to a situation of political gridlock and ultimately, come to pose a real threat to the effective functioning of British democracy. What is more concerning is that even if there was to be no genuine increase in education-based polarisation, any widespread public perception that this was the case could stoke further divisions. This may, for example, lead to a deeper sense of alienation between educational groups, further fuel education-based out-group antagonisms and present other challenges in terms of social cohesion (Stubager, 2009). A collective, psychological sense that education divides us could then lead to a very real strengthening of the existing British educational divide.

It is evident that action must be taken to reconcile the stark educational divide that exists in British politics today. The findings presented in Chapter 5 and Chapter 6 of this thesis have crucial implications for those seeking to design strategies to achieve precisely this. In having demonstrated that right-leaning commentators' claims that 'woke' universities are 'indoctrinating' students with 'left-liberal' bias are evidentially unfounded (e.g., Hopkins, 2016; Torres, 2020), Chapter 5 indicates that we must work to tackle this misleading discourse around the 'liberalising function' of universities in modern society. Doing so is imperative because these unwarranted claims not only have the potential to damage the public image, legitimacy and funding situation of universities (Sachs, 2020; van de Werfhorst, 2020), but to further stoke the sense of educational division in society and thus, contribute to damaging increases in education-based polarisation. Encouraging political commentators and the media to change the way they talk about the educational divide may therefore offer opportunities for reconciling this divide. Moreover, Chapter 6 provided evidence to suggest that any strategy to alleviate education-based divisions in British politics should be local, rather than national, in nature. It not only showed that some constituencies have experienced considerably greater levels of education-based vote polarisation in recent British elections than others but identified a specific list of areas most affected by educational divisions. It is in these 'worst affected' areas that the most targeted endeavours to reconcile educational divisions should be concentrated.

While these recommendations on how to design effective strategies for alleviating educational divisions are based in empirical work conducted in the British context, it is expected that the suggestions posed here would generalise fairly well to an array of different advanced Western democratic contexts.

### 7.3.3 Studying How, and Why, Educational Attainment, and Other Socio-demographics, Shape Outcomes

If we are to gain a deeper understanding of how, and why, it is that educational attainment has come to shape the way individuals vote in advanced Western democracies today, we must develop fully encompassing theoretical models of the education-vote choice association and test these in empirical work. This was demonstrated clearly in Chapter 4 and Chapter 6, which showed that existing British studies have not been able to build a fully comprehensive picture of education's shaping effect on individuals' vote choices because they have tended not to consider a sufficiently broad range of explanations for this effect. Previous studies, for example, have typically not captured the important roles of economic orientations and political cue-taking behaviours in *mediating*, and constituency characteristics - including levels of left behind-ness and interaction dynamics - in *moderating*, the association of educational attainment with voting at recent British political contests. The implications of these findings are clear. Future research which seeks to explore how, and why, educational attainment, or indeed any other kind of socio-demographic characteristic, has come to shape individuals' vote choices must consider how a full range of individual- and aggregate-level factors may mediate and moderate these associations. The theoretical frameworks specified, and tested, in Chapter 4 and Chapter 6 of this thesis provide a suitable starting point for such enquiries.

Chapter 4 and Chapter 5 also made evident that the tendency of existing British studies to employ standard regression methods when investigating the complex association of educational attainment with public opinion and electoral behaviour has prevented us from developing a complete understanding of the *causes* of educational division. The research presented in the first two chapters of this thesis clearly demonstrates that using advanced quantitative and quasi-experimental methods, which have been designed explicitly to identify and isolate the independent effects of key independent variables in complex relationships, is crucial if we are to develop a deeper understanding of why it is that individuals with different levels of education think and vote differently in advanced Western democracies today. This research can therefore be considered something of a 'methodological blueprint', in that it offers guidance on best practice for social scientists seeking to conduct empirical work which aims to understand why it is that education, or indeed any other kind of socio-demographic characteristic, shapes a whole host of outcomes.

Moreover, given that educational attainment is one of the most widely used control variables in the social sciences, it is imperative that we know what this variable actually controls for when added to our statistical models (Persson, 2015). The findings presented in Chapter 5 provided some important clues in this regard. They showed that the well-established association of

educational attainment and socio-political values is predominantly spurious. The link between university study and British individuals' attitudes materialises largely because liberals disproportionately self-select into university enrolment, and to a lesser extent, because graduates and non-graduates tend to have divergent adult status experiences. The distinctive attitudes of graduates are then more a product of their early life and adult status experiences (e.g., their family socio-economic background, parental socialisation or adult occupational situation), than of university study. Given that educational attainment serves largely as a proxy for pre-adult experiences in this context, it is important that future studies of attitudinal formation try to avoid using both educational and pre-adult experience variables as controls, as the close relationship (non-independence) of these variables may introduce collinearity issues which could cause issues when interpreting model estimates (Dormann *et al.*, 2013; Persson, 2015).

## 7.4 Strengths and Limitations of this Research

Specifying more expansive theories of how, and why, it is that educational attainment has come to shape the ways we think and vote in advanced Western democracies today, and applying a range of advanced quantitative methods to high-quality sources of secondary data to provide the first robust tests of these 'educational effects' in the modern British context, allowed this thesis to provide an exceptionally detailed understanding of the complex association of educational attainment with public opinion and electoral behaviour which is observed in Britain today. The core strength of this research is then that it goes beyond the scope of existing research by providing a significant, and timely, advance in our knowledge of the nature and causes of the stark educational divide that has emerged in British politics.

While the body of research presented in this thesis has greatly advanced our understanding of the complex association of educational attainment with public opinion and electoral behaviour, our knowledge of this relationship remains somewhat incomplete, due to some general limitations of this empirical work. Firstly, as the research presented in Chapters 4-6 focussed on a single country context it cannot be certain that the findings presented here regarding the educational divide will generalise to other advanced Western democratic contexts. It may well be that educational cleavages manifest themselves quite differently in different contexts depending on 'the idiosyncrasies of the national political and social context, e.g., the organisation of the educational system, the configuration of the party system, and the policy stances taken by parties' (Stubager, 2010: 506). For example, it is possible that the findings in Chapter 4, which suggested that economic orientations have fairly strong effects in mediating the education-vote choice association, may be highly specific to Britain, in that they reflect the historically strong British class cleavage and economic conflict (Goldberg, 2020; Langsæther and Evans, 2020), and would not be

replicated elsewhere. However, the fact that Chapter 4's conclusions broadly corroborate those of existing studies conducted in other advanced Western democratic contexts (e.g., Attewell, 2022; Bornschier *et al.*, 2021; Stubager, 2010, 2013) suggests there is reason to believe these findings are likely to generalise fairly well.

Secondly, because the sources of secondary data employed in this research did not collect information on respondents' social networks (e.g., what kinds of people they socialise with, what they talk about and how often) or their sense of education-based identity and group consciousness, it was not possible for this thesis to explore how these factors moderated or mediated educational attainment's complex association with public opinion and electoral behaviour. These social network and identity-based explanations are important mechanisms through which education's shaping effect on public opinion and electoral behaviour is theorised to operate (see the black lines in Figure 7-1). Being unable to account for these variables in the analyses presented in Chapters 4-6 of this thesis therefore prevented this research from developing a fully comprehensive understanding of the extent to which, and reasons why, individuals with differing levels of educational attainment tend to think and vote differently in advanced Western democracies today.

The final general limitation of the research presented in this thesis is that it only considered voting for the three largest British political parties - the Conservative Party, the Labour Party and the Liberal Democrats (and only the former two versus all others in Chapter 4) - in its analyses of the mediators and moderators of educational attainment's effect on vote choice at recent general elections. While understanding how educational attainment shapes voting for smaller British political parties, like the Green Party and the Brexit Party/Reform UK, is undoubtedly important, particularly given that Abou-Chadi and Hix (2021) and Attewell (2022) show there is a stark 'educational gap' in voting for green, liberal and radical right parties across Western Europe, it was not possible to investigate these patterns here due to concerns over sparse data bias (see: Greenland, Ali Mansournia and Altman, 2016). For example, as relatively few people voted for these smaller parties in recent British general elections - with just 2.7% of votes going to the Green Party and 2.0% to the Brexit Party at the 2019 contest (British Broadcasting Corporation (BBC) News, 2019), and just 7.4% to the Liberal Democrats in 2017 (BBC News, 2017) - it was feared splitting these small groups of voters across so many cells in the analyses in Chapter 4 and Chapter 6 would have produced severely distorted estimates and led to erroneous conclusions being drawn. Although it would have been desirable to study the educational divide in voting for these smaller parties at recent British general elections, not doing so is not as harmful in the British context as it would have been in other advanced Western democratic contexts, as the high barriers to party entry in Britain mean that these kinds of newer, challenger parties play a much

less significant role in the British political system than they do in many others (Hooghe and Marks, 2018).

Moving on from these more general limitations, some specific limitations of the analyses presented in Chapters 4-6 are now considered. The main limitation of Chapter 4 is that it does not offer a *causal* account of educational attainment's shaping effects on British electors' vote choices at recent general elections and referendums. Because this study used the BESIP data in a cross-sectional manner - in that its measures of respondents' cultural attitudes, economic orientations and political cue-taking behaviours were not recorded prior to voting - it is impossible to be certain that individuals actually held these specific attitudes at the time of voting, and, thus, that these could genuinely have shaped the way these individuals chose to vote. However, given that research suggests multi-item attitudinal scales are highly stable over time (Ansolabehere, Rodden and Snyder, 2008; Evans, Heath and Lalljee, 1996), and that the main mediating effects identified in Chapter 4 (cultural attitudes and economic orientations) were primarily measured via such scales, it seems highly likely that the education-based attitudinal differences identified here were, in fact, the genuine drivers of the stark educational divisions observed in British voting in recent years.

There are two limitations of the research presented in Chapter 5 which should be noted. The first is that this study's within-sibship design - in which estimates were based on samples of outcome-discordant siblings only - means that its findings can only be generalised to individuals who have siblings, and who grew up in households where not all of their siblings had the same HE outcomes (Campbell and Horowitz, 2016; Gilman and Loucks, 2014; Madsen *et al.*, 2014). If studying at university was to have different effects on the attitudes of only children, or individuals from families where all siblings attended university, than it does for the HE-discordant siblings considered in Chapter 5's analysis, the effect of HE on British individuals' attitudes reported in this study would not provide an accurate population-level estimate. The second, and somewhat related, issue is that Chapter 5 reported only the 'average' effect of university study on British individuals' socio-political attitudes in the period 1994-2020. This is problematic, because the fact that (in)formal processes of on-campus socialisation are the most likely mechanisms through which any direct effects of studying at university on individuals' attitudes are transmitted (e.g., Scott, 2022; Surridge, 2016) suggests that the extent of attitudinal change undergone at university would likely vary between-individuals, depending on the exact nature of their university experiences. We might for example, expect that HE's *causal* effect on attitudes would be larger for British graduates who moved away from home to study, than for those who did not, or that the kinds of societies students joined, the type of course they studied or the specific university

they attended would moderate this effect. Unfortunately, these interesting possibilities could not be explored in Chapter 5 due to data deficiencies.

The findings presented in Chapter 4, which showed that educational attainment's 'true' effect on voting may be under- or overestimated when using standard regression methods to isolate the independent effect of education from that of mediating variables, rather than specifically designed mediation techniques, have implications in terms of the conclusions drawn in Chapter 6. Because educational attainment's effect on recent general election voting was estimated using a random-coefficient multilevel logistic regression modelling strategy in Chapter 6, and attitudinal variables were also included in these models as controls, the estimates of education's effects produced in this chapter may have been somewhat imperfect. To the best of my knowledge at the time of writing, there were, however, no alternative methods that would have offered the possibility of providing more accurate estimates of this effect given the need to analyse categorical data at both the individual- and aggregate-levels. In light of this, and the fact that it was not so much the estimates of educational attainment's effect on individuals' recent British general election voting in themselves, but whether these varied statistically significantly across different kinds of constituencies that mattered most in this chapter, this issue should not be given too much weight. The analysis presented in Chapter 6 can be seen as offering the best understanding of the kinds of constituencies where individuals with identical qualifications have voted differently in Britain at recent general elections that was possible given the available statistical tools.

One final limitation of the research presented in this thesis is the fact that, like Chapter 4, Chapter 6 did not provide a *causal* explanation of the phenomenon it studied. While the findings presented in Chapter 6 showed that identically qualified individuals voted differently in constituencies characterised by different levels of left behind-ness and interaction dynamics in recent British general elections, they cannot not tell us whether it was actually the experience of living in these specific kinds of constituencies that drove the spatial variation(s) observed in educational voting. It is possible, for example, that these constituency context effects could be explained entirely by a disproportionate tendency of particular kinds of persons to sort, or self-select, into areas that reflect their political persuasion (e.g., Bishop and Cushing, 2008; Gallego *et al.*, 2016; Sussell, 2013; Tam Cho, Gimpel and Hui, 2013). That Chapter 6 cannot distinguish between these two competing explanations of the causes of the spatial distribution of educational voting is unsurprising as doing so was not the aim of this study. Given that very little existing research (for notable exceptions see: Goodwin and Heath, 2016a; Zingher, 2022) had previously explored the geography of educational voting, this study simply sought to identify how, and where, identically educated individuals had voted differently across space at recent British

general elections. Now that this research has done precisely this, future studies should move on to understanding why this patterning has developed.

## 7.5 Recommendations for Future Research

The limitations of this research that were highlighted in the previous section (7.4) directly inform the recommendations for future research outlined below.

While this thesis clearly contributes to advancing our knowledge of the complex association of educational attainment with public opinion and electoral behaviour, it is unclear to what extent its novel findings can be generalised beyond the modern British context in which this study was conducted. If we are to gain a fuller understanding of the stark educational divide in politics that has emerged across an array of advanced Western democracies, in recent years, we must conduct comparative research that investigates how this educational divide manifests itself across a number of different country contexts and explain any cross-national differences identified. Only by expanding the geographical scope of this research in this way can we hope to build a better understanding of how it is that educational attainment has come to shape the ways individuals think and vote in advanced Western democracies today and to make judgements about how this educational divide is likely to shape the political landscape in years to come.

Future research must also explore how individuals' social networks and senses of education-based identity and group consciousness *moderate and/or mediate* the complex association of educational attainment with public opinion and electoral behaviour, both in the modern British context and beyond. This is because although these factors have been theorised to have important influences in determining education's shaping effects on the way individuals think and vote (e.g., Lipset and Rokkan, 1967), these effects could not be tested in the analysis presented in Chapters 4-6 of this thesis as the British sources of secondary data used here contained no detailed information on respondents' social networks or educational identities (see the black lines in Figure 7-1). Doing so will require the collection of primary data.

Another productive agenda for future research would be to replicate the analysis presented in Chapter 5 using a within-individual rather than within-sibship design, to ascertain whether this study's findings regarding the causal effect of university study on British individuals' economic and cultural attitudes can be generalised to the entire population of British adults, rather than just those with HE-discordant siblings. Any such endeavour should also seek to explore whether there are statistically significant individual differences in the 'average' HE effect, as doing so holds the key to furthering our understanding of how it is that on-campus socialisation experiences shape graduates' attitudes.

Furthermore, if we are to get to the bottom of why it is that individuals with identical qualifications have voted differently in different kinds of constituencies at recent British general elections, a detailed longitudinal study of British electors' voting patterns, which tracks how people vote before and after moving into particular kinds of areas, must be conducted. Only by studying the kinds of areas people move to and how these relate to their attitudinal positions and voting patterns, and then isolating these selection-into-residence effects from constituency context effects in empirical analysis, will it be possible to determine which of these explanations is the driver of the spatial heterogeneity observed in education's effect on voting.

Finally, qualitative research could be used effectively to supplement the findings of this research. For example, Chapter 6 found that identically qualified individuals have voted differently in constituencies characterised by differing levels of (traditionally defined) left behind-ness at recent British general elections, and surmises, much like Goodwin and Heath (2016a), that they do so because the same educational qualifications offer more, or less, opportunities to get ahead in some places than others. However, the quantitative analysis presented in this chapter only shows us that this pattern exists, it cannot reveal the motivation behind these individuals' actions. Conducting interview or focus group research with individuals who possess the same educational qualifications but live in different parts of Britain, and asking them about what motivates them to vote in the ways they do, would provide a valuable opportunity to explore whether the interpretation provided in Chapter 6 is supported by individuals' own accounts of their behaviour.

## 7.6 Concluding Remarks

The politics of advanced Western democracies divide starkly along educational lines today because graduates and non-graduates have increasingly come to think and vote in different ways. While there has understandably been an explosion of interest in this divide - and particularly in the potential negative consequences any strengthening of these education-based divisions might have for the functioning of democracy and social cohesion - our understanding of this phenomenon has remained limited because few empirical studies have explored the nature or causes of this emerging educational divide. The findings of this thesis address these gaps in knowledge, providing an exceptionally detailed understanding of the complex association of educational attainment with public opinion and electoral behaviour that is observed in modern Britain. They demonstrate, that at least in the British case, *this educational divide is, to a fairly large extent, not strictly a direct product of educational differences at all*. Individuals with different levels of educational attainment have voted differently at recent British political contests primarily because they possess divergent cultural attitudes, and they possess different attitudes predominantly because they have divergent pre-adult and adult-status experiences.

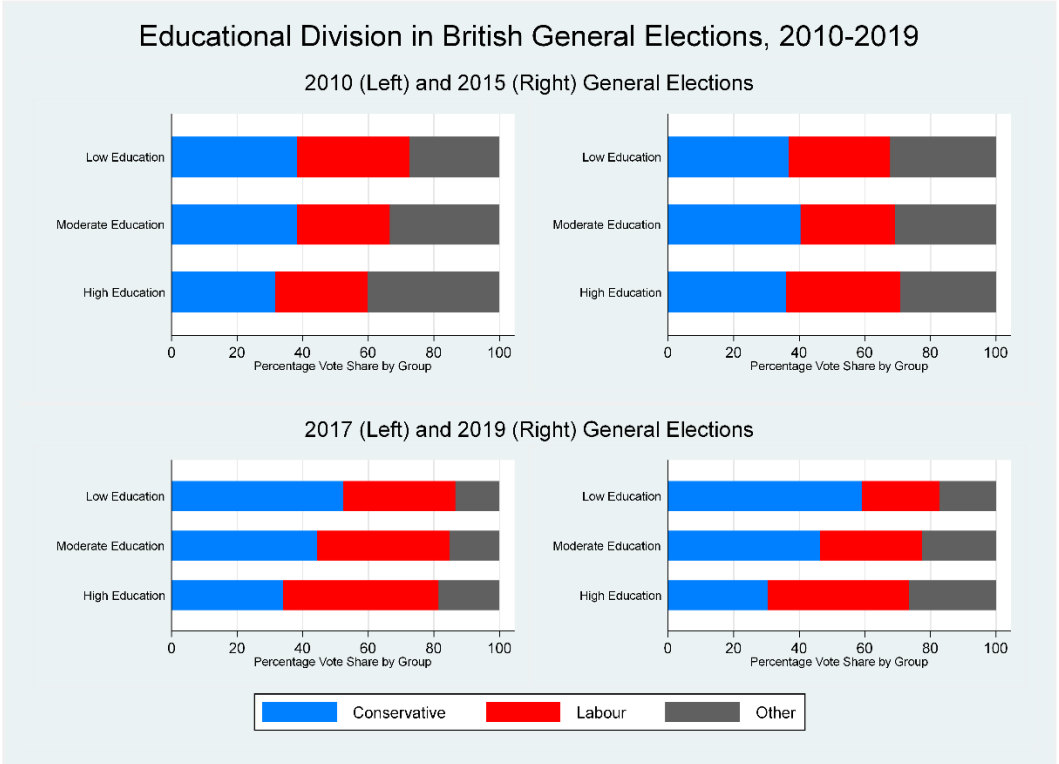
Perhaps the educational divide which has contributed to the dramatic realignment of the politics of advanced Western democracies today is then better described as a status divide.

# Appendix A Comparison of the Educational Divide in Electoral Contests Pre- and Post- 2016

The figure below (A-1) compares the extent of educational division observed in British general elections pre- and post-2016. For the 2015, 2017 and 2019 contests this graph shows vote choice by respondents' highest level of educational attainment reported at the wave immediately post-election (waves 6, 13 and 19, respectively). As data collection for the BESIP began in 2014 (Fieldhouse *et al.*, 2020), the 2010 sub-graph shows the pattern of retrospectively reported 2010 vote choices by respondents' highest level of educational attainment stated in the first wave of the panel. All estimates are weighted.

Figure A-1 clearly shows a strong educational gradient exists in all vote choices in the 2017 and 2019 elections - although this educational distinction is less pronounced in the 'other' category than for Labour and Conservative voting. In comparison, in 2015, we see almost no educational division - party choice does not appear associated with vote choice. Further, in 2010, although we see some educational division in electors' tendency to vote for 'other' parties, we see almost no educational variation in voting for the two main parties (Labour and Conservative). This figure shows there was a stronger educational divide in British politics post-2016, than pre-2016.

**Figure A-1 - The Educational Divide in British General Elections, 2010-2019**



# Appendix B Comparison of Karlson-Holm-Breen Results Reported for Samples of English and Welsh Voters (With and Without Non-voters) and British Voters

Complete case analysis has been used to estimate all results presented here, rather than using data imputed via a MICE approach (as in Paper 1/Chapter 4). This is because combining multiply imputed estimates of KHB decomposition using Rubin's (1986) rules is arduous. It was therefore not viable to estimate comparisons based on MICE data for all different model and political contest combinations presented here.

**Table B-1 - KHB Results for the 2016 EU Referendum Model Across Various Samples, Using Complete Case Analysis**

| **Reference Category: Low Education** | **2016: Leave versus Remain N = 20,956. British Voters** | | **2016: Leave versus Remain N = 18,134. English and Welsh Voters** | | **2016: Leave versus Remain N = 18,811. English and Welsh Voters + non-Voters** | | **2016: Did not vote versus Remain N = 18,811. English and Welsh Voters + non-Voters** | |
|---|---|---|---|---|---|---|---|---|
| **Moderate Education** | | | | | | | | |
| Total Effect | -0.865*** | (0.069) | -0.831*** | (0.073) | -0.802*** | (0.074) | -0.732*** | (0.147) |
| Direct Effect | -0.139** | (0.070) | -0.134* | (0.074) | -0.110 | (0.075) | -0.267* | (0.146) |
| Indirect Effect | -0.725*** | (0.071) | -0.697*** | (0.074) | -0.692*** | (0.072) | -0.465*** | (0.059) |
| % Total which is Direct | 16.12% | | 16.14% | | 13.76% | | 36.52% | |
| % Total which is Indirect | 83.88% | | 83.86% | | 86.24% | | 63.48% | |
| % Total via Economic Orientation | 3.65% | | 3.75% | | 3.96% | | 17.58% | |
| % Total via Cultural Attitudes | 74.81% | | 74.86% | | 77.61% | | 42.46% | |
| % Total via Political Cues | 5.41% | | 5.27% | | 4.68% | | 3.42% | |
| **High Education** | | | | | | | | |
| Total Effect | -1.895*** | (0.082) | -1.836*** | (0.087) | -1.779*** | (0.088) | -1.382*** | (0.158) |

| Reference Category: Low Education | 2016: Leave versus Remain N = 20,956. British Voters | | 2016: Leave versus Remain N = 18,134. English and Welsh Voters | | 2016: Leave versus Remain N = 18,811. English and Welsh Voters + non-Voters | | 2016: Did not vote versus Remain N = 18,811. English and Welsh Voters + non-Voters | |
|---|---|---|---|---|---|---|---|---|
| Direct Effect | -0.331*** | (0.083) | -0.308*** | (0.088) | -0.278*** | (0.088) | -0.461*** | (0.163) |
| Indirect Effect | -1.564*** | (0.079) | -1.528*** | (0.083) | -1.502*** | (0.081) | -0.921*** | (0.091) |
| % Total which is Direct | | 17.45% | | 16.78% | | 15.60% | | 33.38% |
| % Total which is Indirect | | 82.55% | | 83.22% | | 84.40% | | 66.62% |
| % Total via Economic Orientation | | 2.45% | | 2.45% | | 2.69% | | 16.23% |
| % Total via Cultural Attitudes | | 72.83% | | 73.40% | | 74.53% | | 44.54% |
| % Total via Political Cues | | 7.27% | | 7.37% | | 7.18% | | 5.82% |

*Note: weighted regression coefficients are reported with constituency-clustered standard errors in parentheses. *p < 0.1, ** p < 0.05 and ***p < 0.01.*

**Table B-2 - KHB Results for the 2017 General Election Model Across Various Samples, Using Complete Case Analysis**

| Reference Category: Low Education | 2017: Labour versus Conservative N = 14,156. British Voters | 2017: Other versus Conservative N = 14,156. British Voters | 2017: Labour versus Conservative N = 12,336. English and Welsh Voters | 2017: Other versus Conservative N = 12,336. English and Welsh Voters | 2017: Labour versus Conservative N = 13,176. English and Welsh Voters + Non-voters | 2017: Other versus Conservative N = 13,176. English and Welsh Voters + Non-voters | 2017: Did not vote versus Conservative N = 13,176. English and Welsh Voters + non-Noters |
|---|---|---|---|---|---|---|---|
| **Moderate Education** | | | | | | | |
| Total Effect | 0.379*** (0.075) | 0.433*** (0.081) | 0.390*** (0.080) | 0.448*** (0.085) | 0.405*** (0.075) | 0.432*** (0.085) | -0.102 (0.110) |
| Direct Effect | 0.113 (0.078) | 0.143* (0.083) | 0.140* (0.083) | 0.195** (0.087) | 0.195** (0.077) | 0.216** (0.087) | -0.123 (0.113) |
| Indirect Effect | 0.267*** (0.092) | 0.290*** (0.074) | 0.249** (0.099) | 0.253*** (0.075) | 0.209** (0.093) | 0.216*** (0.069) | 0.021 (0.062) |
| % Total which is Direct | 29.71% | 33.00% | 36.06% | 43.51% | 48.31% | 50.09% | 85.38% |
| % Total which is Indirect | 70.29% | 67.00% | 63.94% | 56.49% | 51.69% | 49.91% | 14.62% |

| **Reference Category: Low Education** | **2017: Labour versus Conservative N = 14,156. British Voters** | **2017: Other versus Conservative N = 14,156. British Voters** | **2017: Labour versus Conservative N = 12,336. English and Welsh Voters** | **2017: Other versus Conservative N = 12,336. English and Welsh Voters** | **2017: Labour versus Conservative N = 13,176. English and Welsh Voters + Non-voters** | **2017: Other versus Conservative N = 13,176. English and Welsh Voters + Non-voters** | **2017: Did not vote versus Conservative N = 13,176. English and Welsh Voters + non-Noters** |
|---|---|---|---|---|---|---|---|
| % Total via Economic Orientation | -52.04% | -24.83% | -52.52% | -25.81% | -54.69% | -28.88% | -104.82% |
| % Total via Cultural Attitudes | 121.18% | 92.75% | 117.79% | 84.74% | 107.10% | 80.44% | 127.86% |
| % Total via Political Cues | 1.16% | -0.91% | -1.34% | -2.43% | -0.71% | -1.62% | -8.42% |
| **High Education** | | | | | | | |
| Total Effect | 1.283*** (0.088) | 1.237*** (0.090) | 1.301*** (0.093) | 1.281*** (0.095) | 1.238*** (0.094) | 1.223*** (0.095) | -0.001 (0.144) |
| Direct Effect | 0.153 (0.098) | 0.190** (0.095) | 0.162 (0.102) | 0.303*** (0.099) | 0.202** (0.102) | 0.332*** (0.098) | -0.401*** (0.120) |
| Indirect Effect | 1.130*** (0.098) | 1.047*** (0.082) | 1.138*** (0.105) | 0.977*** (0.083) | 1.037*** (0.099) | 0.891*** (0.078) | 0.400*** (0.079) |
| % Total which is Direct | 11.92% | 15.32% | 12.49% | 23.68% | 16.28% | 27.13% | 50.04% |
| % Total which is Indirect | 88.09% | 84.68% | 87.51% | 76.32% | 83.72% | 72.87% | 49.96% |
| % Total via Economic Orientation | -6.21% | -1.72% | -6.31% | -3.02% | -9.88% | -4.93% | -18.53% |
| % Total via Cultural Attitudes | 85.39% | 81.32% | 84.97% | 73.98% | 83.76% | 71.71% | 60.66% |
| % Total via Political Cues | 8.91% | 5.08% | 8.85% | 5.34% | 9.82% | 6.10% | 7.84% |

*Note: Weighted regression coefficients are reported with constituency-clustered standard errors in parentheses. *p < 0.1, ** p < 0.05 and ***p < 0.01. Following the guidance of* Alwin and Hauser (1975)*, where the absolute sum of direct and indirect effects exceeds the reported total effect, the proportion mediated by the indirect effect is calculated by dividing indirect effect size by the absolute sum of (in)direct effects. Where the absolute sum of direct and indirect effects exceeds the reported total effect, the % of total effect driven by each variable set was derived by calculating (% of total indirect effect driven by each mediating variable set x (% of total effect which is indirect/100)).*

**Table B-3 - KHB Results for the 2019 General Election Model Across Various Samples, Using Complete Case Analysis**

| Reference Category: Low Education | 2019: Labour versus Conservative N = 23,862. All British Voters | 2019: Other versus Conservative N = 23,862. All British Voters | 2019: Labour versus Conservative N = 21,338. English and Welsh Voters | 2019: Other versus Conservative N = 21,338. English and Welsh Voters | 2019: Labour versus Conservative N = 23,318. English and Welsh Voters + non-Voters | 2019: Other versus Conservative N = 23,318. English and Welsh Voters + non-Voters | 2019: Did not vote versus Conservative N = 23,318. English and Welsh Voters + non-Voters |
|---|---|---|---|---|---|---|---|
| **Moderate Education** | | | | | | | |
| Total Effect | 0.514*** (0.073) | 0.568*** (0.063) | 0.533*** (0.076) | 0.583*** (0.066) | 0.490*** (0.074) | 0.557*** (0.064) | -0.074 (0.083) |
| Direct Effect | 0.051 (0.074) | 0.180*** (0.064) | 0.067 (0.077) | 0.197*** (0.067) | 0.054 (0.074) | 0.191*** (0.065) | -0.183** (0.086) |
| Indirect Effect | 0.463*** (0.078) | 0.387*** (0.060) | 0.466*** (0.084) | 0.386*** (0.061) | 0.436*** (0.076) | 0.366*** (0.056) | 0.109** (0.046) |
| % Total which is Direct | 9.93% | 31.80% | 12.54% | 33.74% | 10.99% | 34.32% | 62.64% |
| % Total which is Indirect | 90.07% | 68.20% | 87.46% | 66.26% | 89.01% | 65.68% | 37.36% |
| % Total via Economic Orientation | -20.53% | -14.37% | -19.54% | -13.24% | -20.68% | -13.29% | -52.48% |
| % Total via Cultural Attitudes | 102.48% | 78.85% | 98.99% | 75.64% | 100.41% | 74.54% | 83.97% |
| % Total via Political Cues | 8.10% | 3.75% | 7.99% | 3.89% | 9.29% | 4.44% | 5.88% |
| **High Education** | | | | | | | |
| Total Effect | 1.789*** (0.082) | 1.581*** (0.073) | 1.811*** (0.086) | 1.588*** (0.077) | 1.688*** (0.082) | 1.500*** (0.075) | 0.237** (0.096) |
| Direct Effect | 0.329*** (0.080) | 0.422*** (0.073) | 0.324*** (0.084) | 0.451*** (0.078) | 0.335*** (0.082) | 0.451*** (0.077) | -0.254** (0.103) |
| Indirect Effect | 1.459*** (0.086) | 1.158*** (0.069) | 1.487*** (0.092) | 1.137*** (0.071) | 1.353*** (0.083) | 1.050*** (0.065) | 0.491*** (0.060) |
| % Total which is Direct | 18.40% | 26.73% | 17.90% | 28.37% | 19.86% | 30.04% | 34.07% |
| % Total which is Indirect | 81.60% | 73.27% | 82.10% | 71.63% | 80.14% | 69.96% | 65.93% |
| % Total via Economic Orientation | 1.32% | -2.22% | 1.68% | -1.95% | -0.82% | -3.45% | -27.65% |

| **Reference Category: Low Education** | **2019: Labour versus Conservative N = 23,862. All British Voters** | **2019: Other versus Conservative N = 23,862. All British Voters** | **2019: Labour versus Conservative N = 21,338. English and Welsh Voters** | **2019: Other versus Conservative N = 21,338. English and Welsh Voters** | **2019: Labour versus Conservative N = 23,318. English and Welsh Voters + non-Voters** | **2019: Other versus Conservative N = 23,318. English and Welsh Voters + non-Voters** | **2019: Did not vote versus Conservative N = 23,318. English and Welsh Voters + non-Voters** |
|---|---|---|---|---|---|---|---|
| % Total via Cultural Attitudes | 69.75% | 67.94% | 69.86% | 65.75% | 70.18% | 65.73% | 83.10% |
| % Total via Political Cues | 10.51% | 7.56% | 10.57% | 7.81% | 10.77% | 7.69% | 10.47% |

*Note: Weighted regression coefficients are reported with constituency-clustered standard errors in parentheses. *p < 0.1, ** p < 0.05 and ***p < 0.01. Following the guidance of* Alwin and Hauser (1975)*, where the absolute sum of direct and indirect effects exceeds the reported total effect, the proportion mediated by the indirect effect is calculated by dividing indirect effect size by the absolute sum of (in)direct effects. Where the absolute sum of direct and indirect effects exceeds the reported total effect, the % of total effect driven by each variable set was derived by calculating (% of total indirect effect driven by each mediating variable set x (% of total effect which is indirect/100)).*

# Appendix C Variable Coding and Descriptive Statistics

Tables C-1-C-4 show the unweighted number of observations in each category and the row percentages. All exclude Scots.

**Table C-1 - Descriptive Statistics and Coding of Dependent Vote Choice Variables**

| | ***Vote Choice*** | | | | | |
|---|---|---|---|---|---|---|
| | *Leave* | | *Remain* | | ***Total*** | |
| ***2016 Referendum*** | 12,214 | 51.50% | 11,502 | 48.50% | 23,716 | 100.00% |
| | *Labour* | | *Conservative* | | *Other* | | ***Total*** | |
| ***2017 General Election*** | 7,639 | 40.45% | 7,976 | 42.23% | 3,270 | 17.32% | 18,885 | 100.00% |
| ***2019 General Election*** | 7,607 | 31.02% | 11,477 | 46.80% | 5,442 | 22.19% | 24,526 | 100.00% |

**Table C-2 - Cross-tabulation of Educational Attainment with 2016 EU Referendum Voting**

| | | ***2016 EU Referendum Vote Choice*** | | |
|---|---|---|---|---|
| | | *Remain* | *Leave* | ***Total*** |
| ***Educational Attainment*** | *Low* | 2,190<br>(29.72%) | 5,179<br>(70.28%) | 7,369<br>100.00% |
| | *Moderate* | 4,278<br>(47.74%) | 4,683<br>(52.26%) | 8,961<br>100.00% |
| | *High* | 5,034<br>(68.16%) | 2,352<br>(31.84%) | 7,386<br>100.00% |

**Table C-3 - Cross-tabulation of Educational Attainment with 2017 General Election Voting**

| | | ***2017 General Election Vote Choice*** | | | |
|---|---|---|---|---|---|
| | | *Conservative* | *Labour* | *Other* | ***Total*** |
| ***Educational Attainment*** | *Low* | 2,997<br>(50.86%) | 2,072<br>(35.16%) | 824<br>(13.98%) | 5,893<br>100.00% |
| | *Moderate* | 3,136<br>(44.19%) | 2,793<br>(39.35%) | 1,168<br>(16.46%) | 7,097<br>100.00% |
| | *High* | 1,843<br>(31.26%) | 2,774<br>(47.06%) | 1,278<br>(21.68%) | 5,895<br>100.00% |

**Table C-4 - Cross-tabulation of Educational Attainment with 2019 General Election Voting**

| | | ***2019 General Election Vote Choice*** | | | |
|---|---|---|---|---|---|
| | | *Conservative* | *Labour* | *Other* | ***Total*** |
| ***Educational Attainment*** | *Low* | 4,436<br>(61.07%) | 1,630<br>(22.44%) | 1,198<br>(16.49%) | 7,264<br>100.00% |
| | *Moderate* | 4,471<br>(49.61%) | 2,575<br>(28.57%) | 1,966<br>(21.82%) | 9,012<br>100.00% |
| | *High* | 2,570<br>(31.15%) | 3,402<br>(41.24%) | 2,278<br>(27.61%) | 8,250<br>100.00% |

**Table C-5 - Descriptive Statistics and Coding of Model Independent Variables**

| | | | *2016 EU Referendum* | *2017 General Election* | *2019 General Election* |
|---|---|---|---|---|---|
| ***Key Independent Variable*** | Educational attainment | Low – NVQ 2 or below | 7,369 (31.07%) | 5,893 (31.20%) | 7,264 (29.62%) |
| | | Moderate – NVQ 3 or 4 | 8,961 (37.78%) | 7,097 (37.58%) | 9,012 (36.74%) |
| | | High – NVQ 5 | 7,386 (31.14%) | 5,895 (31.22%) | 8,250 (33.64%) |
| ***Socio-demographic Controls*** | Age | | 23,716 (53.62, 0.102) | 18,885 (53.54, 0.113) | 24,526 (55.98, 0.099) |
| | Ethnicity | White British | 22,027 (93.58%) | 17,532 (93.29%) | 22,535 (93.06%) |
| | | Other | 1,512 (6.42%) | 1,261 (6.71%) | 1,681 (6.94%) |
| | Gender | Male | 11,515 (48.55%) | 8,947 (47.38%) | 11,552 (47.10%) |
| | | Female | 12,201 (51.45%) | 9,938 (52.62%) | 12,974 (52.90%) |
| | Subjective class | Working-class | 9,634 (41.18%) | 6,531 (39.12%) | 9,155 (37.33%) |
| | | Middle-class | 8,034 (34.34%) | 5,151 (30.85%) | 7,489 (30.53%) |
| | | Don't belong to any class | 4,681 (20.01%) | 4,142 (24.81%) | 6,671 (27.20%) |
| | | Other or don't know | 1,047 (4.48%) | 871 (5.22%) | 1,211 (4.94%) |
| | Interest in politics | Not at all interested | 1,038 (4.38%) | 1,147 (6.11%) | 1,360 (5.57%) |
| | | Not very interested | 3,447 (14.55%) | 3,216 (17.14%) | 3,805 (15.58%) |
| | | Fairly interested | 12,887 (54.41%) | 9,300 (49.57%) | 13,230 (54.16%) |
| | | Very interested | 6,314 (26.66%) | 5,099 (27.18%) | 6,031 (24.69%) |
| | Country of residence | England | 21,567 (90.94%) | 17,361 (91.93%) | 22,809 (93.00%) |
| | | Wales | 2,149 (9.06%) | 1,524 (8.07%) | 1,717 (7.00%) |
| ***Economic Orientation Mediators*** | Left-right views | | 22,048 (2.963, 0.014) | 17,720 (3.187, 0.016) | 24,004 (3.294, 0.013) |
| | Household Income | £14,999 a year, or less | 3,332 (14.82%) | 2,769 (15.49%) | 3,148 (13.35%) |
| | | £15,000 to £29,999, inclusive | 5,773 (25.68%) | 4,775 (26.71%) | 5,705 (24.20%) |
| | | £30,000 to £49,999, inclusive | 5,052 (22.47%) | 3,973 (22.22%) | 5,329 (22.61%0 |
| | | £50,000 a year, or more | 3,843 (17.09%) | 3,022 (16.90%) | 4,532 (19.22%) |
| | | Prefer not to say | 4,481 (19.93%) | 3,339 (18.68%) | 4,860 (20.62%) |

| | | | *2016 EU Referendum* | *2017 General Election* | *2019 General Election* |
|---|---|---|---|---|---|
| | Social Class | Managerial and professional | 10,392 (43.82%) | 6,485 (34.34%) | 10,418 (42.48%) |
| | | Intermediate occupations | 4,516 (19.04%) | 2,945 (15.59%) | 4,311 (17.58%) |
| | | Small employers and self-employed | 1,709 (7.21%) | 1,059 (5.61%) | 1,507 (6.14%) |
| | | Lower supervisory, technical and (semi)routine | 4,381 (18.47%) | 2,771 (14.67%) | 4,039 (16.47%) |
| | | Unclassified | 2,718 (11.46%) | 5,625 (29.79%) | 4,251 (17.33%) |
| ***Cultural Attitudes Mediators*** | Libertarian-authoritarian views | | 21,672 (6.379, 0.015) | 16,813 (6.331, 0.018) | 23,833 (6.322, 0.015) |
| | Immigration's cultural impact | | 23,435 (3.556, 0.013) | 18,073 (3.843, 0.015) | 24,274 (4.190, 0.013) |
| | Immigration's economic impact | Bad for economy | 9,539 (40.82%) | 5,058 (28.21%) | 5,366 (22.14%) |
| | | Neutral | 4,762 (20.38%) | 3,909 (21.80%) | 5,227 (21.56%) |
| | | Good for economy | 9,067 (38.80%) | 8,962 (49.99%) | 13,646 (56.30%) |
| | Number of immigrants | Less should be allowed | 12,584 (55.62%) | 9,700 (52.71%) | 10,544 (43.96%) |
| | | No strong opinion | 7,303 (32.28%) | 6,450 (35.05%) | 9,688 (40.40%) |
| | | More should be allowed | 2,737 (12.10%) | 2,251 (12.23%) | 3,751 (15.64%) |
| | Gay equality | Gone too far | 6,629 (28.94%) | 4,953 (27.42%) | 7,501 (31.33%) |
| | | About right | 10,644 (46.47%) | 8,430 (46.67%) | 10,281 (42.94%) |
| | | Not gone far enough | 5,630 (24.58%) | 4,681 (25.91%) | 6,159 (25.73%) |
| | Ethnic minority equality | Gone too far | 8,481 (37.20%) | 6,574 (36.49%) | 7,481 (31.28%) |
| | | About right | 9,386 (41.17%) | 7,414 (41.16%) | 9,824 (41.07%) |
| | | Not gone far enough | 4,931 (21.63%) | 4,026 (22.35%) | 6,613 (27.65%) |
| | Britishness | Not British | 1,236 (5.25%) | 789 (4.19%) | 865 (3.53%) |
| | | Somewhat British | 7,558 (32.12%) | 5,861 (31.12%) | 7,566 (30.91%) |
| | | Strongly British | 14,739 (62.63%) | 12,184 (64.69%) | 16,043 (65.55%) |
| | Europeanness | Not European | 7,952 (34.01%) | 6,433 (34.21%) | 7,825 (32.16%) |

| | | | *2016 EU Referendum* | *2017 General Election* | *2019 General Election* |
|---|---|---|---|---|---|
| | | Somewhat European | 10,256 (43.87%) | 8,053 (42.82%) | 10,385 (42.69%) |
| | | Strongly European | 5,171 (22.12%) | 4,321 (22.98%) | 6,118 (25.15%) |
| ***Political Cue-taking Mediators*** | News readership | Reads right-leaning paper | 8,975 (37.84%) | 6,543 (34.65%) | 8,325 (33.94%) |
| | | Reads left-leaning paper | 3,522 (14.85%) | 2,834 (15.01%) | 3,688 (15.04%) |
| | | Reads other paper | 2,298 (9.69%) | 1,714 (9.08%) | 1,791 (7.30%) |
| | | Doesn't regularly read news | 8,921 (37.62%) | 7,794 (41.27%) | 10,722 (43.72%) |
| | Populist sentiment | Politicians care what people like me think | 3,643 (15.63%) | 3,503 (18.63%) | 3,018 (12.42%) |
| | | Neutral | 5,003 (21.46%) | 4,772 (25.38%) | 4,936 (20.32%) |
| | | Politicians don't care what people like me think | 14,668 (62.91%) | 10,525 (55.98%) | 16,343 (67.26%) |

*Note: for categorical variables the unweighted number of observations in each category, and the % of the total variable this occupies, are reported. For continuous variables total number of observations are reported along with variable means and standard deviations. Scots are excluded.*

**Table C-6 - Descriptive Statistics and Coding of Model Independent Variables**

| | | *EU Referendum Model – F-Statistic (P-Value)* | *2017 GE Model – F-Statistic (P-Value)* | *2019 GE Model – F-Statistic (P-Value)* |
|---|---|---|---|---|
| ***Key Independent Variable*** | Educational attainment | 519.7 (0.000) | 79.44 (0.000) | 198.1 (0.000) |
| ***Socio-demographic Controls*** | Age | 9.839 (0.000) | 9.469 (0.000) | 12.46 (0.000) |
| | Ethnicity | 142.2 (0.000) | 56.89 (0.000) | 104.0 (0.000) |
| | Gender | *1.534 (0.216)* | 10.12 (0.000) | 11.53 (0.000) |
| | Subjective class | 62.85 (0.000) | 58.80 (0.000) | 43.21 (0.000) |
| | Interest in politics | 4.334 (0.012) | 5.268 (0.000) | 6.185 (0.000) |
| | Country | *0.397 (0.529)* | 14.37 (0.000) | 6.814 (0.000) |
| ***Economic Orientation*** | Left-right attitudes | 2.256 (0.002) | 89.36 (0.000) | 77.00 (0.000) |
| | Household income | 63.36 (0.000) | 11.88 (0.000) | 14.29 (0.000) |

| | | *EU Referendum Model – F-Statistic (P-Value)* | *2017 GE Model – F-Statistic (P-Value)* | *2019 GE Model – F-Statistic (P-Value)* |
|---|---|---|---|---|
| | Social class | 57.52 (0.000) | 25.15 (0.000) | 35.07 (0.000) |
| ***Cultural Attitudes*** | Libertarian-authoritarian views | 101.8 (0.000) | 48.88 (0.000) | 80.98 (0.000) |
| | Immigration's cultural impact | 492.5 (0.000) | 476.2 (0.000) | 291.9 (0.000) |
| | Immigration number | 1642 (0.000) | 355.1 (0.000) | 750.0 (0.000) |
| | Immigration's economic impact | 1486 (0.000) | 427.2 (0.000) | 522.3 (0.000) |
| | Gay equality | 320.8 (0.000) | 300.0 (0.000) | 595.6 (0.000) |
| | Ethnic minority equality | 674.2 (0.000) | 379.3 (0.000) | 764.4 (0.000) |
| | Britishness | 104.6 (0.000) | 123.9 (0.000) | 192.9 (0.000) |
| | Europeanness | 1301 (0.000) | 318.2 (0.000) | 718.5 (0.000) |
| ***Political Cues*** | News readership | 228.3 (0.000) | 303.1 (0.000) | 372.7 (0.000) |
| | Populist sentiment | 228.7 (0.000) | 134.7 (0.000) | *1.680 (0.153)* |

*Note: for the sake of ease, continuous variables have been treated as categorical variables here. This allowed the same measures of association (F statistics) to be used uniformly. Weights and constituency-clustered standard errors have been used with non-imputed data. Scots have been excluded. Italic text indicates no significant association between variable and the model dependent variable.*

# Appendix D Details of Multiple Imputation Procedure

MICE 'fills in' missing data by creating multiple imputations for each incomplete variable using a series of univariate imputation models, each of which have a fully conditional specification and include all variables except that being imputed (van Buuren, 2018; Stata.com, n.d.). The general MICE process for drawing imputed values for incomplete explanatory variables $X_{1,}\ X_2\ , \dots\ ,\ X_p$, is captured by the following equation, where $Z$ represents predictors with no missing values. The MICE imputation process in this equation is completed for $t = 0, 1, \dots, T$ iterations, until convergence is reached at $t = T$. The form of each univariate imputation model $g_p$ is determined by the form of $X_p$. Here, binary variables were imputed using binary logistic regression, unordered categorical variables using multinomial logistic regression and quasi-continuous scale variables using a nearest neighbour technique, matched to the five closest records (see Equation D-1.). Each missing value was imputed 10 times ($T = 10$). Uncertainty in the imputed vales is accounted for by combining the 10 imputed values for each variable to produce a final draw which is used in subsequent analyses.

**Equation D-1 - Multiple Imputation Procedure**

$$X_p^{(t+1)} \sim g_p\left(X_p \middle| X_1^{(t+1)}, X_2^{(t+2)}, \dots, X_{p-1}^{(t+1)}, Z, \emptyset_p\right) \quad \textit{Source: (Stata.com, n.d.)}$$

One imputation model was run for each of Chapter 4's 2016 EU referendum, 2017 and 2019 general election analytical models. Each imputation model included the model dependent variable, all independent variables (educational attainment, socio-demographic controls and hypothesised mediators) and variables indicating data structure (weights and clustering variables). While dependent vote choice variable(s) were used to impute incomplete explanatory variables ($X_{1,}\ X_2\ , \dots\ ,\ X_p$), to prevent these values being imputed as though they were un-related to vote choice, imputed values of the dependent (Y) variables were dropped before estimating the final 2016, 2017 and 2019 vote choice models. This decision was made based on von Hippel's (2007: 83) finding that using 'imputed Ys can add needless noise to...estimates' and therefore that cases with imputed dependent variable values should not be included for analysis.

# Appendix E Imputation Diagnostics

Eddings and Marchenko's (2012) user-written 'diagplots' command was used to compare the distributions of variable's imputed and observed values, across all vote choice models. A selection of these diagnostics are presented below - these suggest the imputation models were adequate, and thus, that MICE should be used rather than complete case analysis.

**Table E-1 - Imputation Diagnostics for Household Income in the 2016 EU Referendum Model**

| Household Income | Observed | Imputed | Completed |
|---|---|---|---|
| £14,999 a year, or less | 0.147 | 0.182 | 0.149 |
| £15,000 to £29,999, inclusive | 0.255 | 0.241 | 0.254 |
| £30,000 to £49,999, inclusive | 0.226 | 0.216 | 0.226 |
| £50,000 a year, or more | 0.170 | 0.152 | 0.169 |
| Prefer not to say | 0.201 | 0.210 | 0.202 |

**Figure E-1 - Imputation Diagnostics for Libertarian-Authoritarian Values in the 2016 EU Referendum Model**

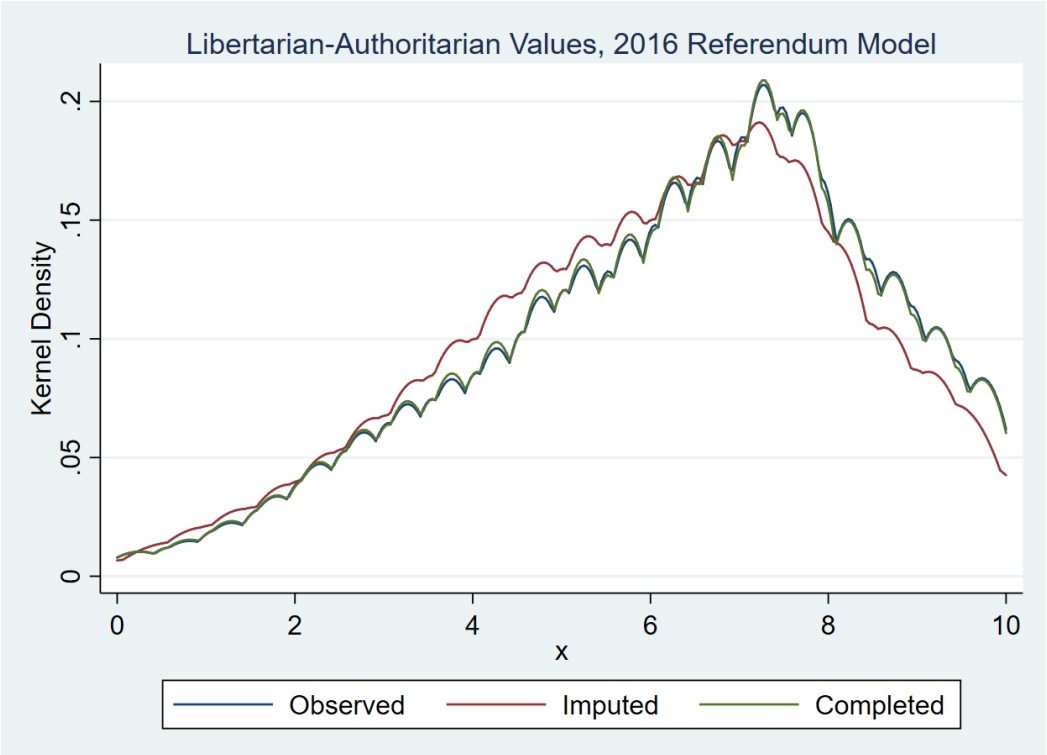



**Table E-2 - Imputation Diagnostics for Subjective Class in the 2017 General Election Model**

| Subjective Class Background | Observed | Imputed | Completed |
|---|---|---|---|
| Don't belong to a class | 0.251 | 0.280 | 0.254 |

| Subjective Class Background | Observed | Imputed | Completed |
|---|---|---|---|
| Working-class | 0.303 | 0.265 | 0.299 |
| Middle-class | 0.395 | 0.391 | 0.395 |
| Don't know or other class | 0.051 | 0.064 | 0.052 |

**Table E-3 - Imputation Diagnostics for Equality for Gays and Lesbians in the 2017 General Election Model**

| Equal Opportunities for Gays and Lesbians | Observed | Imputed | Completed |
|---|---|---|---|
| Have not gone far enough | 0.268 | 0.267 | 0.268 |
| About right | 0.462 | 0.489 | 0.463 |
| Have gone too far | 0.270 | 0.244 | 0.269 |

**Table E-4 - Imputation Diagnostics for Populist Sentiment in the 2019 General Election Model**

| Politicians Don't Care What People Like Me Think | Observed | Imputed | Completed |
|---|---|---|---|
| Do Care | 0.126 | 0.103 | 0.126 |
| Neutral | 0.204 | 0.244 | 0.204 |
| Don't Care | 0.670 | 0.653 | 0.670 |

**Table E-5 - Imputation Diagnostics for Ethnic Minority Equality in the 2019 General Election Model**

| Equal Opportunities for Ethnic Minorities | Observed | Imputed | Completed |
|---|---|---|---|
| Have not gone far enough | 0.282 | 0.257 | 0.282 |
| About right | 0.410 | 0.467 | 0.411 |
| Have gone too far | 0.308 | 0.276 | 0.307 |

Odds ratios and standard errors reported for all three final vote choice models (which correspond to block 5 models in Table 4-1 in the main text) obtained using complete case analysis and MICE were compared to assess the adequacy of the imputation models utilised. The three following tables show the results of these comparisons. The fact that estimates for all coefficients remain broadly similar across the complete case analysis and MICE models also suggests the imputation models used in the analysis presented in Chapter 4 were adequate.

**Table E-6 - Comparison of MICE and Complete Case Analysis Estimates for Full 2016 EU Referendum Vote Choice Logistic Regression Model**

| ***Explanatory Variables*** | ***2016: Leave versus Remain, Using Complete Case Analysis*** | | ***2016: Leave versus Remain, Using MICE*** | |
|---|---|---|---|---|
| *Educational Attainment, base: Low* | | | | |
| Moderate | 0.874* | (0.065) | 0.851** | (0.054) |
| High | 0.735*** | (0.065) | 0.662*** | (0.051) |
| *Age* | 1.001 | (0.002) | 1.002 | (0.002) |
| *Ethnicity, base: White British* | | | | |
| Other ethnicity | 0.923 | (0.123) | 0.842 | (0.096) |
| *Gender, base: Male* | | | | |
| Female | 0.967 | (0.060) | 0.908* | (0.052) |
| *Subjective Class Background, base: No Class Belonging* | | | | |
| Middle-class | 0.764*** | (0.065) | 0.761*** | (0.059) |
| Working-class | 0.947 | (0.083) | 0.886 | (0.067) |
| Don't know or other class | 1.152 | (0.258) | 1.134 | (0.174) |
| *Interest in Politics, base: Fairly Interested* | | | | |
| Not at all interested | 0.466*** | (0.067) | 0.467*** | (0.050) |
| Not very interested | 0.783*** | (0.062) | 0.764*** | (0.049) |
| Very interested | 1.913*** | (0.129) | 1.829*** | (0.115) |
| *Country of Residence, base: England* | | | | |
| Wales | 0.801** | (0.089) | 0.779** | (0.082) |
| *Left-Right Values* | 1.042** | (0.018) | 1.046*** | (0.017) |
| *Household Income, base: £14,999 or less* | | | | |
| £15,000 to £29,999 inclusive | 1.025 | (0.116) | 0.906 | (0.093) |
| £30,000 to £49,999 inclusive | 0.830 | (0.094) | 0.763** | (0.080) |
| £50,000 or more | 0.746** | (0.090) | 0.650*** | (0.075) |
| Prefer not to say | 0.928 | (0.109) | 0.846 | (0.093) |
| *Occupational Social Class, base: Managerial and Professional* | | | | |
| Intermediate occupations | 0.813** | (0.066) | 0.861* | (0.066) |
| Small employers and self-employed | 1.201 | (0.137) | 1.274** | (0.133) |
| Lower supervisory, technical and (semi-)routine work | 1.123 | (0.102) | 1.119 | (0.089) |
| Unclassifiable | 0.878 | (0.104) | 0.955 | (0.094) |
| *Libertarian-Authoritarian Values* | 1.104*** | (0.021) | 1.113*** | (0.020) |
| *Immigration's Cultural Effect* | 0.855*** | (0.020) | 0.862*** | (0.019) |
| *Number of Immigrants, base: Neutral* | | | | |
| Should be less | 2.535*** | (0.201) | 2.566*** | (0.177) |
| Should be more | 0.849 | (0.108) | 0.923 | (0.116) |
| *Immigration's Economic Effect, base: Neutral* | | | | |
| Bad for economy | 1.337*** | (0.114) | 1.361*** | (0.106) |
| Good for economy | 0.632*** | (0.053) | 0.603*** | (0.043) |
| *Equal Opportunities for Gays and Lesbians, base: About Right* | | | | |
| Not gone far enough | 0.905 | (0.092) | 0.960 | (0.088) |

| ***Explanatory Variables*** | ***2016: Leave versus Remain, Using Complete Case Analysis*** | | ***2016: Leave versus Remain, Using MICE*** | |
|---|---|---|---|---|
| Gone too far | 1.102 | (0.091) | 1.084 | (0.083) |
| *Equal Opportunities for Ethnic Minorities, base: About Right* | | | | |
| Not gone far enough | 0.782** | (0.087) | 0.837* | (0.085) |
| Gone too far | 1.148* | (0.088) | 1.164** | (0.080) |
| *Britishness, base: Somewhat British* | | | | |
| Not British | 0.809 | (0.138) | 0.719** | (0.105) |
| Very strongly British | 1.374*** | (0.092) | 1.312*** | (0.080) |
| *Europeanness, base: Somewhat European* | | | | |
| Not European | 4.274*** | (0.320) | 4.073*** | (0.273) |
| Very strongly European | 0.353*** | (0.032) | 0.351*** | (0.030) |
| *News Readership, base: Does not Regularly Consume News* | | | | |
| Reads right-leaning news | 1.571*** | (0.108) | 1.568*** | (0.099) |
| Reads left-leaning news | 0.631*** | (0.058) | 0.711*** | (0.065) |
| Reads other news | 1.110 | (0.114) | 1.052 | (0.098) |
| *Populist sentiment, base: Neutral* | | | | |
| Politicians care what people 'like me' think | 0.656*** | (0.067) | 0.659*** | (0.062) |
| Politicians do not care what people 'like me' think | 1.573*** | (0.120) | 1.364*** | (0.091) |
| ***Constant*** | 0.328*** | (0.090) | 0.371*** | (0.087) |
| ***Observations*** | | 18,134 | | 23,716 |

*Note: Odds ratios are reported with constituency clustered standard errors in parentheses. Weighting has been applied in analysis. Statistical significance is indicated by *** p<0.01, ** p<0.05, * p<0.1.*

**Table E-7 - Comparison of MICE and Complete Case Analysis Estimates for Full 2017 General Election Vote Choice Logistic Regression Model**

| ***Explanatory Variables*** | ***2017: Labour versus Conservative, Using Complete Case Analysis*** | | ***2017: Other versus Conservative, Using Complete Case Analysis*** | | ***2017: Labour versus Conservative, Using MICE*** | | ***2017: Other versus Conservative, Using MICE*** | |
|---|---|---|---|---|---|---|---|---|
| *Educational Attainment, base: Low* | | | | | | | | |
| Moderate | 1.151* | (0.095) | 1.215** | (0.106) | 1.105 | (0.076) | 1.131 | (0.085) |
| High | 1.176 | (0.120) | 1.354*** | (0.134) | 1.149* | (0.095) | 1.311*** | (0.122) |
| *Age* | 0.979*** | (0.003) | 0.996 | (0.003) | 0.976*** | (0.002) | 0.994** | (0.002) |
| *Ethnicity, base: White British* | | | | | | | | |
| Other ethnicity | 1.281 | (0.202) | 0.698** | (0.125) | 0.635*** | (0.097) | 0.901 | (0.168) |
| *Gender, base: Male* | | | | | | | | |
| Female | 1.286*** | (0.091) | 0.944 | (0.070) | 1.310*** | (0.078) | 0.983 | (0.063) |
| *Subjective Class Background, base: No Class Belonging* | | | | | | | | |
| Middle-class | 0.730*** | (0.072) | 0.834* | (0.080) | 0.678*** | (0.063) | 0.819* | (0.084) |
| Working-class | 1.913*** | (0.175) | 0.973 | (0.089) | 1.699*** | (0.133) | 0.951 | (0.084) |
| Don’t know or other class | 1.207 | (0.222) | 1.083 | (0.211) | 1.246 | (0.213) | 1.114 | (0.167) |
| *Interest in Politics, base: Fairly Interested* | | | | | | | | |
| Not at all interested | 0.819 | (0.134) | 0.756* | (0.127) | 0.759** | (0.090) | 0.737** | (0.093) |
| Not very interested | 0.688** | (0.105) | 0.617*** | (0.093) | 0.667*** | (0.073) | 0.603*** | (0.067) |
| Very interested | 0.661** | (0.109) | 0.608*** | (0.099) | 0.620*** | (0.079) | 0.560*** | (0.072) |
| *Country of Residence, base: England* | | | | | | | | |
| Wales | 1.830*** | (0.278) | 2.219*** | (0.451) | 1.825*** | (0.213) | 2.282*** | (0.433) |
| *Left-Right Values* | 0.516*** | (0.011) | 0.703*** | (0.016) | 0.511*** | (0.011) | 0.682*** | (0.014) |
| *Household Income, base: £14,999 or less* | | | | | | | | |
| £15,000 to £29,999 inclusive | 0.827* | (0.088) | 0.823* | (0.095) | 0.783*** | (0.068) | 0.786** | (0.087) |
| £30,000 to £49,999 inclusive | 0.782** | (0.095) | 0.892 | (0.114) | 0.746*** | (0.074) | 0.845 | (0.097) |
| £50,000 or more | 0.709** | (0.094) | 0.788* | (0.110) | 0.659*** | (0.076) | 0.783* | (0.106) |

| ***Explanatory Variables*** | ***2017: Labour versus Conservative, Using Complete Case Analysis*** | | ***2017: Other versus Conservative, Using Complete Case Analysis*** | | ***2017: Labour versus Conservative, Using MICE*** | | ***2017: Other versus Conservative, Using MICE*** | |
|---|---|---|---|---|---|---|---|---|
| Prefer not to say | 0.712*** | (0.087) | 0.706*** | (0.091) | 0.673*** | (0.065) | 0.657*** | (0.071) |
| *Occupational Social Class, base: Managerial and Professional* | | | | | | | | |
| Intermediate occupations | 1.326** | (0.145) | 1.023 | (0.115) | 1.275*** | (0.118) | 1.004 | (0.095) |
| Small employers and self-employed | 0.918 | (0.136) | 0.957 | (0.144) | 0.951 | (0.119) | 1.130 | (0.144) |
| Lower supervisory, technical and (semi-)routine work | 1.432*** | (0.156) | 1.324** | (0.150) | 1.312*** | (0.116) | 1.202** | (0.109) |
| Unclassifiable | 1.057 | (0.095) | 0.909 | (0.089) | 1.087 | (0.083) | 0.995 | (0.085) |
| *Libertarian-Authoritarian Values* | 0.738*** | (0.017) | 0.747*** | (0.017) | 0.738*** | (0.015) | 0.747*** | (0.017) |
| *Immigration's Cultural Effect* | 1.201*** | (0.036) | 1.065* | (0.035) | 1.152*** | (0.030) | 1.053 | (0.034) |
| *Number of Immigrants, base: Neutral* | | | | | | | | |
| Should be less | 0.652*** | (0.064) | 0.584*** | (0.058) | 0.661*** | (0.054) | 0.590*** | (0.058) |
| Should be more | 1.372** | (0.191) | 1.620*** | (0.235) | 1.182 | (0.150) | 1.142 | (0.150) |
| *Immigration's Economic Effect, base: Neutral* | | | | | | | | |
| Bad for economy | 0.973 | (0.097) | 1.197* | (0.123) | 0.936 | (0.081) | 1.058 | (0.100) |
| Good for economy | 1.197* | (0.118) | 1.218* | (0.133) | 1.179* | (0.105) | 1.241* | (0.156) |
| *Equal Opportunities for Gays and Lesbians, base: About Right* | | | | | | | | |
| Not gone far enough | 1.046 | (0.107) | 0.996 | (0.108) | 1.102 | (0.094) | 1.052 | (0.100) |
| Gone too far | 0.895 | (0.081) | 1.057 | (0.097) | 0.796*** | (0.066) | 0.912 | (0.079) |
| *Equal Opportunities for Ethnic Minorities, base: About Right* | | | | | | | | |
| Not gone far enough | 1.429*** | (0.167) | 1.528*** | (0.202) | 1.362*** | (0.141) | 1.363** | (0.164) |
| Gone too far | 0.900 | (0.076) | 0.947 | (0.080) | 0.888 | (0.067) | 0.993 | (0.081) |
| *Britishness, base: Somewhat British* | | | | | | | | |
| Not British | 0.773 | (0.144) | 1.148 | (0.207) | 0.803 | (0.125) | 1.330* | (0.203) |
| Very strongly British | 0.678*** | (0.054) | 0.638*** | (0.051) | 0.767*** | (0.053) | 0.767*** | (0.057) |

| ***Explanatory Variables*** | ***2017: Labour versus Conservative, Using Complete Case Analysis*** | | ***2017: Other versus Conservative, Using Complete Case Analysis*** | | ***2017: Labour versus Conservative, Using MICE*** | | ***2017: Other versus Conservative, Using MICE*** | |
|---|---|---|---|---|---|---|---|---|
| *Europeanness, base: Somewhat European* | | | | | | | | |
| Not European | 0.585*** | (0.050) | 0.728*** | (0.073) | 0.586*** | (0.042) | 0.685*** | (0.058) |
| Very strongly European | 1.756*** | (0.181) | 2.486*** | (0.255) | 1.565*** | (0.144) | 2.103*** | (0.202) |
| *News Readership, base: Does not Regularly Consume News* | | | | | | | | |
| Reads right-leaning news | 0.534*** | (0.046) | 0.712*** | (0.062) | 0.506*** | (0.035) | 0.732*** | (0.056) |
| Reads left-leaning news | 2.790*** | (0.341) | 2.108*** | (0.284) | 2.601*** | (0.285) | 1.926*** | (0.230) |
| Reads other news | 1.105 | (0.131) | 1.212 | (0.160) | 1.054 | (0.107) | 1.254** | (0.141) |
| *Populist sentiment, base: Neutral* | | | | | | | | |
| Politicians care what people 'like me' think | 0.740*** | (0.080) | 0.813* | (0.095) | 0.713*** | (0.069) | 0.801* | (0.093) |
| Politicians do not care what people 'like me' think | 1.658*** | (0.140) | 1.978*** | (0.185) | 1.528*** | (0.110) | 1.842*** | (0.143) |
| ***Constant*** | 106.9*** | (39.87) | 11.41*** | (4.233) | 307.7*** | (107.0) | 19.15*** | (7.845) |
| ***Observations*** | | | | 12,336 | | | | 18,885 |

*Note: Odds ratios are reported with constituency clustered standard errors in parentheses. Weighting has been applied. Statistical significance is indicated by *** p<0.01, ** p<0.05, * p<0.1.*

**Table E-8 - Comparison of MICE and Complete Case Analysis Estimates for Full 2019 General Election Vote Choice Logistic Regression Model**

| ***Explanatory Variables*** | ***2019: Labour versus Conservative, Using Complete Case Analysis*** | | ***2019: Other versus Conservative, Using Complete Case Analysis*** | | ***2019: Labour versus Conservative, Using MICE*** | | ***2019: Other versus Conservative, Using MICE*** | |
|---|---|---|---|---|---|---|---|---|
| *Educational Attainment, base: Low* | | | | | | | | |
| Moderate | 1.069 | (0.082) | 1.217*** | (0.082) | 1.048 | (0.075) | 1.210*** | (0.075) |
| High | 1.383*** | (0.116) | 1.569*** | (0.122) | 1.424*** | (0.114) | 1.556*** | (0.117) |
| *Age* | 0.973*** | (0.002) | 0.989*** | (0.002) | 0.972*** | (0.002) | 0.989*** | (0.002) |
| *Ethnicity, base: White British* | | | | | | | | |
| Other ethnicity | 1.402** | (0.185) | 0.944 | (0.124) | 1.454*** | (0.177) | 0.974 | (0.120) |
| *Gender, base: Male* | | | | | | | | |
| Female | 1.241*** | (0.073) | 0.961 | (0.054) | 1.277*** | (0.070) | 0.932 | (0.049) |
| *Subjective Class Background, base: No Class Belonging* | | | | | | | | |
| Middle-class | 0.759*** | (0.059) | 0.965 | (0.065) | 0.754*** | (0.055) | 0.938 | (0.059) |
| Working-class | 1.737*** | (0.120) | 0.927 | (0.061) | 1.727*** | (0.110) | 0.902 | (0.057) |
| Don’t know or other class | 0.962 | (0.151) | 1.025 | (0.136) | 1.010 | (0.144) | 0.951 | (0.113) |
| *Interest in Politics, base: Fairly Interested* | | | | | | | | |
| Not at all interested | 0.865 | (0.118) | 0.738** | (0.090) | 0.757** | (0.090) | 0.700*** | (0.074) |
| Not very interested | 0.614*** | (0.078) | 0.495*** | (0.058) | 0.582*** | (0.063) | 0.507*** | (0.051) |
| Very interested | 0.543*** | (0.079) | 0.437*** | (0.057) | 0.521*** | (0.066) | 0.444*** | (0.053) |
| *Country of Residence, base: England* | | | | | | | | |
| Wales | 1.717*** | (0.314) | 1.846*** | (0.344) | 1.943*** | (0.333) | 1.998*** | (0.340) |
| *Left-Right Values* | 0.563*** | (0.010) | 0.747*** | (0.012) | 0.569*** | (0.010) | 0.759*** | (0.012) |
| *Household Income, base: £14,999 or less* | | | | | | | | |
| £15,000 to £29,999 inclusive | 0.823* | (0.089) | 0.853* | (0.078) | 0.803** | (0.081) | 0.832** | (0.073) |
| £30,000 to £49,999 inclusive | 0.735*** | (0.073) | 0.824** | (0.077) | 0.727*** | (0.069) | 0.802** | (0.072) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| £50,000 or more | 0.642*** | (0.071) | 0.808** | (0.084) | 0.591*** | (0.062) | 0.740*** | (0.075) |
| Prefer not to say | 0.679*** | (0.067) | 0.770*** | (0.072) | 0.672*** | (0.062) | 0.753*** | (0.066) |
| *Occupational Social Class, base: Managerial and Professional* | | | | | | | | |
| Intermediate occupations | 1.069 | (0.084) | 1.241*** | (0.089) | 1.075 | (0.079) | 1.197*** | (0.081) |
| Small employers and self-employed | 0.675*** | (0.095) | 1.014 | (0.114) | 0.716** | (0.097) | 1.023 | (0.106) |
| Lower supervisory, technical and (semi-) routine work | 0.767*** | (0.065) | 0.967 | (0.085) | 0.802*** | (0.062) | 0.940 | (0.074) |
| Unclassifiable | 1.104 | (0.095) | 1.266*** | (0.103) | 1.117 | (0.062) | 1.220*** | (0.091) |
| *Libertarian-Authoritarian Values* | 0.765*** | (0.014) | 0.793*** | (0.014) | 0.775*** | (0.014) | 0.802*** | (0.014) |
| *Immigration's Cultural Effect* | 1.159*** | (0.029) | 1.058*** | (0.021) | 1.170*** | (0.027) | 1.063*** | (0.021) |
| *Immigration's Economic Effect, base: Neutral* | | | | | | | | |
| Bad for economy | 1.083 | (0.100) | 0.983 | (0.088) | 1.103 | (0.100) | 1.048 | (0.087) |
| Good for economy | 1.200** | (0.098) | 1.316*** | (0.093) | 1.162* | (0.090) | 1.293*** | (0.090) |
| *Number of Immigrants, base: Neutral* | | | | | | | | |
| Should be less | 0.604*** | (0.049) | 0.616*** | (0.041) | 0.615*** | (0.049) | 0.610*** | (0.041) |
| Should be more | 1.183 | (0.123) | 1.167 | (0.119) | 1.257** | (0.125) | 1.286** | (0.125) |
| *Equal Opportunities for Gays and Lesbians, base: About Right* | | | | | | | | |
| Not gone far enough | 1.377*** | (0.121) | 1.262*** | (0.112) | 1.367*** | (0.113) | 1.270*** | (0.108) |
| Gone too far | 0.855* | (0.068) | 0.944 | (0.067) | 0.879* | (0.068) | 0.945 | (0.065) |
| *Equal Opportunities for Ethnic Minorities, base: About Right* | | | | | | | | |
| Not gone far enough | 1.488*** | (0.128) | 1.287*** | (0.111) | 1.405*** | (0.114) | 1.213** | (0.102) |
| Gone too far | 0.785*** | (0.061) | 0.897 | (0.061) | 0.728*** | (0.056) | 0.867** | (0.056) |
| *Britishness, base: Somewhat British* | | | | | | | | |
| Not British | 0.832 | (0.153) | 1.042 | (0.164) | 0.945 | (0.161) | 1.127 | (0.176) |
| Very strongly British | 0.624*** | (0.038) | 0.626*** | (0.038) | 0.649*** | (0.037) | 0.652*** | (0.037) |
| *Europeanness, base: Somewhat European* | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Not European | 0.410*** | (0.031) | 0.535*** | (0.036) | 0.420*** | (0.029) | 0.518*** | (0.033) |
| Very strongly European | 3.070*** | (0.217) | 3.449*** | (0.236) | 3.026*** | (0.212) | 3.392*** | (0.233) |
| *News Readership, base: Does not Regularly Consume News* | | | | | | | | |
| Reads right-leaning news | 0.410*** | (0.028) | 0.608*** | (0.037) | 0.392*** | (0.026) | 0.600*** | (0.035) |
| Reads left-leaning news | 2.538*** | (0.273) | 2.124*** | (0.234) | 2.418*** | (0.259) | 2.113*** | (0.226) |
| Reads other news | 1.210* | (0.125) | 1.325*** | (0.127) | 1.127 | (0.113) | 1.334*** | (0.127) |
| *Populist sentiment, base: Neutral* | | | | | | | | |
| Politicians care what people 'like me' think | 0.947 | (0.109) | 1.036 | (0.106) | 0.921 | (0.101) | 0.962 | (0.098) |
| Politicians do not care what people 'like me' think | 0.950 | (0.071) | 1.174** | (0.076) | 0.980 | (0.068) | 1.175** | (0.078) |
| ***Constant*** | 121.8*** | (35.69) | 18.06 | (5.156) | 116.4*** | (30.38) | 16.83*** | (4.543) |
| ***Observations*** | | | | 21,338 | | | | 24,526 |

*Note: Odds ratios are reported with constituency clustered standard errors in parentheses. Weighting has been applied. Statistical significance is indicated by *** p<0.01, ** p<0.05, * p<0.1.*

# Appendix F Sensitivity Analysis. Direct, Indirect and Total Effects Reported using Karlson-Holm-Breen versus 'LDECOMP' Methods

Sensitivity analyses were conducted to ensure results obtained using the KHB method were broadly comparable with those obtained using other methods. This sensitivity analysis presents a comparison of direct, indirect and total effect estimates, and the contribution direct and indirect effects make to the total effect of education on vote choice, for each political contest considered, when using the KHB and LDECOMP methods. The LDECOMP Stata package is used (see: Buis, 2010).

Unlike the KHB method, LDECOMP does not facilitate disentanglement of each mediators' relative contribution to the overall indirect effect. This is the main reason the KHB analysis was favoured, over LDECOMP, and used in this paper's analysis. The KHB method was also preferred as it can:

- produce effect decomposition estimates on imputed and weighted data, unlike LDECOMP, which can only use one or the other
- use multinomial dependent and mediating variables without requiring these to be converted into binary variable format

While structural equation modelling is widely known to allow exploration of how mediating variables contribute to an overall indirect effect, this property is only available when estimating linear models. Structural equation modelling cannot be used to perform path analysis in non-linear models, like those used here, as it offers no ability to re-scale coefficients, unlike the specifically designed LDECOMP and KHB methods. Using structural equation modelling would lead to mistaken inferences about the size of indirect effect pathways as this method is unable to separate the influences of genuine mediating effects and coefficient re-scaling effects in contributing to changes in the reported coefficient(s) of a given independent variable, as mediators are added (Karlson, Holm and Breen, 2012).

These sensitivity analyses use imputed data, as in the final models presented in Chapter 4. Both KHB and LDECOMP estimates are unweighted, to facilitate comparability, as LDECOMP cannot calculate standard errors when both imputed data and weights are used. As with the final models presented in the main body of this paper, these sensitivity analyses exclude Scots.

While some slight differences are seen in the estimates produced by the LDECOMP and KHB methods, estimates of the % of the total effect driven by direct and indirect effects are generally

within a few percentage points of one another and the same general overall conclusions about effects' size and statistical significance are drawn from both methods. This suggests the results of the KHB method are robust.

LDECOMP produces two estimates of direct and indirect effects. The average of these estimates is reported in the tables below. As the LDECOMP method does not allow effect decomposition with multinomial dependent variables, LDECOMP values for the Labour/Conservative and Other/Conservative outcomes have been calculated by estimating two separate binary logistic regressions. Unweighted regression coefficients are reported with constituency-clustered standard errors in parentheses throughout. *p < 0.1, ** p < 0.05 and ***p < 0.01.

**Table F-1 - Comparison of Effect Decomposition Statistics Reported Using the KHB and LDECOMP Methods, for the 2016 EU Referendum Model**

| Reference: Low Education | 2016: Leave versus Remain (KHB) | 2016: Leave versus Remain (LDECOMP) |
|---|---|---|
| **Moderate Education** | | |
| Total Effect | -0.919*** | -0.784*** |
| Direct Effect | -0.106** | -0.063** |
| Indirect Effect | -0.814*** | -0.722*** |
| % Total which is Direct | 11.48% | 8.00% |
| % Total which is Indirect | 88.52% | 92.00% |
| **High Education** | | |
| Total Effect | -2.066*** | -1.627*** |
| Direct Effect | -0.282*** | -0.167*** |
| Indirect Effect | -1.784*** | -1.460*** |
| % Total which is Direct | 13.64% | 10.27% |
| % Total which is Indirect | 86.36% | 89.73% |
| **Observations** | | 23,716 |

**Table F-2 - Comparison of Effect Decomposition Statistics Reported Using the KHB and LDECOMP Methods, for the 2017 General Election Model**

| Reference: Low Education | 2017: Labour versus Conservative (KHB) | 2017: Other versus Conservative (KHB) | 2017: Labour versus Conservative (LDECOMP) | 2017: Other versus Conservative (LDECOMP) |
|---|---|---|---|---|
| **Moderate Education** | | | | |
| Total Effect | 0.377*** | 0.445*** | 0.251*** | 0.357*** |
| Direct Effect | 0.052 | 0.144** | 0.036 | 0.118** |
| Indirect Effect | 0.325*** | 0.302*** | 0.215*** | 0.239*** |
| % Total which is Direct | 13.91% | 32.27% | 14.47% | 33.04% |
| % Total which is Indirect | 86.09% | 67.73% | 85.53% | 66.96% |
| **High Education** | | | | |
| Total Effect | 1.373*** | 1.401*** | 0.783*** | 1.002*** |

| Reference: Low Education | 2017: Labour versus Conservative (KHB) | 2017: Other versus Conservative (KHB) | 2017: Labour versus Conservative (LDECOMP) | 2017: Other versus Conservative (LDECOMP) |
|---|---|---|---|---|
| Direct Effect | 0.169** | 0.389*** | 0.079** | 0.277*** |
| Indirect Effect | 1.204*** | 1.011*** | 0.704*** | 0.725*** |
| % Total which is Direct | 12.29% | 27.80% | 10.10% | 27.67% |
| % Total which is Indirect | 87.71% | 72.20% | 89.90% | 72.33% |
| **Observations** | | | | 18,885 |

**Table F-3 - Comparison of Effect Decomposition Statistics Reported Using the KHB and LDECOMP Methods, for the 2019 General Election Model**

| Reference: Low education | 2019: Labour versus Conservative (KHB) | 2019: Other versus Conservative (KHB) | 2019: Labour versus Conservative (LDECOMP) | 2019: Other versus Conservative (LDECOMP) |
|---|---|---|---|---|
| **Moderate Education** | | | | |
| Total Effect | 0.580*** | 0.615*** | 0.429*** | 0.497*** |
| Direct Effect | 0.095* | 0.211*** | 0.046 | 0.153*** |
| Indirect Effect | 0.485*** | 0.404*** | 0.383*** | 0.344*** |
| % Total which is Direct | 16.31% | 34.33% | 10.80% | 30.83% |
| % Total which is Indirect | 83.69% | 65.67% | 89.20% | 69.17% |
| **High Education** | | | | |
| Total Effect | 1.880*** | 1.653*** | 1.241*** | 1.207*** |
| Direct Effect | 0.302*** | 0.456*** | 0.144*** | 0.321*** |
| Indirect Effect | 1.577*** | 1.197*** | 1.096*** | 0.886*** |
| % Total which is Direct | 16.09% | 27.59% | 11.62% | 26.61% |
| % Total which is Indirect | 83.91% | 72.41% | 88.38% | 73.39% |
| **Observations** | | | | 24,526 |

# Appendix G Sensitivity Analysis. Direct, Indirect and Total Effects Reported Using Complete Cases Versus Imputed Data

The following set of tables show that estimates of educations' direct and indirect effects on vote choice, and effect disentanglement statistics, reported across the three vote choice models analysed in Chapter 4, vary relatively little whether they are based on complete cases or imputed data. Differences between complete cases and MICE results are primarily linked to their different sample sizes and thus, the level of precision with which their estimates can be made. Standard errors are consistently, and considerably, larger in the complete cases models and less results are highly statistically significant in these models. Weighted regression coefficients are reported with constituency-clustered standard errors in parentheses throughout. *p < 0.1, ** p < 0.05 and ***p < 0.01.

**Table G-1 - Comparison of Effect Decomposition Statistics Reported Using Complete Cases and Imputed Data for the 2016 EU Referendum Vote Choice Model**

| **Reference category: Low Education** | **2016: Leave versus Remain N = 23,716 (MICE)** | | **2016: Leave versus Remain N = 18,134 (Complete Cases)** | |
|---|---|---|---|---|
| **Moderate Education** | | | | |
| Total Effect | -0.894*** | (0.062) | -0.831*** | (0.073) |
| Direct Effect | -0.162** | (0.063) | -0.134* | (0.074) |
| Indirect Effect | -0.732*** | (0.065) | -0.697*** | (0.074) |
| % Total which is Direct | 18.10% | | 16.14% | |
| % Total which is Indirect | 81.90% | | 83.86% | |
| % Total via Economic Orientation | 4.44% | | 3.75% | |
| % Total via Cultural Attitudes | 73.74% | | 74.86% | |
| % Total via Political Cues | 3.71% | | 5.27% | |
| **High Education** | | | | |
| Total Effect | -1.843*** | (0.074) | -1.836*** | (0.087) |
| Direct Effect | -0.412*** | (0.076) | -0.308*** | (0.088) |
| Indirect Effect | -1.431*** | (0.072) | -1.528*** | (0.083) |
| % Total which is Direct | 22.35% | | 16.78% | |
| % Total which is Indirect | 77.65% | | 83.22% | |
| % Total via Economic Orientation | 3.60% | | 2.45% | |
| % Total via Cultural Attitudes | 68.62% | | 73.40% | |
| % Total via Political Cues | 5.43% | | 7.37% | |

**Table G-2 - Comparison of Effect Decomposition Statistics Reported Using Complete Cases and Imputed Data for the 2017 General Election Vote Choice Model**

| Reference category: Low Education | 2017: Labour versus Conservative N = 18,885 (MICE) | | 2017: Other versus Conservative N = 18,885 (MICE) | | 2017: Labour versus Conservative N = 12,336 (Complete Cases) | | 2017: Other versus Conservative N = 12,336 (Complete Cases) | |
|---|---|---|---|---|---|---|---|---|
| **Moderate Education** | | | | | | | | |
| Total Effect | 0.336*** | (0.067) | 0.374*** | (0.074) | 0.390*** | (0.080) | 0.448*** | (0.085) |
| Direct Effect | 0.099 | (0.069) | 0.123 | (0.075) | 0.140* | (0.083) | 0.195** | (0.087) |
| Indirect Effect | 0.236*** | (0.080) | 0.250*** | (0.061) | 0.249** | (0.099) | 0.253*** | (0.075) |
| % Total which is Direct | | 29.62% | | 32.97% | | 36.06% | | 43.51% |
| % Total which is Indirect | | 70.38% | | 67.03% | | 63.94% | | 56.49% |
| % Total via Economic Orientation | | -54.18% | | -27.53% | | -52.52% | | -25.81% |
| % Total via Cultural Attitudes | | 121.91% | | 93.83% | | 117.79% | | 84.74% |
| % Total via Political Cues | | 2.65% | | 0.73% | | -1.34% | | -2.43% |
| **High Education** | | | | | | | | |
| Total Effect | 1.050*** | (0.077) | 1.083*** | (0.087) | 1.301*** | (0.093) | 1.281*** | (0.095) |
| Direct Effect | 0.139* | (0.082) | 0.271*** | (0.093) | 0.162 | (0.102) | 0.303*** | (0.099) |
| Indirect Effect | 0.911*** | (0.085) | 0.812*** | (0.070) | 1.138*** | (0.105) | 0.977*** | (0.083) |
| % Total which is Direct | | 13.24% | | 25.04% | | 12.49% | | 23.68% |
| % Total which is Indirect | | 86.76% | | 74.96% | | 87.51% | | 76.32% |
| % Total via Economic Orientation | | -11.51% | | -4.97% | | -6.31% | | -3.02% |
| % Total via Cultural Attitudes | | 87.82% | | 74.29% | | 84.97% | | 73.98% |
| % Total via Political Cues | | 10.46% | | 5.64% | | 8.85% | | 5.34% |

**Table G-3 - Comparison of Effect Decomposition Statistics Reported Using Complete Cases and Imputed Data for the 2019 General Election Vote Choice Model**

| Reference category: Low Education | 2019: Labour versus Conservative N = 24,526 (MICE) | | 2019: Other versus Conservative N = 24,526 (MICE) | | 2019: Labour versus Conservative N = 21,338 (Complete Cases) | | 2019: Other versus Conservative N = 21,338 (Complete Cases) | |
|---|---|---|---|---|---|---|---|---|
| **Moderate Education** | | | | | | | | |
| Total Effect | 0.504*** | (0.071) | 0.587*** | (0.061) | 0.533*** | (0.076) | 0.583*** | (0.066) |
| Direct Effect | 0.047 | (0.072) | 0.190*** | (0.062) | 0.067 | (0.077) | 0.197*** | (0.067) |
| Indirect Effect | 0.457*** | (0.077) | 0.397*** | (0.056) | 0.466*** | (0.084) | 0.386*** | (0.061) |
| % Total which is Direct | | 9.36% | | 32.42% | | 12.54% | | 33.74% |
| % Total which is Indirect | | 90.64% | | 67.58% | | 87.46% | | 66.26% |
| % Total via Economic Orientation | | -22.77% | | -12.53% | | -19.54% | | -13.24% |
| % Total via Cultural Attitudes | | 104.71% | | 75.71% | | 98.99% | | 75.64% |
| % Total via Political Cues | | 8.70% | | 4.39% | | 7.99% | | 3.89% |
| **High Education** | | | | | | | | |
| Total Effect | 1.742*** | (0.080) | 1.533*** | (0.074) | 1.811*** | (0.086) | 1.588*** | (0.077) |
| Direct Effect | 0.354*** | (0.080) | 0.442*** | (0.075) | 0.324*** | (0.084) | 0.451*** | (0.078) |
| Indirect Effect | 1.388*** | (0.085) | 1.091*** | (0.066) | 1.487*** | (0.092) | 1.137*** | (0.071) |
| % Total which is Direct | | 20.31% | | 28.84% | | 17.90% | | 28.37% |
| % Total which is Indirect | | 79.69% | | 71.16% | | 82.10% | | 71.63% |
| % Total via Economic Orientation | | 0.01% | | -2.50% | | 1.68% | | -1.95% |
| % Total via Cultural Attitudes | | 69.17% | | 65.55% | | 69.86% | | 65.75% |
| % Total via Political Cues | | 10.51% | | 8.11% | | 10.57% | | 7.81% |

# Appendix H Exploration of the Educational Divide in Key Indicators of Economic Orientations and Cultural Attitudes

Left-right (economic) attitudes and libertarian-authoritarian (cultural) attitudes can be considered key measures of the economic and cultural divisions that mark British politics. Exploring the size of the educational gulfs in these attitudes provides an indication as to the relative size of the overall educational divide over economic orientations and cultural attitudes. Table H-1 shows the mean position of each educational group on the left-right and libertarian-authoritarian attitudinal scales in each election studied, and the difference between each groups' position as compared to the low education reference group.

**Table H.1 - Educational Divide in Left-right and Libertarian-authoritarian Attitudes**

| | Left-right Scale | Difference to Low Educated Reference | Libertarian-Authoritarian Scale | Difference to Low Educated Reference |
|---|---|---|---|---|
| *2017 General Election Sample* | | | | |
| Low Education | 3.157 | | 7.385 | |
| Moderate Education | 3.358 | +0.201 | 6.420 | -0.965 |
| High Education | 3.318 | +0.161 | 5.450 | -1.935 |
| *2019 General Election Sample* | | | | |
| Low Education | 3.148 | | 7.355 | |
| Moderate Education | 3.407 | +0.259 | 6.286 | -1.069 |
| High Education | 3.210 | +0.062 | 5.312 | -2.043 |

*Note: statistics presented are based on weighted, imputed data. Scots are excluded.*

Results clearly show that the economic orientations of high and low educated British electors are more similar than those of moderately and low educated electors, although this difference is relatively subtle. Table H-1 also clearly illustrates that the cultural attitudes of high and low educated British electors diverge considerably more strongly than those of moderately and low educated electors. These facts are reflected in the results of the analysis presented in Chapter 4, whereby economic and cultural mechanisms explain a relatively larger portion of education's indirect effect on general election vote choices for educational contrasts in situations where a deeper initial educational divide in these orientations is observed.

# Appendix I Age Distribution of Higher Education Graduates

**Table I-1 - Age Distribution of HE Graduates in Full Sample**

| Summary Statistic | Value |
|---|---|
| 1st percentile | 20 |
| 25th percentile | 22 |
| 50th percentile (median) | 23 |
| 75th percentile | 27 |
| 99th percentile | 62 |
| Mean | 27 |
| Standard deviation | 9.563 |
| Skewness | 2.169 |
| Kurtosis | 7.777 |

# Appendix J Comparison of Higher Education's Effect on Attitudes Based on Three- and Four-year Specifications

**Table J-1 - The HE Effect on Gender Attitudes, 3- and 4-year Specifications**

| Regression Model Statistics | (1.4) Education Only | (1.3) Education Only | (2.4) Self-selection | (2.3) Self-selection | (3.4) Self-selection + Pre-adult Attitudes | (3.3) Self-selection + Pre-adult Attitudes | (4.4) Sibling - Matched | (4.3) Sibling - Matched |
|---|---|---|---|---|---|---|---|---|
| Education coefficient – HE versus non-HE | 0.447*** | 0.426*** | 0.210*** | 0.193*** | 0.180*** | 0.176*** | 0.084 | 0.051 |
| Standard error | 0.022 | 0.021 | 0.038 | 0.038 | 0.037 | 0.036 | 0.065 | 0.066 |
| T value of coefficient | 20.61 | 20.63 | 5.51 | 5.15 | 4.81 | 4.91 | 1.29 | 0.077 |
| P value of coefficient | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.199 | 0.439 |
| Observations | 10,775 | 11,048 | 2,242 | 2,296 | 2,027 | 2,171 | 1,151 | 1,278 |

*Note: Estimates are based on complete cases and use sibling-clustered standard errors. Significance is denoted by *** p < 0.01; ** p < 0.05; * p < 0.1.*

**Table J-2 - The HE Effect on Economic Attitudes, 3- and 4-year Specifications**

| Regression Model Statistics | (1.4) Education Only | (1.3) Education Only | (2.4) Self-selection | (2.3) Self-selection | (3.4) Self-selection + Pre-adult Attitudes | (3.3) Self-selection + Pre-adult Attitudes | (4.4) Sibling - Matched | (4.3) Sibling - Matched |
|---|---|---|---|---|---|---|---|---|
| Education coefficient – HE versus non-HE | -0.134*** | -0.127*** | -0.069 | -0.070 | -0.073 | -0.050 | -0.022 | -0.011 |
| Standard error | 0.028 | 0.028 | 0.051 | 0.050 | 0.055 | 0.048 | 0.090 | 0.076 |
| T value of coefficient | -4.74 | 4.60 | -1.35 | -1.39 | -1.34 | -1.05 | -0.247 | -0.15 |
| P value of coefficient | 0.000 | 0.000 | 0.176 | 0.164 | 0.182 | 0.295 | 0.805 | 0.881 |
| Observations | 3,075 | 3,108 | 647 | 652 | 542 | 616 | 326 | 375 |

*Note: Estimates are based on complete cases and use sibling-clustered standard errors. Significance is denoted by *** p < 0.01; ** p < 0.05; * p < 0.1.*

**Table J-3 - The HE Effect on Environmental Attitudes, 3- and 4-year Specifications**

| Regression Model Statistics | (1.4) Education Only | (1.3) Education Only | (2.4) Self-selection | (2.3) Self-selection | (3.4) Self-selection + Pre-adult Attitudes | (3.3) Self-selection + Pre-adult Attitudes | (4.4) Sibling - Matched | (4.3) Sibling - Matched |
|---|---|---|---|---|---|---|---|---|
| Education coefficient – HE versus non-HE | 0.402*** | 0.367*** | 0.184*** | 0.172*** | 0.122*** | 0.135*** | -0.045 | -0.118 |
| Standard error | 0.017 | 0.017 | 0.048 | 0.048 | 0.055 | 0.049 | 0.143 | 0.116 |
| T value of coefficient | 23.06 | 22.07 | 3.82 | 3.60 | 2.22 | 2.38 | -0.316 | -1.023 |
| P value of coefficient | 0.000 | 0.000 | 0.000 | 0.000 | 0.027 | 0.006 | 0.753 | 0.308 |
| Observations | 7,099 | 7,353 | 851 | 869 | 599 | 746 | 171 | 268 |

*Note: Estimates are based on complete cases and use sibling-clustered standard errors. Significance is denoted by *** p < 0.01; ** p < 0.05; * p < 0.1.*

# Appendix K Comparison of the Distribution of Separate Understanding Society and British Household Panel Study Attitudinal Scales

**Table K-1 - Summaries of Attitudinal Scales Constructed Across Understanding Society and the British Household Panel Study**

| Attitudinal Scale | Summary Statistics | Combined Summary Statistics |
|---|---|---|
| Gender attitudes | 1st percentile – 1.0<br>25th percentile – 2.7<br>50th percentile (median) – 3.3<br>75th percentile – 4.0<br>99th percentile – 5.0<br>Mean – 3.2<br>Standard deviation – 0.9<br>Skewness – -0.1<br>Kurtosis – 2.6 | |
| Economic attitudes | 1st percentile – 1.8<br>25th percentile – 3.0<br>50th percentile (median) – 3.4<br>75th percentile – 3.6<br>99th percentile – 4.6<br>Mean – 3.3<br>Standard deviation – 0.6<br>Skewness – -0.2<br>Kurtosis – 3.2 | |
| Environmentalism – Understanding Society | 1st percentile – 1.9<br>25th percentile – 2.9<br>50th percentile (median) – 3.2<br>75th percentile – 3.7<br>99th percentile – 4.8<br>Mean – 3.3<br>Standard deviation – 0.6<br>Skewness – 0.1<br>Kurtosis – 3.0 | 1st percentile – 1.9<br>25th percentile – 2.9<br>50th percentile (median) – 3.3<br>75th percentile – 3.8<br>99th percentile – 4.8<br>Mean – 3.3<br>Standard deviation – 0.6<br>Skewness – 0.1<br>Kurtosis – 2.9 |
| Environmentalism – BHPS | 1st percentile – 2.0<br>25th percentile – 3.0<br>50th percentile (median) – 3.5<br>75th percentile – 4.0<br>99th percentile – 5.0<br>Mean – 3.5<br>Standard deviation – 0.6<br>Skewness – -0.2<br>Kurtosis – 2.9 | |

# Appendix L Construction of Attitudinal Scales

**Table L-1 - Summary of Survey Items Included in Attitudinal Scales and Reliability Measures of Resulting Scales**

| Attitude Measured | Survey Items Included | Cronbach's Alpha |
|---|---|---|
| Gender roles | • A husband's job is to earn money, a wife's job is to look after the home and family.<br>• All in all, family life suffers when the woman has a full-time job.<br>• A pre-school child is likely to suffer if his or her mother works. | 0.801 |
| Economic Attitudes | • There is one law for the rich and one for the poor.<br>• Private enterprise is the best way to solve the UK's economic problems<br>• Major public services and industries ought to be in state ownership<br>• It is the government's responsibility to provide a job for everyone who wants one.<br>• Strong trade unions are needed to protect the working conditions and wages of employees | 0.576 |
| Environmentalism | **In Understanding Society:**<br>• My behaviour and everyday lifestyle contribute to climate change.<br>• I would be prepared to pay more for environmentally-friendly products.<br>• If things continue on their current course, we will soon experience a major environmental disaster.<br>• The so-called 'environmental crisis' facing humanity has been greatly exaggerated.<br>• Climate change is beyond control - it's too late to do anything about it.<br>• The effects of climate change are too far in the future to really worry me.<br>• Any changes I make to help the environment need to fit in with my lifestyle.<br>• It's not worth me doing things to help the environment if others don't do the same.<br>• It's not worth the UK trying to combat climate change, because other countries will just cancel out what we do.<br><br>**In the BHPS:**<br>• It takes too much time and effort to do things that are environmentally friendly<br>• Scientists will find a solution to global warming without people having to make big changes to their lifestyle | **Understanding Society** = 0.993<br>**BHPS** = 0.970 |

| Attitude Measured | Survey Items Included | Cronbach's Alpha |
|---|---|---|
| | • The environment is a low priority for me compared with a lot of other things in my life<br>• I am environmentally friendly in most things I do | |

# Appendix M Variable Coding and Summary Statistics

**Table M-1 - Summary Statistics for All Variables Used in Analysis**

| Variable | Categories (if relevant) | Summary Statistic |
|---|---|---|
| Adult gender role attitude scale | | 3.462 (0.899) |
| Adult economic attitude scale | | 3.334 (0.547) |
| Adult environmentalism scale | | 3.293 (0.613) |
| HE status | Graduate | 2,650 (4.42%) |
| | Non-graduate | 57,292 (95.58%) |
| Gender | Male | 28,090 (46.86%) |
| | Female | 31,852 (53.14%) |
| Cognitive ability | No information | 27,342 (45.61%) |
| | Low ability | 12,387 (20.66%) |
| | Medium ability | 11,117 (18.55%) |
| | High ability | 9,096 (15.17%) |
| Psychological security | No information | 26,085 (43.52%) |
| | Agree | 25,419 (42.41%) |
| | Disagree | 8,438 (14.08%) |
| Occupational class | Managers & professionals | 3,121 (20.20%) |
| | Intermediate | 2,605 (16.86%) |
| | Semi(routine) | 5,180 (33.53%) |
| | Inapplicable | 4,543 (29.41%) |
| Membership of community groups | Yes | 1,065 (1.78%) |
| | No | 58,877 (98.22%) |
| Membership of sports groups | Yes | 2,612 (4.36%) |
| | No | 57,330 (95.64%) |
| Participation in cultural activities | Yes | 4,384 (7.31%) |
| | No | 55,558 (92.69%) |
| Birth order **(siblings only)** | Oldest sibling | 6,677 (48.62%) |
| | Not the oldest | 7,057 (51.38%) |
| Pre-adult gender role attitude scale | | 3.568 (0.845) |
| Pre-adult economic attitude scale | | 3.316 (0.500) |
| Pre-adult environmentalism scale | | 3.259 (0.592) |
| Parental occupation | Managers & professionals | 3,087 (28.38%) |
| | Intermediate | 1,920 (17.65%) |
| | Semi(routine) | 2,798 (25.72%) |
| | Inapplicable | 3,074 (28.26%) |
| Parental education | Degree | 2,130 (19.78%) |
| | Non-degree HE | 1,513 (14.05%) |
| | A level, or equivalent | 1,844 (17.12%) |
| | GCSE, or equivalent | 2,760 (25.63%) |
| | Other qualifications | 1,136 (10.55%) |
| | No qualifications | 1,385 (12.86%) |
| Parental income | Lowest quintile | 1,393 (12.75%) |
| | 2nd lowest | 1,988 (18.20%) |
| | Middle | 2,553 (23.37%) |
| | 2nd highest | 2,858 (26.16%) |
| | Highest quintile | 2,134 (19.53%) |

| Variable | Categories (if relevant) | Summary Statistic |
|---|---|---|
| Parental PTA membership | Yes | 571 (0.95%) |
| | No | 59,371 (99.05%) |
| Parental gender role attitude scale | | 3.300 (0.919) |
| Parental economic attitude scale | | 3.398 (0.524) |
| Parental environmentalism scale | | 3.355 (0.575) |

*Note: Summary statistics reported are means with standard deviation in parentheses for continuous or scale variables. For categorical variables, each separate category is reported with the number of unique responses in each category and the proportion of the total variable this represents in parentheses. The three-year specification of HE graduation is used and all those with missing education are excluded.*

# Appendix N Sensitivity Analysis for the In/Exclusion of Psychological Security and Cognitive Ability Variables

Both tables presented here show regression coefficients with sibling-clustered standard errors in parentheses. Statistical significance of these coefficients is denoted by *** p < 0.01; ** p < 0.05; * p < 0.1.

**Table N-1 - Models Including and Excluding Psychological Security**

| | (3) Self-Selection | (3) minus psychological security | (4) Self-Selection and pre-adult attitudes | (4) minus psychological security | (5) Sibling - matched | (5) minus psychological security |
|---|---|---|---|---|---|---|
| **Gender Attitudes** | | | | | | |
| HE status: Graduate | 0.193*** | 0.202*** | 0.176*** | 0.184*** | 0.051 | 0.055 |
| | (0.038) | (0.037) | (0.036) | (0.036) | (0.066) | (0.066) |
| Disagree | 0.107*** (0.040) | | 0.061 (0.037) | | 0.062 (0.063) | |
| No information | 0.124*** (0.042) | | 0.102** (0.041) | | -0.131 (0.082) | |
| Observations | | 2,296 | | 2,171 | | 1,278 |
| **Economic Attitudes** | | | | | | |
| HE status: Graduate | -0.070 | -0.071 | -0.050 | -0.048 | -0.011 | -0.013 |
| | (0.050) | (0.050) | (0.048) | (0.048) | (0.076) | (0.074) |
| Disagree | -0.005 (0.043) | | 0.043 (0.040) | | -0.051 (0.066) | |
| No information | -0.036 (0.053) | | 0.024 (0.048) | | 0.006 (0.083) | |
| Observations | | 652 | | 616 | | 375 |
| **Environmental Attitudes** | | | | | | |
| HE status: Graduate | 0.172*** | 0.177*** | 0.135*** | 0.152*** | -0.118 | -0.116 |
| | (0.048) | (0.048) | (0.049) | (0.049) | (0.116) | (0.110) |

| | (3) Self-Selection | (3) minus psychological security | (4) Self-Selection and pre-adult attitudes | (4) minus psychological security | (5) Sibling - matched | (5) minus psychological security |
|---|---|---|---|---|---|---|
| Disagree | 0.001 (0.062) | | 0.015 (0.066) | | 0.041 (0.128) | |
| No information | 0.124** (0.051) | | 0.164 (0.053) | | 0.043 (0.106) | |
| Observations | 869 | | 746 | | 268 | |

At least one category of psychological security is statistically significant (at the 5% threshold) in 3 of the 9 attitudinal models. Failing to include this variable also leads to changes (generally increases) in the size of HE's effect on attitudes - this shows that, in most cases, psychological security is working as a control variable, as expected. Omitted variable bias is engendered if this variable is left out of analysis.

**Table N-2 - Models Including and Excluding Cognitive Ability**

| | (3) Self-Selection | (3) minus cognitive ability | (4) Self-Selection and pre-adult attitudes | (4) minus cognitive ability | (5) Sibling - matched | (5) minus cognitive ability |
|---|---|---|---|---|---|---|
| **Gender Attitudes** | | | | | | |
| HE status: | 0.193*** | 0.208*** | 0.176*** | 0.181*** | 0.051 | 0.055 |
| Graduate | (0.038) | (0.037) | (0.036) | (0.035) | (0.066) | (0.064) |
| Low ability | 0.076 (0.055) | | 0.119** (0.055) | | 0.119 (0.100) | |
| Med. ability | 0.016 (0.048) | | 0.034 (0.046) | | 0.097 (0.092) | |
| High ability | 0.147*** (0.047) | | 0.122*** (0.045) | | 0.092 (0.088) | |
| Observations | 2,296 | | 2,171 | | 1,278 | |
| **Economic Attitudes** | | | | | | |
| HE status: | -0.070 | -0.084* | -0.050 | -0.064 | -0.011 | 0.002 |
| Graduate | (0.050) | (0.049) | (0.048) | (0.046) | (0.076) | (0.076) |
| Low ability | 0.013 (0.062) | | 0.015 (0.057) | | -0.041 (0.084) | |
| Med. ability | -0.014 (0.052) | | -0.005 (0.047) | | -0.011 (0.087) | |
| High ability | -0.065 (0.053) | | -0.073 (0.050) | | 0.053 (0.082) | |

| | (3) Self-Selection | (3) minus cognitive ability | (4) Self-Selection and pre-adult attitudes | (4) minus cognitive ability | (5) Sibling - matched | (5) minus cognitive ability |
|---|---|---|---|---|---|---|
| Observations | | 652 | | 616 | | 375 |
| **Environmental Attitudes** | | | | | | |
| HE status: Graduate | 0.172*** | 0.199*** | 0.135*** | 0.154*** | -0.118 | -0.106 |
| | (0.048) | (0.047) | (0.049) | (0.048) | (0.116) | (0.119) |
| Low ability | -0.153** (0.067) | | -0.129* (0.070) | | 0.071 (0.158) | |
| Med. ability | -0.098 (0.061) | | -0.037 (0.065) | | 0.196 (0.146) | |
| High ability | 0.015 (0.061) | | 0.039 (0.064) | | 0.264** (0.113) | |
| Observations | | 869 | | 746 | | 268 |

At least one category of cognitive ability is statistically significant (at the 5% threshold) in 4 of the 9 attitudinal models. Failing to include this variable also leads to changes (generally increases) in the size of HE's effect on attitudes. Omitted variable bias is engendered if this variable is left out of analysis.

# Appendix O Comparison of the Characteristics of the Full Combined Panel Samples and the Sibling Only Panel Sample

**Table O-1 - Comparing the Composition of the Full and Sibling Samples**

| Variable | Full Sample | Sibling Only Sample |
|---|---|---|
| Education: degree in panel | 4.42% | 12.36% |
| Education: no degree | 95.58% | 87.64% |
| Gender: male | 46.86% | 51.52% |
| Gender: female | 53.14% | 48.48% |
| Class: managers & professionals | 20.20% | 19.48% |
| Class: intermediate | 16.86% | 16.10% |
| Class: semi(routine) | 33.53% | 35.56% |
| Class: inapplicable | 29.41% | 28.86% |
| Cognitive ability: low | 20.66% | 10.46% |
| Cognitive ability: medium | 18.55% | 13.46% |
| Cognitive ability: high | 15.17% | 13.46% |
| Cognitive ability: no information | 45.61% | 62.62% |
| What happens in life is beyond control: agree | 42.41% | 21.90% |
| What happens in life is beyond control: disagree | 14.08% | 11.58% |
| What happens in life is beyond control: no information | 43.52% | 66.52% |
| Community group participation: no | 98.22% | 93.64% |
| Community group participation: yes | 1.78% | 6.36% |
| Sport group participation: no | 95.64% | 84.35% |
| Sport group participation: yes | 4.36% | 15.65% |
| Cultural activity participation: no | 92.69% | 74.97% |
| Cultural activity participation: yes | 7.31% | 25.03% |

*Note: This table shows the proportion of all unique responses in the full, and sibling, samples which fall into each of the categories represented here - it is designed to highlight any key differences between the composition of these samples. The three-year specification of HE graduation is used and all those with missing education are excluded.*

As can be seen from Table O-1, the sibling sample are somewhat more educated, and more likely to have participated in cultural, sporting and community activities pre-adulthood, than the full sample. They are also somewhat more likely to have no information on the cognitive ability and psychological security questions.

# Appendix P Two-sample T-tests for the Differences in Pre-adult and Adult Attitudes Reported by Educational Group

**Table P-1 - Comparing Pre-adult and Adult Attitudes**

| | Significant difference between graduates and non-graduates pre-university? | Significant difference between graduates and non-graduates post-university? |
|---|---|---|
| Gender attitudes | YES (p = 0.000) | YES (p = 0.000) |
| Economic attitudes | YES (p = 0.006) | YES (p = 0.000) |
| Environmentalism | YES (p = 0.000) | YES (p = 0.000) |

# Appendix Q Full Regression Results

**Table Q-1 - Gender Attitudes Regression Results**

| | (1) Education only | (2) Sibling education only model | (3) Self-selection model | (4) Self-selection and pre-adult attitudes model | (5) Sibling matched model |
|---|---|---|---|---|---|
| HE status: Graduate | 0.426 *** | 0.338 *** | 0.193 *** | 0.176 *** | 0.051 |
| | (0.021) | (0.039) | (0.038) | (0.036) | (0.065) |
| Gender: female | | | 0.267 *** | 0.118 *** | 0.074 |
| | | | (0.034) | (0.033) | (0.056) |
| Cognitive ability: low | | | 0.076 | 0.119 ** | 0.119 |
| | | | (0.054) | (0.052) | (0.093) |
| Cognitive ability: medium | | | 0.016 | 0.034 | 0.097 |
| | | | (0.047) | (0.045) | (0.086) |
| Cognitive ability: high | | | 0.147 *** | 0.122 *** | 0.092 |
| | | | (0.046) | (0.044) | (0.084) |
| Psychological security: disagree | | | 0.107 *** | 0.061 | 0.062 |
| | | | (0.040) | (0.038) | (0.062) |
| Psychological security: no information | | | 0.124 *** | 0.102 ** | -0.131 * |
| | | | (0.041) | (0.040) | (0.075) |
| Occupational class: intermediate | | | -0.100 * | -0.082 | -0.178 ** |
| | | | (0.052) | (0.050) | (0.086) |
| Occupational class: (semi)routine | | | -0.098 ** | -0.094 ** | -0.092 |
| | | | (0.045) | (0.043) | (0.074) |
| | | | -0.215 *** | -0.153 *** | -0.102 |

| | (1) Education only | (2) Sibling education only model | (3) Self-selection model | (4) Self-selection and pre-adult attitudes model | (5) Sibling matched model |
|---|---|---|---|---|---|
| Occupational class: inapplicable | | | (0.049) | (0.047) | (0.084) |
| Membership of community groups: yes | | | 0.010 | 0.027 | 0.019 |
| | | | (0.052) | (0.049) | (0.088) |
| Membership of sport groups: yes | | | -0.011 | 0.019 | 0.066 |
| | | | (0.036) | (0.034) | (0.064) |
| Participation in cultural activities: yes | | | 0.079 ** | 0.054 | -0.017 |
| | | | (0.035) | (0.034) | (0.067) |
| Parental occupation: intermediate | | | 0.078 | 0.078 | |
| | | | (0.052) | (0.050) | |
| Parental occupation: (semi)routine | | | 0.017 | 0.022 | |
| | | | (0.052) | (0.050) | |
| Parental occupation: inapplicable | | | -0.038 | -0.010 | |
| | | | (0.061) | (0.058) | |
| Parental education: non-degree HE | | | -0.098 | -0.086 | |
| | | | (0.063) | (0.061) | |
| Parental education: A level, or equiv. | | | -0.112 * | -0.098 | |
| | | | (0.063) | (0.061) | |
| Parental education: GCSE, or equiv. | | | -0.048 | -0.049 | |
| | | | (0.059) | (0.056) | |
| Parental education: other quals | | | -0.163 ** | -0.131 * | |
| | | | (0.072) | (0.069) | |
| Parental education: no quals | | | -0.078 | -0.042 | |
| | | | (0.069) | (0.066) | |
| | | | 0.083 | 0.096 | |

| | (1) Education only | (2) Sibling education only model | (3) Self-selection model | (4) Self-selection and pre-adult attitudes model | (5) Sibling matched model |
|---|---|---|---|---|---|
| Parental income: 2nd lowest | | | (0.065) | (0.062) | |
| Parental income: middle | | | 0.127 ** | 0.134 ** | |
| | | | (0.064) | (0.061) | |
| Parental income: 2nd highest | | | 0.133 ** | 0.124 * | |
| | | | (0.067) | (0.064) | |
| Parental income: highest | | | 0.187 ** | 0.167 ** | |
| | | | (0.076) | (0.073) | |
| Parental PTA membership: yes | | | -0.081 | -0.054 | |
| | | | (0.063) | (0.060) | |
| Parental gender attitude | | | 0.187 *** | 0.103 *** | |
| | | | (0.019) | (0.019) | |
| Pre-adult gender attitude | | | | 0.380 *** | 0.300 *** |
| | | | | (0.021) | (0.037) |
| **Intercept** | 3.383 *** | 3.463 *** | 2.781 *** | 1.749 *** | 1.887 *** |
| | (0.009) | (0.022) | (0.117) | (0.128) | (0.500) |
| **Birth order (oldest versus other)** | | | | | -0.081 * |
| | | | | | (0.043) |
| **Sibling fixed effects** | NO | NO | NO | NO | YES |
| **Observations** | 11048 | 2240 | 2296 | 2171 | 1278 |
| **R2** | 0.034 | 0.033 | 0.147 | 0.254 | 0.644 |

*Note: Regression coefficients are presented with sibling-clustered standard errors in parentheses. Significance is denoted by *** p < 0.01; ** p < 0.05; * p < 0.1.*

**Table Q-2 - Economic Attitudes Regression Results**

| | (1) Education only | (2) Sibling education only model | (3) Self-selection model | (4) Self-selection and pre-adult attitudes model | (5) Sibling matched model |
|---|---|---|---|---|---|
| HE status: Graduate | -0.127 *** | -0.058 | -0.070 | -0.050 | -0.011 |
| | (0.028) | (0.046) | (0.050) | (0.048) | (0.076) |
| Gender: female | | | 0.048 | 0.021 | 0.028 |
| | | | (0.040) | (0.037) | (0.062) |
| Cognitive ability: low | | | 0.013 | 0.015 | -0.041 |
| | | | (0.068) | (0.064) | (0.101) |
| Cognitive ability: medium | | | -0.014 | -0.005 | -0.011 |
| | | | (0.057) | (0.053) | (0.100) |
| Cognitive ability: high | | | -0.065 | -0.073 | 0.053 |
| | | | (0.055) | (0.052) | (0.098) |
| Psychological security: disagree | | | -0.005 | 0.043 | -0.051 |
| | | | (0.044) | (0.041) | (0.064) |
| Psychological security: no information | | | -0.036 | 0.024 | 0.006 |
| | | | (0.054) | (0.050) | (0.088) |
| Occupational class: intermediate | | | 0.158 *** | 0.108 ** | -0.081 |
| | | | (0.059) | (0.055) | (0.096) |
| Occupational class: (semi)routine | | | 0.155 *** | 0.122 ** | 0.102 |
| | | | (0.054) | (0.050) | (0.083) |
| Occupational class: inapplicable | | | 0.176 *** | 0.145 ** | 0.138 |
| | | | (0.061) | (0.057) | (0.102) |
| Membership of community groups: yes | | | 0.074 | 0.093 | 0.291 *** |
| | | | (0.062) | (0.057) | (0.109) |
| Membership of sport groups: yes | | | 0.014 | 0.005 | 0.036 |
| | | | (0.040) | (0.037) | (0.065) |

| | (1) Education only | (2) Sibling education only model | (3) Self-selection model | (4) Self-selection and pre-adult attitudes model | (5) Sibling matched model |
|---|---|---|---|---|---|
| Participation in cultural activities: yes | | | 0.002 | 0.014 | 0.010 |
| | | | (0.041) | (0.038) | (0.072) |
| Parental occupation: intermediate | | | 0.031 | 0.028 | |
| | | | (0.064) | (0.059) | |
| Parental occupation: (semi)routine | | | -0.032 | -0.011 | |
| | | | (0.063) | (0.058) | |
| Parental occupation: inapplicable | | | 0.014 | 0.032 | |
| | | | (0.074) | (0.069) | |
| Parental education: non-degree HE | | | 0.165 * | 0.221 *** | |
| | | | (0.089) | (0.083) | |
| Parental education: A level, or equiv. | | | 0.185 * | 0.163 * | |
| | | | (0.094) | (0.089) | |
| Parental education: GCSE, or equiv. | | | 0.207 ** | 0.191 ** | |
| | | | (0.086) | (0.080) | |
| Parental education: other quals | | | 0.093 | 0.133 | |
| | | | (0.101) | (0.094) | |
| Parental education: no quals | | | 0.278 *** | 0.260 *** | |
| | | | (0.095) | (0.089) | |
| Parental income: 2nd lowest | | | 0.024 | 0.083 | |
| | | | (0.070) | (0.065) | |
| Parental income: middle | | | 0.042 | 0.096 | |
| | | | (0.071) | (0.066) | |
| Parental income: 2nd highest | | | 0.001 | 0.006 | |
| | | | (0.077) | (0.072) | |
| Parental income: highest | | | 0.090 | 0.066 | |

| | (1) Education only | (2) Sibling education only model | (3) Self-selection model | (4) Self-selection and pre-adult attitudes model | (5) Sibling matched model |
|---|---|---|---|---|---|
| | | | (0.088) | (0.081) | |
| Parental PTA membership: yes | | | 0.049 | 0.039 | |
| | | | (0.067) | (0.063) | |
| Parental economic attitude | | | 0.136 *** | 0.015 | |
| | | | (0.036) | (0.035) | |
| Pre-adult economic attitude | | | | 0.442 *** | 0.485 *** |
| | | | | (0.038) | (0.064) |
| **Intercept** | 3.353 *** | 3.341 *** | 2.517 *** | 1.431 *** | 1.819 *** |
| | (0.011) | (0.023) | (0.167) | (0.181) | (0.362) |
| **Birth order (oldest versus other)** | | | | | 0.034 |
| | | | | | (0.049) |
| **Sibling fixed effect** | NO | NO | NO | NO | YES |
| **Observations** | 3108 | 569 | 652 | 616 | 375 |
| **R2** | 0.007 | 0.003 | 0.095 | 0.270 | 0.661 |

*Note: Regression coefficients are presented with sibling-clustered standard errors in parentheses. Significance is denoted by *** p < 0.01; ** p < 0.05; * p < 0.1.*

**Table Q-3 - Environmental Attitudes Regression Results**

| | (1) Education only | (2) Sibling education only model | (3) Self-selection model | (4) Self-selection and pre-adult attitudes model | (5) Sibling matched model |
|---|---|---|---|---|---|
| HE status: Graduate | 0.367 *** | 0.315 *** | 0.172 *** | 0.135 *** | -0.118 |
| | (0.017) | (0.032) | (0.048) | (0.049) | (0.116) |
| Gender: female | | | 0.131 *** | 0.066 | 0.035 |
| | | | (0.043) | (0.044) | (0.091) |
| Cognitive ability: low | | | -0.153 ** | -0.129 * | 0.071 |
| | | | (0.068) | (0.069) | (0.145) |
| Cognitive ability: medium | | | -0.098 | -0.037 | 0.196 |
| | | | (0.061) | (0.062) | (0.154) |
| Cognitive ability: high | | | 0.015 | 0.039 | 0.264 ** |
| | | | (0.060) | (0.061) | (0.132) |
| Psychological security: disagree | | | 0.001 | 0.015 | 0.041 |
| | | | (0.061) | (0.063) | (0.128) |
| Psychological security: no information | | | 0.124 ** | 0.164 *** | 0.043 |
| | | | (0.050) | (0.050) | (0.124) |
| Occupational class: intermediate | | | -0.024 | -0.041 | -0.551 *** |
| | | | (0.068) | (0.071) | (0.160) |
| Occupational class: (semi)routine | | | -0.011 | 0.002 | -0.214 * |
| | | | (0.057) | (0.057) | (0.127) |
| Occupational class: inapplicable | | | 0.052 | 0.045 | -0.187 |
| | | | (0.060) | (0.061) | (0.145) |
| Membership of community groups: yes | | | 0.140 ** | 0.083 | 0.201 |
| | | | (0.065) | (0.064) | (0.137) |
| | | | 0.005 | 0.004 | 0.032 |

| | (1) Education only | (2) Sibling education only model | (3) Self-selection model | (4) Self-selection and pre-adult attitudes model | (5) Sibling matched model |
|---|---|---|---|---|---|
| Membership of sport groups: yes | | | (0.048) | (0.048) | (0.116) |
| Participation in cultural activities: yes | | | 0.089 * | 0.053 | -0.010 |
| | | | (0.046) | (0.048) | (0.112) |
| Parental occupation: intermediate | | | -0.042 | -0.046 | |
| | | | (0.066) | (0.067) | |
| Parental occupation: (semi)routine | | | -0.068 | -0.057 | |
| | | | (0.065) | (0.065) | |
| Parental occupation: inapplicable | | | -0.127 * | -0.150 * | |
| | | | (0.077) | (0.080) | |
| Parental education: non-degree HE | | | -0.161 ** | -0.114 | |
| | | | (0.070) | (0.072) | |
| Parental education: A level, or equiv. | | | -0.174 ** | -0.089 | |
| | | | (0.074) | (0.075) | |
| Parental education: GCSE, or equiv. | | | -0.169 ** | -0.126 * | |
| | | | (0.070) | (0.071) | |
| Parental education: other quals | | | -0.148 * | -0.132 | |
| | | | (0.088) | (0.089) | |
| Parental education: no quals | | | -0.303 *** | -0.188 ** | |
| | | | (0.095) | (0.095) | |
| Parental income: 2nd lowest | | | -0.009 | 0.064 | |
| | | | (0.089) | (0.089) | |
| Parental income: middle | | | -0.022 | 0.024 | |
| | | | (0.086) | (0.086) | |
| | | | -0.105 | -0.096 | |

| | (1) Education only | (2) Sibling education only model | (3) Self-selection model | (4) Self-selection and pre-adult attitudes model | (5) Sibling matched model |
|---|---|---|---|---|---|
| Parental income: 2nd highest | | | (0.087) | (0.088) | |
| Parental income: highest | | | -0.082 | -0.019 | |
| | | | (0.096) | (0.097) | |
| Parental PTA membership: yes | | | -0.095 | -0.116 | |
| | | | (0.089) | (0.091) | |
| Parental environmental attitude | | | 0.079 ** | -0.021 | |
| | | | (0.037) | (0.038) | |
| Pre-adult environmental attitude | | | | 0.349 *** | 0.091 |
| | | | | (0.038) | (0.086) |
| **Intercept** | 3.199 *** | 3.241 *** | 3.182 *** | 2.341 *** | 2.701 *** |
| | (0.008) | (0.018) | (0.184) | (0.208) | (0.500) |
| **Birth order (oldest versus other)** | | | | | -0.081 |
| | | | | | (0.080) |
| **Sibling fixed effect** | NO | NO | NO | NO | YES |
| **Observations** | 7353 | 1769 | 869 | 746 | 268 |
| **R2** | 0.068 | 0.056 | 0.143 | 0.239 | 0.726 |

*Note: Regression coefficients are presented with sibling-clustered standard errors in parentheses. Significance is denoted by *** p < 0.01; ** p < 0.05; * p < 0.1.*

# Appendix R Selecting an Appropriate Spatial Scale for Analysis

Exploratory analysis was conducted to select the appropriate scale at which to analyse the spatial distribution of the British educational cleavage. Null multilevel models which included only the relevant dependent vote choice variables, indicators of respondents' local authority, Parliamentary constituency and MSOA of residence and random intercepts were run. These models were designed to explore i) the spatial levels at which British electors vote choices actually exhibit statistically significant variation and ii) whether variance at higher spatial levels is accounted for once lower levels are also considered. All models were weighted and considered only complete cases. Significance is indicated by *** at the 1% level, ** at the 5% level and * at the 10% level in all cases.

**Table R-1 - Variance at Local Authority, Constituency and MSOA-levels in 2019 General Election Voting**

| | **Conservative 2019** | | | |
|---|---|---|---|---|
| Intercept | -0.154*** | -0.119*** | -0.146*** | -0.213*** |
| Variance(Lo.Auth) | 0.080*** | 0.000 | | |
| Variance(Const.) | | 0.052*** | 0.292*** | 0.405*** |
| Variance(MSOA) | | | 0.000 | |
| **N** | 7,918 | 7,918 | 7,761 | 21,112 |
| | **Labour 2019** | | | |
| Intercept | -0.701*** | -0.851*** | -0.869*** | -0.757*** |
| Variance(Lo.Auth) | 0.086*** | 0.002 | | |
| Variance(Const.) | | 0.121** | 0.439*** | 0.613*** |
| Variance(MSOA) | | | 0.000 | |
| **N** | 7,918 | 7,918 | 7,761 | 21,112 |
| | **Liberal Democrat 2019** | | | |
| Intercept | -2.092*** | -2.351*** | *Liberal Democrat 2019 models do not converge at MSOA level or with more than 1 level included* | |
| Variance(Lo.Auth) | 0.156** | | | |
| Variance(Const.) | | 0.905*** | | |
| Variance(MSOA) | | | | |
| **N** | 7,918 | 22,114 | | |

Statistically significant between-local authority variance in vote choice was identified in all 2019 vote outcomes. However, this disappeared after the more finely-grained constituency level was accounted for - so, local authority was removed from models. After between-constituency variance in 2019 voting was considered, no further, statistically significant, MSOA-level variations in voting could be identified. British Parliamentary constituencies therefore appeared to be the most appropriate unit of analysis for the study of contextual effects in 2019 general election voting.

**Table R-2 - Variance at Local Authority, Constituency and MSOA-levels in 2017 General Election Voting**

| | | | | |
|---|---|---|---|---|
| | **Conservative 2017** | | | |
| Intercept | -0.242*** | -0.325*** | -0.335*** | -0.266*** |
| Variance(Lo.Auth) | 0.079*** | 0.000 | | |
| Variance(Const.) | | 0.056*** | 0.218*** | 0.347*** |
| Variance(MSOA) | | | 0.000 | |
| **N** | 7,232 | 7,232 | 7,232 | 20,998 |
| | **Labour 2017** | | | |
| Intercept | -0.367*** | -0.399*** | -0.417*** | -0.379*** |
| Variance(Lo.Auth) | 0.117*** | 0.008 | | |
| Variance(Const.) | | 0.064** | 0.382*** | 0.519*** |
| Variance(MSOA) | | | 0.000 | |
| **N** | 7,232 | 7,232 | 7,232 | 20,998 |
| | **Liberal Democrat 2017** | | | |
| Intercept | -2.534*** | -2.864*** | *Liberal Democrat 2017 models do not converge at MSOA level or with more than 1 level included* | |
| Variance(Lo.Auth) | 0.125* | | | |
| Variance(Const.) | | 0.980*** | | |
| Variance(MSOA) | | | | |
| **N** | 7,232 | 20,998 | | |

Broadly the same patterns are seen in 2017 voting as for 2019 voting. British Parliamentary constituencies again appeared to be the most appropriate unit of analysis for the study of contextual effects in 2017 general election voting.

**Table R-3 - Variance at Local Authority, Constituency and MSOA-levels in 2015 General Election Voting**

| | | | |
|---|---|---|---|
| | **Conservative 2015** | | |
| Intercept | -0.576*** | -0.660*** | -0.569*** |
| Variance(Lo.Auth) | 0.085*** | 0.000 | |
| Variance(Const.) | | 0.119*** | 0.358*** |
| **N** | 6,657 | 6,657 | 21,460 |
| | **Labour 2015** | | |
| Intercept | -0.637*** | -0.711*** | -0.713*** |
| Variance(Lo.Auth) | 0.085*** | 0.000 | |
| Variance(Const.) | | 0.135*** | 0.560*** |
| **N** | 6,657 | 6,657 | 21,460 |
| | **Liberal Democrat 2015** | | |
| Intercept | -2.343*** | -2.585*** | |
| Variance(Lo.Auth) | 0.547*** | | |
| Variance(Const.) | | 1.165*** | |
| **N** | 6,657 | 21,460 | |

*Note: Liberal Democrat 2015 models did not converge when LA and constituency-levels were included simultaneously.*

The same patterns of between-local authority and between-constituency voting are seen in 2015 general election voting as for 2017 and 2019. Between-constituency variance in 2015 voting is not

only stronger than between-local authority variance, but accounting for this cancels out effects observed at the less finely grained local authority level. British Parliamentary constituencies again emerge as the most appropriate unit of analysis for studying the spatial distribution of the impacts of the educational cleavage.

# Appendix S Descriptive Statistics for Independent Variables

**Table S-1 - Summary Statistics for Individual-level Independent Variables in 2015, 2017 and 2019**

| **Individual-level Variables** | | **2015** | **2017** | **2019** | **BESIP Wave(s) Collected** |
|---|---|---|---|---|---|
| Educational attainment | GCSE or below *(reference category)* | 6,496<br>35.14% | 6,327<br>34.73% | 6,135<br>34.25% | 5, 12, 18 |
| | A-level or equivalent | 3,735<br>20.20% | 3,789<br>20.80% | 3,443<br>19.22% | |
| | At least a Bachelor's degree | 8,256<br>44.66% | 8,100<br>44.47% | 8,337<br>46.54% | |
| Age at last birthday (in years) | | 52.26 (15.98) | 53.31 (15.78) | 55.97 (15.48) | 5, 12, 18 |
| Occupational social class | Managerial and professional occupations *(reference category)* | 7,377<br>33.95% | 7,033<br>33.11% | 7,489<br>35.54% | 1-5, 6-9, 16-18 |
| | Intermediate occupations | 4,028<br>18.54% | 4,265<br>20.08% | 4,507<br>21.39% | |
| | Manual and routine occupations | 2,726<br>12.55% | 3,015<br>14.19% | 3,255<br>15.45% | |
| | Unclassifiable | 7,595<br>34.96% | 6,927<br>32.61% | 5,821<br>27.62% | |
| Attention paid to politics | | 8.26 (2.12) | 8.03 (2.30) | 7.73 (2.34) | 4, 11, 17 |
| Economic attitudes | | 2.99 (2.10) | 2.94 (1.95) | 3.30 (2.04) | 1-5, 10-12, 17 |
| Cultural attitudes | | 6.61 (2.18) | 6.39 (2.24) | 6.47 (2.23) | 1-5, 10-12, 17 |
| News readership (on and offline) | Does not regularly read paper *(reference category)* | 7,409<br>34.10% | 8,733<br>41.12% | 9,297<br>44.12% | 5, 12, 18 |
| | Reads left-leaning paper | 2,307<br>10.62% | 2,275<br>10.71% | 2,474<br>11.74% | |

| Individual-level Variables | | 2015 | 2017 | 2019 | BESIP Wave(s) Collected |
|---|---|---|---|---|---|
| | Reads right-leaning paper | 8,226<br>37.86% | 7,400<br>34.84% | 7,158<br>33.97% | |
| | Reads another paper | 3,784<br>17.42% | 2,832<br>13.33% | 2,143<br>10.17% | |
| Orientation to populism – 'politicians don't care what people like me think' | Agree *(reference category)* | 11,855<br>59.78% | 9,453<br>56.29% | 9,928<br>67.53% | 4, 11, 17 |
| | Disagree | 3,568<br>17.99% | 3,125<br>18.61% | 1,678<br>11.41% | |
| | Neither | 4,407<br>22.22% | 4,215<br>25.10% | 3,096<br>21.06% | |
| Talks to neighbour or co-workers about politics | Yes *(reference category)* | 706<br>16.89% | 476<br>15.08% | 234<br>14.91% | 4, 12 |
| | No | 3,473<br>83.11% | 2,680<br>84.92% | 1,335<br>85.09% | |
| Feels they belong to local community | Yes | 4,250<br>38.50% | 6,041<br>36.79% | 3,522<br>36.70% | 11* |
| | No *(reference category)* | 6,790<br>61.50% | 10,379<br>63.21% | 6,075<br>63.30% | |
| Feels education is important to sense of self | Yes | 1,451<br>60.79% | 2,175<br>61.91% | 1,667<br>61.17% | 14* |
| | No *(reference category)* | 936<br>39.21% | 1,338<br>38.09% | 1,058<br>38.83% | |

*Note: all descriptive statistics are unweighted and were calculated prior to imputation. Scots, those without valid constituency identifiers and who did not record a valid vote choice in each contest are excluded. For categorical variables, the number of observations and % per category are shown, for continuous variables the mean is reported with the standard deviation shown in parentheses*.

**Table S-2 - Degree of Missingness for All Individual-level Independent Variables**

| Individual-level Independent Variables | 2015 | | 2017 | | 2019 | |
|---|---|---|---|---|---|---|
| | % valid | % missing | % valid | % missing | % valid | % missing |
| Educational attainment | 85.1% | 14.9% | 85.8% | 14.2% | 85.0% | 15.0% |
| Age at last birthday (in years) | 99.9% | 0.05% | 100% | 0.00% | 100% | 0.00% |
| Occupational social class | 100% | 0.00% | 100% | 0.00% | 100% | 0.00% |
| Attention paid to politics | 92.8% | 7.20% | 80.4% | 19.6% | 71.3% | 28.7% |
| Economic attitudes | 93.0% | 7.04% | 70.6% | 29.4% | 65.2% | 34.8% |
| Cultural attitudes | 91.6% | 8.45% | 69.9% | 30.1% | 64.6% | 36.4% |
| News readership | 100% | 0.00% | 100% | 0.00% | 100% | 0.00% |
| Orientation to populism | 91.3% | 8.73% | 79.1% | 20.9% | 69.8% | 30.2% |
| Talks to neighbour or co-workers about politics | 19.2% | 80.8% | 14.9% | 85.1% | 7.45% | 92.6% |
| Feels they belong to local community | 50.8% | 49.2% | 77.3% | 22.7% | 45.5% | 54.5% |
| Feels education is important to sense of self | 11.0% | 89.0% | 16.5% | 83.5% | 12.9% | 87.1% |

*Note: all percentages are unweighted and were calculated prior to imputation. Scots, those without valid constituency identifiers and who did not record a valid vote choice in each contest are excluded. Percentages may not add to 100 due to rounding error.*

**Table S-3 - Degree of Missingness in Constituency Median Gross Annual Income Figures**

| Constituency-level Independent Variable | 2015 | | 2017 | | 2019 | |
|---|---|---|---|---|---|---|
| | % valid | % missing | % valid | % missing | % valid | % missing |
| Median Gross Annual Income | 87.2% | 12.8% | 93.7% | 6.29% | 92.7% | 7.34% |

*Note: all percentages are unweighted and were calculated prior to imputation. Percentages may not add to 100 due to rounding error.*

As constituency median gross annual income was the only variable which contained any missing values, no other constituency level variables are reported here.

The table below shows the top and bottom ranked 5 constituencies on each 'constituency context' measure, at each election. While it is customary to present means and standard deviations as descriptive statistics for numeric variables, these statistics are not presented as they would not be particularly informative due to the ranked coding of these variables e.g., the mean of all 'constituency context' measures would be approximately 286.

**Table S-4 - Top and Bottom 5 Constituencies on Each Constituency-level Variables in 2015, 2017 and 2019 Data**

| Constituency-level Independent Variables | 2015 | 2017 | 2019 |
|---|---|---|---|
| Educational Environment | **Most educational:**<br>1. Kensington<br>2. Chelsea and Fulham<br>3. Cities of London and Westminster<br>4. Hampstead and Kilburn<br>5. Twickenham<br>**Least educational:**<br>1. North East Cambridgeshire | **Most educational:**<br>1. Twickenham<br>2. Hampstead and Kilburn<br>3. Richmond Park<br>4. Tooting<br>5. Hammersmith<br>**Least educational:**<br>1. Great Grimsby<br>2. North East Cambridgeshire | **Most educational:**<br>1. Hampstead and Kilburn<br>2. Putney<br>3. Cities of London and Westminster<br>4. Twickenham<br>5. Kensington<br>**Least educational:**<br>1. North East Cambridgeshire |

| **Constituency-level Independent Variables** | **2015** | **2017** | **2019** |
|---|---|---|---|
| | 2. Scunthorpe<br>3. South West Norfolk<br>4. Great Grimsby<br>5. Boston and Skegness | 3. Waveney<br>4. Blaenau Gwent<br>5. Boston and Skegness | 2. Blaenau Gwent<br>3. Waveney<br>4. Torfaen<br>5. Ashfield |
| Left behind-ness | **Most left-behind:**<br>1. Workington<br>2. Staffordshire Moorlands<br>3. Ludlow<br>4. Copeland<br>5. Derbyshire Dales<br>**Least left-behind:**<br>1. Poplar and Limehouse<br>2. Vauxhall<br>3. Bermondsey and Old Southwark<br>4. Bethnal Green and Bow<br>5. Tottenham | **Most left-behind:**<br>1. Workington<br>2. Staffordshire Moorlands<br>3. Ludlow<br>4. Copeland<br>5. Derbyshire Dales<br>**Least left-behind:**<br>1. Poplar and Limehouse<br>2. Vauxhall<br>3. Bermondsey and Old Southwark<br>4. Bethnal Green and Bow<br>5. Tottenham | **Most left-behind:**<br>1. Workington<br>2. Staffordshire Moorlands<br>3. Ludlow<br>4. Copeland<br>5. Derbyshire Dales<br>**Least left-behind:**<br>1. Poplar and Limehouse<br>2. Vauxhall<br>3. Bermondsey and Old Southwark<br>4. Bethnal Green and Bow<br>5. Tottenham |
| Economic Scarcity | **Most economically scarce:**<br>1. Nottingham North<br>2. Liverpool, Walton<br>3. Blackley and Broughton<br>4. Sheffield, Brightside and Hillsborough<br>5. Birmingham, Hodge Hill<br>**Least economically scarce:**<br>1. North East Hampshire<br>2. Wimbledon<br>3. Wokingham<br>4. Kenilworth and Southam<br>5. Henley | **Most economically scarce:**<br>1. Nottingham North<br>2. Birmingham, Hodge Hill<br>3. Liverpool, Walton<br>4. Blackley and Broughton<br>5. Walsall North<br>**Least economically scarce:**<br>1. Wimbledon<br>2. Wokingham<br>3. Kenilworth and Southam<br>4. Epsom and Ewell<br>5. Henley | **Most economically scarce:**<br>1. Nottingham North<br>2. Liverpool, Walton<br>3. Birmingham, Hodge Hill<br>4. Wolverhampton South East<br>5. Birmingham, Erdington<br>**Least economically scarce:**<br>1. Wimbledon<br>2. Henley<br>3. Wokingham<br>4. Esher and Walton<br>5. Buckingham |

| **Constituency-level Independent Variables** | | **2015** | **2017** | **2019** |
|---|---|---|---|---|
| Interaction dynamics | Average authoritarian-libertarian position | **Most authoritarian:**<br>1. West Bromwich West<br>2. Coventry North East<br>3. North Durham<br>4. Rotherham<br>5. Brentwood and Ongar<br>**Most libertarian:**<br>1. Hornsey and Wood Green<br>2. Hackney North and Stoke Newington<br>3. Brighton, Pavilion<br>4. Islington North<br>5. Bermondsey and Old Southwark | **Most authoritarian:**<br>1. Pendle<br>2. West Bromwich West<br>3. Hayes and Harlington<br>4. Plymouth, Moor View<br>5. Kingston upon Hull East<br>**Most libertarian:**<br>1. Hackney North and Stoke Newington<br>2. Bristol West<br>3. Hampstead and Kilburn<br>4. Hornsey and Wood Green<br>5. Bethnal Green and Bow | **Most authoritarian:**<br>1. Harlow<br>2. Hayes and Harlington<br>3. Sittingbourne and Sheppey<br>4. Kingston upon Hull East<br>5. Gravesham<br>**Most libertarian:**<br>1. Hackney North and Stoke Newington<br>2. Hackney South and Shoreditch<br>3. Bethnal Green and Bow<br>4. Hornsey and Wood Green<br>5. Oxford East |
| | Average left-right position | **Most left:**<br>1. Hackney North and Stoke Newington<br>2. Barnsley Central<br>3. Liverpool, Wavertree<br>4. Carlisle<br>5. Aberavon<br>**Most right:**<br>1. Mole Valley<br>2. New Forest West<br>3. Chesham and Amersham<br>4. Surrey Heath<br>5. North Wiltshire | **Most left:**<br>1. Hackney North and Stoke Newington<br>2. Sheffield, Brightside and Hillsborough<br>3. Birkenhead<br>4. Walsall South<br>5. Blaenau Gwent<br>**Most right:**<br>1. Surrey Heath<br>2. South Cambridgeshire<br>3. New Forest West<br>4. Sheffield, Hallam<br>5. Runnymede and Weybridge | **Most left:**<br>1. Liverpool, Riverside<br>2. Aberavon<br>3. Halton<br>4. Hackney North and Stoke Newington<br>5. Bristol South<br>**Most right:**<br>1. South West Surrey<br>2. Newark<br>3. Bosworth<br>4. Tonbridge and Malling<br>5. Daventry |
| | % who talk to neighbours | **Most interaction:**<br>1. Oldham West and Royton | **Most interaction:** | **Most interaction:**<br>1. Poplar and Limehouse |

| **Constituency-level Independent Variables** | | **2015** | **2017** | **2019** |
|---|---|---|---|---|
| | and co-workers about politics | 2. Arfon<br>3. Woking<br>4. Blackburn<br>5. South Leicestershire<br>**Least interaction:**<br>1. Garston and Halewood<br>2. Dwyfor Meirionnydd<br>3. Ludlow<br>4. Newcastle upon Tyne North<br>5. Kingston upon Hull West and Hessle | 1. Hackney North and Stoke Newington<br>2. Hammersmith<br>3. Islington South and Finsbury<br>4. Streatham<br>5. Tooting<br>**Least interaction:**<br>1. Wythenshawe and Sale East<br>2. Wakefield<br>3. Wyre and Preston North<br>4. Sedgefield<br>5. Stafford | 2. Liverpool, Walton<br>3. Bristol West<br>4. Bristol South<br>5. Torfaen<br>**Least interaction:**<br>1. Hexham<br>2. Chesham and Amersham<br>3. Chelsea and Fulham<br>4. Gower<br>5. The Cotswolds |
| | % who identify with their local community | **Most local:**<br>1. Brecon and Radnorshire<br>2. Carmarthen East and Dinefwr<br>3. Ceredigion<br>4. Dwyfor Meirionnydd<br>5. Christchurch<br>**Least local:**<br>1. Bradford East<br>2. Hayes and Harlington<br>3. Luton South<br>4. West Bromwich East<br>5. Chatham and Aylesford | **Most local:**<br>1. Brecon and Radnorshire<br>2. Ludlow<br>3. Preseli Pembrokeshire<br>4. Carmarthen East and Dinefwr<br>5. Workington<br>**Least local:**<br>1. Chatham and Aylesford<br>2. West Bromwich East<br>3. Hayes and Harlington<br>4. Harrow East<br>5. Birmingham, Northfield | **Most local:**<br>1. Brecon and Radnorshire<br>2. Ceredigion<br>3. Shrewsbury and Atcham<br>4. East Hampshire<br>5. Brigg and Goole<br>**Least local:**<br>1. Birmingham, Hodge Hill<br>2. Chingford and Woodford Green<br>3. Halton<br>4. Poplar and Limehouse<br>5. West Bromwich East |

# Appendix T Full Details of Construction of Constituency-level Independent Variables

The constituency-level variables 'distance to the closest university (kilometres)' and '% in precariat' were the only variables that had to be constructed and are therefore the only variables considered here. All other constituency-level variables used were either input to the model as they appeared in the data sources listed in Table 6-2 in the main text or comprised constituency-level aggregates of individual-level data, from these same sources.

**Distance to the closest university (kilometres):**

A list of all universities with degree-awarding powers in 2015, 2017 and 2019, as specified by The Education (Recognised Bodies) (England) Order(s), was drawn up. A database of university postcodes was then created, using web searches. Where universities had multiple campuses, the postcode of their main campus as listed on the university website was used. All university postcodes in the 2015, 2017 and 2019 databases were then converted to co-ordinates, and this database loaded into the statistical software R so that university locations could be mapped.

A shapefile of English and Welsh Parliamentary constituencies (Ordnance Survey, 2015), which used 2010 boundaries (applicable for 2015, 2017 and 2019 elections), was then loaded into R software. The 'st_centroid' feature of the R package 'sf' (Pebesma, 2018) was used to record the co-ordinates of the centroid of each English and Welsh constituency. The co-ordinate reference system 4326 was used for this procedure, rather than latitude/longitude data, as using the latter would give misleading results, as it computes centroids in a way that assumes flat, 2-dimensional space.

The 'st_distance' feature of the R package 'sf' (Pebesma, 2018) was then used to calculate the minimum planar distance (in metres) from the centroid of each English and Welsh constituency to a university possessing degree awarding powers, in 2015, 2017 and 2019. From these calculations, a dataset which listed each English and Welsh constituency, the distance from the centroid of this constituency to the nearest university (in metres) in 2015, 2017 and 2019, and the name of the nearest university, was created, in each instance. Sense checks were performed to ensure this dataset had formed as expected e.g., checking that the nearest universities to the 'Southampton Test' constituency were the University of Southampton and Southampton Solent University. This data was later multiplied by 1,000, to produce distances in kilometres.

**% in precariat:**

The '% in precariat' measure is designed to capture the extent to which constituencies are populated by emergent service workers - a group which have been shown to occupy a particularly economically precarious position in modern society. This measure draws inspiration from the operationalisation of the 'precariat' used in Jennings and Stoker (2017), which is itself based on a schema originally developed by Savage *et al.* (2013). This measure is calculated, first, by summing the total number of workers in each English and Welsh constituency who reported working in or as, any of the following, in the 2011 Census of England and Wales (ONS, 2021a):

- 'caring, leisure and other service occupations'
- 'sales and customer service occupations'
- 'transport and mobile machine drivers and operatives'
- 'elementary administration and service occupations.

For each constituency, the total number of workers across the stated categories was then divided by the overall number of workers and this figure was multiplied by 100. This final figure gave the '% in precariat' in each English and Welsh Parliamentary constituency.

# Appendix U Reliability and Dimensionality Testing for Constituency Context Indices

Table U-1 shows the Cronbach's Alpha values calculated for this study's constituency context measures. According to the 0.6 threshold, this table shows all constituency context indices (in all election years) were acceptable for use in further study.

**Table U-1 - Cronbach's Alpha for Constituency Context Indices**

| Year | Constituency Context Index | Cronbach's Alpha |
|---|---|---|
| 2015 | Educational environment | 0.680 |
| | Left behind-ness | 0.830 |
| | Economic scarcity | 0.799 |
| 2017 | Educational environment | 0.677 |
| | Left behind-ness | 0.830 |
| | Economic scarcity | 0.816 |
| 2019 | Educational environment | 0.646 |
| | Left behind-ness | 0.830 |
| | Economic scarcity | 0.816 |

Table U-2 shows the varimax rotated loadings of all constituency-level indicators on these single-dimensional constituency context indices. As all loadings were > 0.2, this suggested all constituency-level variables included in these indices were making important contributions in defining constituency characteristics. This confirmed that these indices could be included in the form specified in Table U-2 in the final analysis presented in Chapter 6.

**Table U-2 - Factor Loadings for Variables Which Make Up Constituency Context Indices**

| Constituency Context | Indicator | 2015 | 2017 | 2019 |
|---|---|---|---|---|
| Educational Environment | % with level 4 (post-18) qualifications | 0.898 | 0.924 | 0.806 |
| | University application rate | 0.820 | 0.802 | 0.910 |
| | Distance to closest university (in kilometres) | 0.238 | 0.246 | 0.231 |
| | % who feel education important to identity | 0.432 | 0.392 | 0.351 |
| Left behind-ness | % working in manufacturing | 0.452 | 0.452 | 0.451 |
| | % aged over 65 | 0.893 | 0.893 | 0.894 |
| | % born in the UK | 0.807 | 0.807 | 0.808 |
| | Urbanity (0-100 scale) | 0.804 | 0.804 | 0.803 |
| Economic scarcity | % in precariat (economically insecure workers) | 0.747 | 0.762 | 0.760 |
| | % in social housing | 0.770 | 0.771 | 0.771 |
| | % of working age population unemployed | 0.957 | 0.943 | 0.946 |

| **Constituency Context** | Indicator | 2015 | 2017 | 2019 |
|---|---|---|---|---|
| | Median gross annual income (all workers) | 0.323 | 0.393 | 0.395 |

# Appendix V Analysing the Sensitivity of Model Results to the Specification of Constituency Context Indices – Ranked, Average Standardised and Factor Analysis Methods

A sensitivity analysis explored the differences in model results obtained when using three different types of specifications of the constituency context variables. A summary of the results of this analysis (which focusses on differences in statistically significant cross-level interactions reported across the models) is presented below, in Table V-1. This analysis revealed that model results differed little when ranked, average standardised and factor analysis-based methods of specifying the constituency variables were used. This suggested it did not really matter which specification was used in the final analysis.

**Table V-1 - Summary of Statistically Significant Cross-level Interactions Detected When Using Different Constituency Variable Specifications**

| **Model** | **Ranked indices**<br>First 3 concepts as indices. Last as 4 ranked variables. | **Average standardised indices**<br>First 3 concepts as indices. Last as 4 standardised variables. | **Indices created via factor analysis**<br>First 3 concepts as indices. Last as 4 ranked variables. |
|---|---|---|---|
| Conservative 2015 | Degree * local<br>Degree * 'left behind' | Degree * local | Degree * local |
| Labour 2015 | Degree * local<br>A-level * left-right<br>A-level * 'left behind' | Degree * local<br>A-level * left-right | Degree * local<br>A-level * left-right<br>Degree * left-right<br>Degree * auth.-lib. |
| Liberal Democrat 2015 | A-level * economic scarcity<br>Degree * economic scarcity<br>A-level * left-right | A-level * economic scarcity<br>Degree * economic scarcity | A-level * economic scarcity<br>Degree * economic scarcity |
| Conservative 2017 | | Degree * economic scarcity | |
| Labour 2017 | A-level * talk | A-level * talk | A-level * talk |
| Liberal Democrat 2017 | | | |
| Conservative 2019 | Degree * economic scarcity | | |

| Model | Ranked indices<br>First 3 concepts as indices. Last as 4 ranked variables. | Average standardised indices<br>First 3 concepts as indices. Last as 4 standardised variables. | Indices created via factor analysis<br>First 3 concepts as indices. Last as 4 ranked variables. |
|---|---|---|---|
| Labour 2019 | | | |
| Liberal Democrat 2019 | | | |

*Note: results are based on weighted models, run on multiply imputed data. No Liberal Democrat 2017 model was tested, as this model is not explored in this paper, due to the fact no statistically significant constituency-level educational variation was observed in this voting outcome.*

To help make a decision about which specification to use, multivariate Wald test statistics that captured the difference in explanatory power between multilevel models which included individual-level variables (and constituency-level random intercepts and random slopes) only and full models - including all individual- and constituency-level variables, and cross-level interactions - were calculated. This process was repeated using each different type of constituency variable coding (ranked, average standardised and factor analysis-based) to compare the value added by each type of measure. Results are presented in Table V-2, where larger test statistics indicate a greater difference between the two models tested. The ranked specification was selected for use in Chapter 6's final presentation of results as it was the specification which most frequently produced the largest test statistic.

The ranked specification is also preferred for practical reasons. Using this specification offers a simpler interpretation of results than the other two types of specification tested.

**Table V-2 - Multivariate Wald Test Statistics Comparing Multilevel Models with and Without Constituency-level Variables, For Different Constituency Variable Specifications**

| Model | Ranked indices | Average standardised indices | Indices created via factor analysis |
|---|---|---|---|
| Conservative 2015 | **5.477** | 5.476 | 5.454 |
| Labour 2015 | **13.420** | 12.260 | 10.952 |
| Liberal Democrat 2015 | 3.608 | **4.186** | 3.891 |
| Conservative 2017 | **7.008** | 6.078 | 5.629 |
| Labour 2017 | **11.633** | 9.773 | 8.576 |
| Liberal Democrat 2017 | | | |
| Conservative 2019 | 7.395 | **7.701** | 7.082 |
| Labour 2019 | **10.445** | 7.568 | 9.143 |
| Liberal Democrat 2019 | **8.767** | 8.266 | 8.093 |
| **Total** | **6** | **2** | **0** |

*Note: results are based on weighted models, run on multiply imputed data. No Liberal Democrat 2017 model was tested, as this model is not explored in this paper, due to the fact no statistically significant constituency-level educational variation was observed in this voting outcome.*

# Appendix W Details of Multiple Imputation Procedure Used and Imputation Diagnostics

Chapter 6 used a MICE approach to impute missing data in the 2015, 2017 and 2019 datasets created. Missing data was 'filled in' by creating multiple imputations for each incomplete variable using a series of univariate imputation models - each of which had a fully conditional, multilevel, specification and included all variables except that being impute (van Buuren, 2018). This procedure was implemented using the 'mice' R package (van Buuren and Groothius-Oudshoorn, 2011). Binary variables were imputed using logistic regression, categorical variables using polytomous regression and quasi-continuous scale variables using predictive mean matching. Each missing value was imputed 5 times, and estimates combined using Rubin's (1986) rules, to account for uncertainty.

It was essential to account for the multilevel structure of data in the imputation process, as failure to do so is known to cause underestimation of intra-class correlation (van Buuren, 2018). Therefore, each imputation model not only included all variables used in the final models presented in this paper, but also included variables indicating data structure (weights, clustering variables, constituency-level random intercepts and education/constituency random slopes). Given that von Hippel (2007: 83) found using 'imputed Ys can add needless noise to...estimates', it was important to test how using imputed vote choice data would impact model estimates.

Tables W-1-W-3 present a comparison of results obtained when simple, weighted, random slopes models of vote choice (which include only individual education, constituency-level random intercepts, and education/constituency random slopes) are estimated based on complete case analysis, and data generated using three different imputation models (one using all imputed data, one omitting imputed vote choices and one omitting imputed educational data). 'var(const)' shows the constituency variance term.

On the basis of results presented in Tables W-1-W-3, it was decided that the 'vote not imputed' specification was most appropriate for use in the final analysis presented in Chapter 6 - because this model produced estimates closest to the complete cases model on the most occasions. While this model was the most adequate, it is worth noting that this model slightly underestimates random slope variance, as compared to the complete case analysis. This problem has been acknowledged in the multiple imputation literature (see for example: Grund, Lüdtke and Robitzsch, 2016). Given that the only solution to this problem suggested at present is to use complete cases only, and the magnitude of slope underestimation in my models is relatively small

(generally no more than 15-20% of total size compared to the 50% figures seen in simulation studies), it was felt appropriate to proceed with the use of this model.

**Table W-1 - Comparison of 2019 Model Estimates When Using Complete Cases and Multiply Imputed Data**

| Model Coefficients | 0-None imputed | 1-All imputed | 2-Vote not imputed | 3-Education not imputed |
|---|---|---|---|---|
| | **Conservative 2019** | | | |
| Intercept | 0.390*** | 0.227*** | 0.383*** | 0.416*** |
| A-level | -0.615*** | -0.552*** | -0.581*** | -0.580*** |
| Degree | -1.024*** | -0.887*** | -0.976*** | -0.995*** |
| Var(const) | 0.585 (0.058) | 0.534 (0.048) | 0.571 (0.057) | 0.541 (0.074) |
| Var(A-level) | 0.482 (0.091) | 0.477 (0.128) | 0.417 (0.081) | 0.551 (0.119) |
| Var(degree) | 0.299 (0.69) | 0.282 (0.079) | 0.271 (0.075) | 0.321 (0.076) |
| | **Labour 2019** | | | |
| Intercept | -1.260*** | -1.183*** | -1.267*** | -1.262*** |
| A-level | 0.578*** | 0.472*** | 0.558*** | 0.543*** |
| Degree | 0.834*** | 0.708*** | 0.796*** | 0.809*** |
| Var(const) | 0.818 (0.086) | 0.676 (0.092) | 0.782 (0.085) | 0.756 (0.096) |
| Var(A-level) | 0.766 (0.124) | 0.745 (0.139) | 0.668 (0.112) | 0.814 (0.155) |
| Var(degree) | 0.473 (0.101) | 0.448 (0.095) | 0.422 (0.107) | 0.439 (0.101) |
| | **Liberal Democrat 2019** | | | |
| Intercept | -2.974*** | -2.941*** | -2.947*** | -3.065*** |
| A-level | 0.285*** | 0.319*** | 0.330** | 0.338*** |
| Degree | 0.958*** | 0.933*** | 0.951*** | 1.033*** |
| Var(const) | 1.320 (0.231) | 0.871 (0.182) | 1.215 (0.213) | 1.142 (0.300) |
| Var(A-level) | 1.486 (0.366) | 1.106 (0.337) | 1.204 (0.364) | 1.275 (0.378) |
| Var(degree) | 0.855 (0.251) | 0.582 (0.183) | 0.757 (0.344) | 0.686 (0.270) |
| **N** | **17,774** | **23,384** | **21,072** | **19,833** |

**Table W-2 - Comparison of 2017 Model Estimates When Using Complete Cases and Multiply Imputed Data**

| Model Coefficients | 0-None imputed | 1-All imputed | 2-Vote not imputed | 3-Education not imputed |
|---|---|---|---|---|
| | **Conservative 2017** | | | |
| Intercept | 0.129*** | 0.148*** | 0.156*** | 0.130*** |
| A-level | -0.490*** | -0.432*** | -0.479*** | -0.447*** |
| Degree | -0.665*** | -0.613*** | -0.657*** | -0.610*** |
| Var(const) | 0.323 (0.038) | 0.387 (0.051) | 0.345 (0.043) | 0.388 (0.054) |
| Var(A-level) | 0.486 (0.078) | 0.481 (0.108) | 0.405 (0.083) | 0.593 (0.101) |
| Var(degree) | 0.284 (0.063) | 0.344 (0.085) | 0.257 (0.067) | 0.398 (0.071) |
| | **Labour 2017** | | | |
| Intercept | -0.672*** | -0.707*** | -0.707*** | -0.689*** |
| A-level | 0.468*** | 0.408*** | 0.468*** | 0.422*** |
| Degree | 0.519*** | 0.506*** | 0.522*** | 0.499*** |
| Var(const) | 0.480 (0.049) | 0.518 (0.054) | 0.496 (0.049) | 0.534 (0.058) |
| Var(A-level) | 0.436 (0.082) | 0.483 (0.095) | 0.386 (0.087) | 0.594 (0.086) |
| Var(degree) | 0.222 (0.057) | 0.343 (0.073) | 0.237 (0.060) | 0.376 (0.076) |
| | **Liberal Democrat 2017** | | | |

| Model Coefficients | 0-None imputed | 1-All imputed | 2-Vote not imputed | 3-Education not imputed |
|---|---|---|---|---|
| Intercept | -3.440*** | -3.591*** | -3.432*** | -3.538*** |
| A-level | 0.346** | 0.492*** | 0.386*** | 0.403*** |
| Degree | 0.921*** | 0.942*** | 0.893*** | 0.895*** |
| Var(const) | 1.276 (0.348) | 0.868 (0.159) | 1.171 (0.033) | 0.879 (0.114) |
| Var(A-level) | 1.060 (0.406) | 0.070 (0.171) | 0.749 (0.435) | 0.133 (0.181) |
| Var(degree) | 0.366 (0.245) | 0.003 (0.064) | 0.088 (0.176) | 0.000 (0.000) |
| **N** | **18,116** | **23,427** | **21,240** | **20,035** |

**Table W-3 - Comparison of 2015 Model Estimates When Using Complete Cases and Multiply Imputed Data**

| Model Coefficients | 0-None imputed | 1-All imputed | 2-Vote not imputed | 3-Education not imputed |
|---|---|---|---|---|
| | | | | **Conservative 2015** |
| Intercept | -0.580*** | -0.619*** | -0.552*** | -0.591*** |
| A-level | 0.032 | 0.049 | 0.042 | 0.033 |
| Degree | -0.078 | -0.053 | -0.069 | -0.079* |
| Var(const) | 0.495 (0.047) | 0.450 (0.110) | 0.480 (0.045) | 0.389 (0.043) |
| Var(A-level) | 0.441 (0.085) | 0.336 (0.070) | 0.388 (0.096) | 0.336 (0.045) |
| Var(degree) | 0.503 (0.073) | 0.354 (0.063) | 0.351 (0.065) | 0.443 (0.071) |
| | | | **Labour 2015** | |
| Intercept | -0.645*** | -0.638*** | -0.688*** | -0.635*** |
| A-level | -0.072 | -0.151** | -0.058 | -0.085 |
| Degree | -0.066 | -0.090* | -0.043 | -0.078 |
| Var(const) | 0.760 (0.058) | 0.642 (0.053) | 0.768 (0.061) | 0.598 (0.053) |
| Var(A-level) | 0.527 (0.100) | 0.410 (0.088) | 0.502 (0.100) | 0.449 (0.098) |
| Var(degree) | 0.608 (0.084) | 0.411 (0.070) | 0.523 (0.084) | 0.485 (0.086) |
| | | | **Liberal Democrat 2015** | |
| Intercept | -3.553*** | -3.455*** | -3.474*** | -3.552*** |
| A-level | 0.528*** | 0.675*** | 0.472*** | 0.600*** |
| Degree | 1.399*** | 1.361*** | 1.324*** | 1.433*** |
| Var(const) | 2.508 (0.401) | 2.413 (0.413) | 2.519 (0.389) | 2.663 (0.505) |
| Var(A-level) | 3.157 (0.643) | 2.655 (0.479) | 2.651 (0.523) | 3.079 (0.625) |
| Var(degree) | 1.656 (0.397) | 1.774 (0.415) | 1.738 (0.395) | 1.969 (0.507) |
| **N** | **18,378** | **25,192** | **21,726** | **21,410** |

# Appendix X Full Regression Results for Each Multilevel Vote Choice Model Estimated

This section presents the results of the eight full, weighted and imputed, multilevel, vote choice regression models estimated in producing this paper. Log odds are presented with standard errors in parentheses. Statistical significance is denoted by *** 1%, ** 5% and * 10%.

**Table X-1 - Regression Results for the 2019 General Election Models**

| Model Term | | Conservative 2019 | Labour 2019 | Liberal Democrat 2019 |
|---|---|---|---|---|
| ***Individual-level Variables*** | | | | |
| Intercept | | -5.590*** (0.625) | 3.468*** (0.626) | -0.160 (0.766) |
| Educational attainment, reference: GCSE | A-level | 0.511 (0.730) | -0.813 (0.664) | 1.362 (0.990) |
| | Degree | -1.047** (0.513) | -0.510 (0.590) | 1.140 (0.805) |
| Age | | 0.022*** (0.002) | -0.025*** (0.002) | 0.001 (0.002) |
| Attention paid to politics | | 0.053*** (0.013) | -0.028** (0.011) | -0.037** (0.014) |
| Occupational class, reference: managerial and professional occupations | Intermediate occupations | -0.025 (0.064) | 0.005 (0.067) | -0.113 (0.084) |
| | Manual and routine occupations | 0.144* (0.076) | -0.038 (0.075) | -0.291*** (0.098) |
| | Not classified | -0.033 (0.063) | 0.000 (0.061) | -0.090 (0.067) |
| Left-right (economic) attitudes | | 0.501*** (0.015) | -0.499*** (0.017) | -0.009 (0.020) |
| Libertarian-authoritarian (cultural) attitudes | | 0.480*** (0.017) | -0.300*** (0.015) | -0.176*** (0.018) |
| News readership, reference: doesn't regularly read paper | Reads left-leaning paper | -1.335*** (0.138) | 0.557*** (0.083) | 0.160* (0.084) |
| | Reads another paper | -0.363*** (0.078) | 0.346*** (0.077) | 0.053 (0.096) |
| | Reads right-leaning paper | 0.871*** (0.054) | -0.906*** (0.067) | -0.344*** (0.078) |
| Populism (politicians don't care about people like me), reference: agree | Disagree | -0.169** (0.081) | 0.286*** (0.082) | 0.167 (0.100) |
| | Neither agree nor disagree | -0.033 (0.066) | 0.174** (0.076) | -0.105 (0.068) |
| Talks to neighbour/co-worker about politics, reference: does not | | -0.331 (0.199) | 0.151 (0.173) | 0.240 (0.144) |
| Does not identify with local community, reference: does | | 0.218** (0.080) | -0.060 (0.100) | -0.199** (0.077) |
| Education not important to sense of identity, reference: education is important | | -0.100 (0.161) | 0.038 (0.160) | 0.145 (0.203 |

| Model Term | Conservative 2019 | Labour 2019 | Liberal Democrat 2019 |
|---|---|---|---|
| ***Constituency-level Variables*** | | | |
| Educational environment | -0.001*** (0.000) | 0.001*** (0.001) | -0.001 (0.001) |
| Left behind-ness | -0.000 (0.000) | 0.001 (0.000) | -0.002** (0.001) |
| Economic scarcity | -0.002*** (0.000) | 0.002*** (0.000) | -0.002*** (0.001) |
| Political discussion | -0.000 (0.000) | 0.000 (0.000) | -0.000 (0.001) |
| 'Local' feeling | -0.000 (0.000) | -0.001* (0.000) | 0.000 (0.001) |
| Average economic position | 0.001** (0.000) | -0.001*** (0.000) | 0.001 (0.001) |
| Average cultural position | 0.000 (0.000) | -0.000 (0.000) | -0.000 (0.001) |
| ***Cross-level Interactions*** | | | |
| Degree*educational environment | 0.000 (0.000) | -0.000 (0.001) | -0.000 (0.001) |
| A-level*educational environment | -0.001 (0.001) | 0.000 (0.001) | -0.001 (0.001) |
| Degree*left behind-ness | 0.000 (0.001) | 0.000 (0.001) | 0.000 (0.001) |
| A-level*left behind-ness | -0.001 (0.001) | 0.001 (0.001) | -0.001 (0.001) |
| Degree*economic scarcity | 0.001*** (0.001) | 0.000 (0.001) | -0.001 (0.001) |
| A-level* economic scarcity | 0.000 (0.001) | 0.000 (0.001) | -0.001 (0.001) |
| Degree*political discussion | 0.000 (0.000) | 0.000 (0.000) | -0.001 (0.001) |
| A-level*political discussion | -0.000 (0.001) | 0.001 (0.001) | -0.001 (0.001) |
| Degree*local feeling | 0.000 (0.000) | 0.000 (0.000) | -0.001 (0.001) |
| A-level*local feeling | -0.001* (0.001) | 0.001 (0.001) | -0.000 (0.001) |
| Degree*average economic position | 0.000 (0.000) | 0.000 (0.000) | 0.001 (0.001) |
| A-level*average economic position | 0.000 (0.001) | -0.000 (0.001) | 0.000 (0.001) |
| Degree*average cultural position | 0.000 (0.000) | 0.001* (0.000) | -0.001 (0.001) |
| A-level*average cultural position | -0.000 (0.001) | 0.000 (0.001) | -0.001 (0.001) |
| ***Random Part*** | | | |
| Random intercept | 0.457*** (0.067) | 0.477*** (0.072) | 1.066*** (0.218) |
| Random variance: A-level | 0.613*** (0.129) | 0.624*** (0.155) | 1.160*** (0.359) |
| Random variance: degree | 0.414*** (0.120) | 0.559*** (0.136) | 0.790*** (0.214) |
| **N** | | | 21,072 |

**Table X-2 - Regression Results for the 2017 General Election Models**

| Model Term | | Conservative 2017 | Labour 2017 |
|---|---|---|---|
| ***Individual-level Variables*** | | | |
| Intercept | | -5.981*** (0.471) | 3.275*** (0.532) |
| Educational attainment, reference: GCSE | A-level | -0.104 (0.671) | 0.048 (0.580) |
| | Degree | -0.336 (0.489) | -0.124 (0.518) |
| Age | | 0.025*** (0.002) | -0.028*** (0.002) |
| Attention paid to politics | | 0.079*** (0.011) | -0.065*** (0.012) |
| Occupational class, reference: managerial and professional occupations | Intermediate occupations | -0.119* (0.067) | 0.144** (0.065) |
| | Manual and routine occupations | -0.259*** (0.073) | 0.265*** (0.068) |
| | Not classified | -0.131** (0.060) | 0.149** (0.060) |
| Left-right (economic) attitudes | | 0.464*** (0.018) | -0.436*** (0.016) |
| Libertarian-authoritarian (cultural) attitudes | | 0.417*** (0.017) | -0.267*** (0.013) |
| News readership, reference: doesn't regularly read paper | Reads left-leaning paper | -1.202*** (0.128) | 0.675*** (0.075) |
| | Reads another paper | -0.464*** (0.070) | 0.476*** (0.065) |
| | Reads right-leaning paper | 0.790*** (0.051) | -0.784*** (0.054) |
| Populism (politicians don't care about people like me), reference: agree | Disagree | 0.861*** (0.068) | -0.519*** (0.069) |
| | Neither agree nor disagree | 0.591*** (0.061) | -0.330*** (0.054) |
| Talks to neighbour/co-worker about politics, reference: does not | | -0.250 (0.131) | 0.193 (0.110) |
| Does not identify with local community, reference: does | | 0.142** (0.056) | -0.074 (0.064) |
| Education not important to sense of identity, reference: education is important | | 0.113 (0.116) | -0.121 (0.109) |
| ***Constituency-level Variables*** | | | |
| Educational environment | | -0.001* (0.000) | 0.002*** (0.000) |
| Left behind-ness | | -0.000 (0.000) | 0.001* (0.000) |
| Economic scarcity | | -0.002*** (0.000) | 0.003*** (0.000) |
| Political discussion | | -0.000 (0.000) | -0.000 (0.000) |
| 'Local' feeling | | -0.000 (0.000) | 0.000 (0.000) |

| Model Term | Conservative 2017 | Labour 2017 |
|---|---|---|
| Average economic position | 0.001*** (0.000) | -0.001** (0.000) |
| Average cultural position | 0.000 (0.000) | 0.000 (0.000) |
| ***Cross-level Interactions*** | | |
| Degree*educational environment | -0.000 (0.001) | 0.000 (0.000) |
| A-level*educational environment | 0.000 (0.001) | -0.000 (0.001) |
| Degree*left behind-ness | -0.000 (0.001) | -0.000 (0.001) |
| A-level*left behind-ness | -0.000 (0.001) | -0.000 (0.001) |
| Degree*economic scarcity | 0.000 (0.001) | -0.000 (0.001) |
| A-level* economic scarcity | 0.000 (0.001) | -0.000 (0.001) |
| Degree*political discussion | 0.000 (0.000) | 0.001 (0.000) |
| A-level*political discussion | -0.000 (0.000) | 0.001** (0.000) |
| Degree*local feeling | 0.000 (0.000) | -0.000 (0.000) |
| A-level*local feeling | -0.000 (0.001) | -0.000 (0.001) |
| Degree*average economic position | 0.000 (0.000) | -0.000 (0.000) |
| A-level*average economic position | 0.000 (0.001) | -0.001 (0.000) |
| Degree*average cultural position | 0.001* (0.000) | 0.000 (0.000) |
| A-level*average cultural position | 0.000 (0.000) | 0.000 (0.000) |
| ***Random Part*** | | |
| Random intercept | 0.206*** (0.049) | 0.251*** (0.052) |
| Random variance: A-level | 0.518*** (0.124) | 0.344*** (0.110) |
| Random variance: degree | 0.331*** (0.092) | 0.263*** (0.085) |
| **N** | | 21,240 |

**Table X-3 - Regression Results for the 2015 General Election Models**

| Model Term | | Conservative 2015 | Labour 2015 | Liberal Democrat 2015 |
|---|---|---|---|---|
| ***Individual-level Variables*** | | | | |
| Intercept | | -5.866*** (0.379) | 1.579*** (0.380) | 1.094 (0.889) |
| Educational attainment, reference: GCSE | A-level | 1.065** (0.479) | -1.201** (0.506) | -0.346 (1.068) |
| | Degree | 0.700 (0.444) | -0.215 (0.453) | -0.972 (0.826) |
| Age | | 0.009*** (0.002) | -0.010*** (0.002) | 0.007** (0.003) |
| Attention paid to politics | | -0.010 (0.011) | -0.004 (0.011) | -0.107*** (0.019) |
| Occupational class, reference: managerial and professional occupations | Intermediate occupations | -0.044 (0.071) | 0.046 (0.069) | -0.144 (0.120) |
| | Manual and routine occupations | -0.136* (0.079) | 0.206*** (0.078) | -0.204 (0.171) |
| | Not classified | -0.107* (0.062) | 0.217*** (0.061) | -0.088 (0.106) |
| Left-right (economic) attitudes | | 0.526*** (0.016) | -0.420*** (0.015) | -0.044* (0.024) |
| Libertarian-authoritarian (cultural) attitudes | | 0.348*** (0.017) | -0.156*** (0.014) | -0.207*** (0.023) |
| News readership, reference: doesn't regularly read paper | Reads left-leaning paper | -1.032*** (0.126) | 0.410*** (0.081) | -0.199 (0.145) |
| | Reads another paper | -0.525*** (0.072) | 0.835*** (0.061) | -0.311*** (0.113) |
| | Reads right-leaning paper | 0.797*** (0.052) | -0.536*** (0.054) | -0.621*** (0.108) |
| Populism (politicians don't care about people like me), reference: agree | Disagree | 0.977*** (0.076) | -0.337*** (0.068) | 0.261** (0.123) |
| | Neither agree nor disagree | 0.777*** (0.067) | -0.061 (0.063) | 0.044 (0.107) |
| Talks to neighbour/co-worker about politics, reference: does not | | 0.144 (0.131) | -0.160 (0.107) | 0.233* (0.127) |
| Does not identify with local community, reference: does | | 0.060 (0.067) | -0.113 (0.090) | -0.118 (0.131) |
| Education not important to sense of identity, reference: education is important | | -0.029 (0.107) | 0.031 (0.076) | -0.364 (0.229) |
| ***Constituency-level Variables*** | | | | |
| Educational environment | | 0.000 (0.000) | 0.001*** (0.000) | -0.001 (0.001) |
| Left behind-ness | | 0.000 (0.000) | -0.000 (0.000) | 0.001 (0.001) |
| Economic scarcity | | -0.001*** (0.000) | 0.003*** (0.000) | -0.004*** (0.001) |
| Political discussion | | 0.000 (0.000) | -0.000 (0.000) | -0.000 (0.001) |

| Model Term | Conservative 2015 | Labour 2015 | Liberal Democrat 2015 |
|---|---|---|---|
| 'Local' feeling | -0.001** (0.000) | 0.000 (0.000) | -0.001 (0.001) |
| Average economic position | 0.001*** (0.000) | -0.001*** (0.000) | 0.000 (0.001) |
| Average cultural position | 0.001* (0.000) | -0.000 (0.000) | -0.002** (0.001) |
| ***Cross-level Interactions*** | | | |
| Degree*educational environment | -0.001* (0.000) | 0.000 (0.001) | 0.002* (0.001) |
| A-level*educational environment | -0.001 (0.000) | 0.001 (0.001) | 0.000 (0.001) |
| Degree*left behind-ness | -0.001** (0.001) | 0.000 (0.000) | -0.001 (0.001) |
| A-level*left behind-ness | -0.001* (0.001) | 0.001** (0.001) | -0.001 (0.001) |
| Degree*economic scarcity | -0.000 (0.001) | -0.000 (0.000) | 0.003*** (0.001) |
| A-level* economic scarcity | -0.001* (0.001) | 0.001 (0.001) | 0.003** (0.001) |
| Degree*political discussion | -0.000 (0.000) | -0.000 (0.000) | -0.000 (0.001) |
| A-level*political discussion | -0.000 (0.000) | -0.000 (0.000) | 0.000 (0.001) |
| Degree*local feeling | 0.001*** (0.000) | -0.001*** (0.000) | 0.001 (0.001) |
| A-level*local feeling | 0.001* (0.000) | -0.001 (0.000) | 0.001 (0.001) |
| Degree*average economic position | -0.001 (0.000) | 0.001* (0.000) | 0.001 (0.001) |
| A-level*average economic position | -0.001 (0000) | 0.001*** (0.000) | 0.001 (0.001) |
| Degree*average cultural position | -0.000 (0.000) | 0.001* (0.000) | 0.002** (0.001) |
| A-level*average cultural position | -0.000 (0.000) | 0.000 (0.001) | -0.000 (0.001) |
| ***Random Part*** | | | |
| Random intercept | 0.318*** (0.047) | 0.426*** (0.054) | 2.001*** (0.408) |
| Random variance: A-level | 0.611*** (0.166) | 0.670*** (0.149) | 2.622*** (0.558) |
| Random variance: degree | 0.467*** (0.089) | 0.546*** (0.100) | 1.639*** (0.451) |
| **N** | | | 21,726 |

# Appendix Y The Geographical Patterning of Education-based Vote Polarisation in the 2015, 2017 and 2019 General Elections

Maps with English and Welsh constituencies gradient-shaded according to their random coefficient residuals are presented below (see the legend marked by 'avresd'). They show which Parliamentary constituencies had the most extreme positive and negative 'A-level' and 'degree' random coefficients. This allows exploration of whether there are geographical clusters of areas with larger- or smaller- than average levels of education-based vote polarisation. Lists of the 20 most and 20 least educationally polarised constituencies for each vote choice outcome modelled are also presented. In Figures Y-1 to Y-6, 'Con' = Conservative, 'Lab' = Labour and 'LD' = Liberal Democrat.

**Table Y-1 - 20 Most Educationally Polarised Constituencies, Degree versus GCSE**

| | **Conservative 2019** | **Labour 2019** | **Liberal Democrat 2019** | **Conservative 2017** | **Labour 2017** | **Conservative 2015** | **Labour 2015** | **Liberal Democrat 2015** |
|---|---|---|---|---|---|---|---|---|
| **1** | Swansea East | Gower | Winchester | Mole Valley | Gower | New Forest West | Oldham East and Saddleworth | Harrogate and Knaresborough |
| **2** | Blackburn | Corby | Sherwood | Altrincham and Sale West | Haltemprice and Howden | Liverpool, Riverside | Vale of Clwyd | North Durham |
| **3** | Torfaen | Calder Valley | Cheadle | Stoke-on-Trent North | Hove | Tamworth | Stafford | Fylde |
| **4** | Dwyfor Meirionnydd | Northampton South | Ruislip, Northwood and Pinner | Bolsover | Aberavon | Basingstoke | South Suffolk | Warrington South |

| | Conservative 2019 | Labour 2019 | Liberal Democrat 2019 | Conservative 2017 | Labour 2017 | Conservative 2015 | Labour 2015 | Liberal Democrat 2015 |
|---|---|---|---|---|---|---|---|---|
| **5** | South Shields | Middlesbrough South and East Cleveland | North West Cambridgeshire | Stourbridge | Makerfield | South Northamptonshire | Uxbridge and South Ruislip | Bournemouth West |
| **6** | Wigan | Braintree | Cheltenham | Sheffield, Brightside and Hillsborough | Manchester, Withington | Gedling | South Thanet | Canterbury |
| **7** | Batley and Spen | Darlington | Epping Forest | South Holland and the Deepings | Finchley and Golders Green | Bury North | Ashford | Sheffield, Heeley |
| **8** | East Ham | Broxtowe | St Albans | Bradford West | Warley | Leeds East | Finchley and Golders Green | Bermondsey and Old Southwark |
| **9** | Bradford South | Rushcliffe | South East Cambridgeshire | South West Hertfordshire | Cardiff North | Croydon South | Poole | Hemel Hempstead |
| **10** | West Ham | Uxbridge and South Ruislip | Amber Valley | Bradford East | Gravesham | Portsmouth North | Southend West | Broadland |
| **11** | Welwyn Hatfield | Blaydon | Bolsover | Newcastle upon Tyne East | South Derbyshire | Westminster North | Charnwood | Walsall North |
| **12** | North Dorset | Harrow East | Carshalton and Wallington | Blyth Valley | Gedling | Luton North | Broxtowe | Bassetlaw |
| **13** | Monmouth | Wolverhampton South East | Thirsk and Malton | Cheltenham | Dewsbury | Birmingham, Ladywood | Warley | Torridge and West Devon |
| **14** | Nottingham East | Copeland | Wolverhampton South East | Basingstoke | Kingswood | Berwick-upon-Tweed | Bromsgrove | Nottingham South |
| **15** | Stockport | Hove | Torbay | Morecambe and Lunesdale | Harwich and North Essex | Mole Valley | Sheffield, Hallam | Congleton |
| **16** | Chesterfield | Gloucester | Mid Dorset and North Poole | Harlow | Vale of Clwyd | Worthing West | Braintree | Norwich North |

| | Conservative 2019 | Labour 2019 | Liberal Democrat 2019 | Conservative 2017 | Labour 2017 | Conservative 2015 | Labour 2015 | Liberal Democrat 2015 |
|---|---|---|---|---|---|---|---|---|
| **17** | Houghton and Sunderland South | Southend West | St Helens South and Whiston | Putney | Eltham | Suffolk Coastal | Leeds West | Hyndburn |
| **18** | Newport East | Witham | Aldridge-Brownhills | Totnes | Wirral West | Luton South | Pudsey | Newcastle upon Tyne Central |
| **19** | Birmingham, Hall Green | Reading East | Islington South and Finsbury | Halton | Birmingham, Selly Oak | West Ham | Harrow East | South Norfolk |
| **20** | Islwyn | Beverley and Holderness | Spelthorne | Richmond (Yorks) | Hertford and Stortford | Hendon | West Worcestershire | Faversham and Mid Kent |

**Table Y-2 - 20 Least Educationally Polarised Constituencies, Degree versus GCSE**

| | Conservative 2019 | Labour 2019 | Liberal Democrat 2019 | Conservative 2017 | Labour 2017 | Conservative 2015 | Labour 2015 | Liberal Democrat 2015 |
|---|---|---|---|---|---|---|---|---|
| **1** | Gower | Cheadle | Manchester, Gorton | Manchester, Withington | Carshalton and Wallington | Lewes | Stratford-on-Avon | Sheffield, Hallam |
| **2** | West Worcestershire | St Helens South and Whiston | Leeds Central | Cambridge | Richmond Park | Bournemouth West | Liverpool, Riverside | Hackney North and Stoke Newington |
| **3** | Fylde | South Cambridgeshire | Harrow East | Sheffield, Hallam | Eastbourne | South Thanet | Daventry | South Suffolk |
| **4** | Central Suffolk and North Ipswich | Brecon and Radnorshire | Wythenshawe and Sale East | Haltemprice and Howden | Kingston and Surbiton | Bermondsey and Old Southwark | Manchester Central | Birmingham, Ladywood |
| **5** | Beverley and Holderness | Mid Dorset and North Poole | Gosport | Tewkesbury | Brighton, Pavilion | Broadland | Leeds Central | Kenilworth and Southam |

| | Conservative 2019 | Labour 2019 | Liberal Democrat 2019 | Conservative 2017 | Labour 2017 | Conservative 2015 | Labour 2015 | Liberal Democrat 2015 |
|---|---|---|---|---|---|---|---|---|
| **6** | Rushcliffe | Batley and Spen | Telford | Portsmouth South | Bath | Cambridge | Cheltenham | Forest of Dean |
| **7** | Northampton South | Cheltenham | Enfield North | South Norfolk | Ceredigion | Aberavon | Arfon | Bolsover |
| **8** | Shrewsbury and Atcham | Carshalton and Wallington | South Shields | Folkestone and Hythe | Mole Valley | Harrogate and Knaresborough | East Ham | Keighley |
| **9** | Hornsey and Wood Green | Richmond Park | Dudley North | Holborn and St Pancras | Cheltenham | City of Durham | Copeland | Swansea West |
| **10** | Bournemouth East | Brentford and Isleworth | Denton and Reddish | West Dorset | Newton Abbot | Reigate | Truro and Falmouth | Exeter |
| **11** | Calder Valley | South West Hertfordshire | Tottenham | Ealing North | Sheffield, Brightside and Hillsborough | Chesterfield | Central Devon | North West Durham |
| **12** | Islington North | Henley | Swansea East | Birmingham, Selly Oak | Hazel Grove | Faversham and Kent | Witney | South Leicestershire |
| **13** | Huddersfield | Bath | Kingston upon Hull East | Taunton Deane | Torbay | Chingford and Woodford Green | Ceredigion | Houghton and Sunderland South |
| **14** | Broxtowe | Oxford West and Abingdon | Nottingham East | Dagenham and Rainham | Arfon | Beverley and Holderness | Newbury | Finchley and Golders Green |
| **15** | Havant | St Albans | Eltham | South Derbyshire | Meriden | Eastbourne | Hexham | Aldridge-Brownhills |
| **16** | Darlington | Poplar and Limehouse | Kensington | Denton and Reddish | North Cornwall | St Helens North | Macclesfield | Blaydon |
| **17** | Heywood and Middleton | Twickenham | North Durham | Gower | Twickenham | Morley and Outwood | Liverpool, Walton | Poole |
| **18** | City of Chester | Buckingham | Corby | Dewsbury | Nottingham South | Stockton North | Brighton, Pavilion | Newcastle upon Tyne East |

| | Conservative 2019 | Labour 2019 | Liberal Democrat 2019 | Conservative 2017 | Labour 2017 | Conservative 2015 | Labour 2015 | Liberal Democrat 2015 |
|---|---|---|---|---|---|---|---|---|
| **19** | Bedford | Somerton and Frome | Edmonton | Warley | Wells | Arundel and South Downs | Banbury | Bury North |
| **20** | Braintree | Chelsea and Fulham | Cynon Valley | St Ives | Wythenshawe and Sale East | Bromley and Chislehurst | Brecon and Radnorshire | Broxtowe |

**Table Y-3 - 20 Most Educationally Polarised Constituencies, A-level versus GCSE**

| | Conservative 2019 | Labour 2019 | Liberal Democrat 2019 | Conservative 2017 | Labour 2017 | Conservative 2015 | Labour 2015 | Liberal Democrat 2015 |
|---|---|---|---|---|---|---|---|---|
| **1** | Sittingbourne and Sheppey | Arundel and South Downs | Leyton and Wanstead | Bristol South | Dudley North | Westmorland and Lonsdale | Oldham East and Saddleworth | Stalybridge and Hyde |
| **2** | Weaver Vale | Witney | Bournemouth West | Houghton and Sunderland South | Rhondda | Altrincham and Sale West | Poole | Birmingham, Perry Barr |
| **3** | Great Yarmouth | Mid Derbyshire | Holborn and St Pancras | South Holland and the Deepings | Blaneau Gwent | Wirral South | Vale of Clywd | Pudsey |
| **4** | St Helens North | Grantham and Stamford | Boston and Skegness | Leeds North West | Portsmouth South | North Devon | Sheffield Hallam | Meon Valley |
| **5** | Torfaen | South Derbyshire | Leeds East | Wolverhampton South East | Chorley | Tynemouth | Edmonton | Islington South and Finsbury |
| **6** | Bradford South | Leeds North East | Lewisham East | Leicester West | Lewisham, Deptford | Lichfield | Finchley and Golders Green | Bristol East |
| **7** | Enfield North | Telford | Knowsley | Luton North | East Surrey | Saffron Walden | Leyton and Wanstead | Bristol West |
| **8** | Houghton and Sunderland South | Worsley and Eccles South | Birmingham, Erdington | Congleton | Spelthorne | North East Derbyshire | South Norfolk | Macclesfield |

| | Conservative 2019 | Labour 2019 | Liberal Democrat 2019 | Conservative 2017 | Labour 2017 | Conservative 2015 | Labour 2015 | Liberal Democrat 2015 |
|---|---|---|---|---|---|---|---|---|
| **9** | Washington and Sunderland West | Harborough | Harrow West | Newcastle upon Tyne East | Cynon Valley | Barking | Shrewsbury and Atcham | Derbyshire Dales |
| **10** | South Shields | City of Chester | Birmingham, Yardley | Islington South and Finsbury | Barnsley East | Tamworth | Walthamstow | Wansbeck |
| **11** | St Helens South and Whiston | Lancaster and Fleetwood | Barking | Cheltenham | Carmarthen East and Dinefwr | Windsor | Devizes | Kingston upon Hull West and Hessle |
| **12** | Merthyr Tydfil and Rhymney | South Cambridgeshire | Wycombe | Tatton | Richmond Park | Forest of Dean | Newcastle upon Tyne North | Hayles and Harlington |
| **13** | Birkenhead | Exeter | Aberavon | Ipswich | Wimbledon | Carshalton | Selby and Ainsty | Halifax |
| **14** | Hertford and Stortford | Waveney | Cheadle | Northampton North | Crawley | Putney | Blackburn | Dulwich and West Norwood |
| **15** | Rochford and Southend East | East Hampshire | Basildon and Billericay | Ribble Valley | Beverley and Holderness | Westminster North | Keighley | Bermondsey and Old Southwark |
| **16** | South Holland and the Deepings | Somerton and Frome | Blaydon | Montgomeryshire | Devizes | North East Hertfordshire | St Helens North | Kingswood |
| **17** | Devizes | Bognor Regis and Littlehampton | Pendle | Feltham and Heston | Warley | Solihull | Heywood and Middleton | Portsmouth South |
| **18** | Esher and Walton | East Surrey | St Albans | Bradford South | Stafford | Harlow | Rutland and Melton | Middlesbrough |
| **19** | Tottenham | St Ives | Islington South and Finsbury | Oldham East and Saddleworth | Blackpool South | Leeds East | Newcastle upon Tyne Central | Slough |
| **20** | Scunthorpe | Enfield, Southgate | Colchester | Mansfield | Epping Forest | Gravesham | Colne Valley | Stratford-on-Avon |

**Table Y-4 - 20 Least Educationally Polarised Constituencies, A-level versus GCSE**

| | Conservative 2019 | Labour 2019 | Liberal Democrat 2019 | Conservative 2017 | Labour 2017 | Conservative 2015 | Labour 2015 | Liberal Democrat 2015 |
|---|---|---|---|---|---|---|---|---|
| **1** | Oxford East | South Holland and the Deepings | Manchester, Gorton | Wimbledon | Sheffield, Brightside and Hillsborough | Rossendale and Darwen | Sheffield, Brightside and Hillsborough | South Suffolk |
| **2** | Carmarthen East and Dinefwr | Bolton North East | Wythenshawe and Sale East | Blackpool South | Islington and South Finsbury | Bermondsey and Old Southwark | Feltham and Heston | Birmigham, Ladywood |
| **3** | Dover | Monmouth | Telford | Charnwood | Bradford South | East Worthing and Shoreham | Arfon | Forest of Dean |
| **4** | Cambridge | St Helens South and Whiston | Enfield North | Birmingham, Selly Oak | Bristol South | Dulwich and West Norwood | Harlow | Brent Central |
| **5** | Witney | Wigan | Tottenham | New Forest East | North Swindon | Cities of London and Westminster | Hexham | Westmorland and Lonsdale |
| **6** | Wellingborough | Cheadle | South Shields | Saffron Walden | St Albans | St Helens North | Truro and Falmouth | Bolsover |
| **7** | Fylde | Sittingbourne and Sheppey | Harrow East | Burnley | Doncaster North | Runnymede and Weybridge | Macclesfield | Kenilworth and Southam |
| **8** | Tiverton and Honiton | Stourbridge | Tonbridge and Malling | Daventry | Newcastle upon Tyne East | Colne Valley | Basingstoke | Newcastle upon Tyne East |
| **9** | Telford | Rochford and Southend East | Denton and Reddish | Aldershot | West Dorset | Sheffield South East | Portsmouth South | Ashfield |
| **10** | Wyre Forest | Ruislip, Northwood and Pinner | Harborough | Eastbourne | Houghton and Sunderland South | Leyton and Wanstead | Hackney South and Shoreditch | Finchley and Golders Green |
| **11** | City of Chester | Liverpool, Riverside | Newark | Uxbridge and South Ruislip | Northampton North | Cheadle | Chelsea and Fulham | South Leicestershire |

| | Conservative 2019 | Labour 2019 | Liberal Democrat 2019 | Conservative 2017 | Labour 2017 | Conservative 2015 | Labour 2015 | Liberal Democrat 2015 |
|---|---|---|---|---|---|---|---|---|
| **12** | Bognor Regis and Littlehampton | Lewisham East | Swansea East | Cardiff South and Penarth | South Derbyshire | Stretford and Urmston | Bracknell | North East Hertfordshire |
| **13** | Rother Valley | Weaver Vale | Dudley North | Chichester | Lewes | Southport | Esher and Walton | Keighley |
| **14** | Boston and Skegness | Richmond (Yorks) | Gosport | Guildford | Sleaford and North Hykeham | City of Chester | Lewisham, Deptford | Kingston upon Hull East |
| **15** | Arundel and South Downs | Bradford South | Nottingham East | New Forest West | Islington North | Halifax | Erewash | Sheffield, Hallam |
| **16** | Vauxhall | Cardiff South and Penarth | North Durham | Rochford and Southend East | Winchester | Sittingbourne and Sheppey | Southampton, Test | Southampton, Itchen |
| **17** | Grantham and Stamford | North Somerset | Clwyd West | Berwick-upon-Tweed | Rochester and Strood | Derbyshire Dales | Kettering | Aldridge-Brownhills |
| **18** | Reading East | Sheffield, Brightside and Hillsborough | Cynon Valley | South Shields | Bridgwater and West Somerset | Worcester | Ealing and Central Acton | Rayleigh and Wickford |
| **19** | Cheltenham | Brighton, Pavilion | Edmonton | North Norfolk | Huntingdon | Broadland | Berwick-upon-Tweed | Newport East |
| **20** | Islington North | Merthyr Tydfil and Rhymney | Milton Keynes South | Colne Valley | Wokingham | Huddersfield | Bootle | Poole |

**Figure Y-1 - Educational Polarisation in 2019 General Election Voting, Degree versus GCSE**

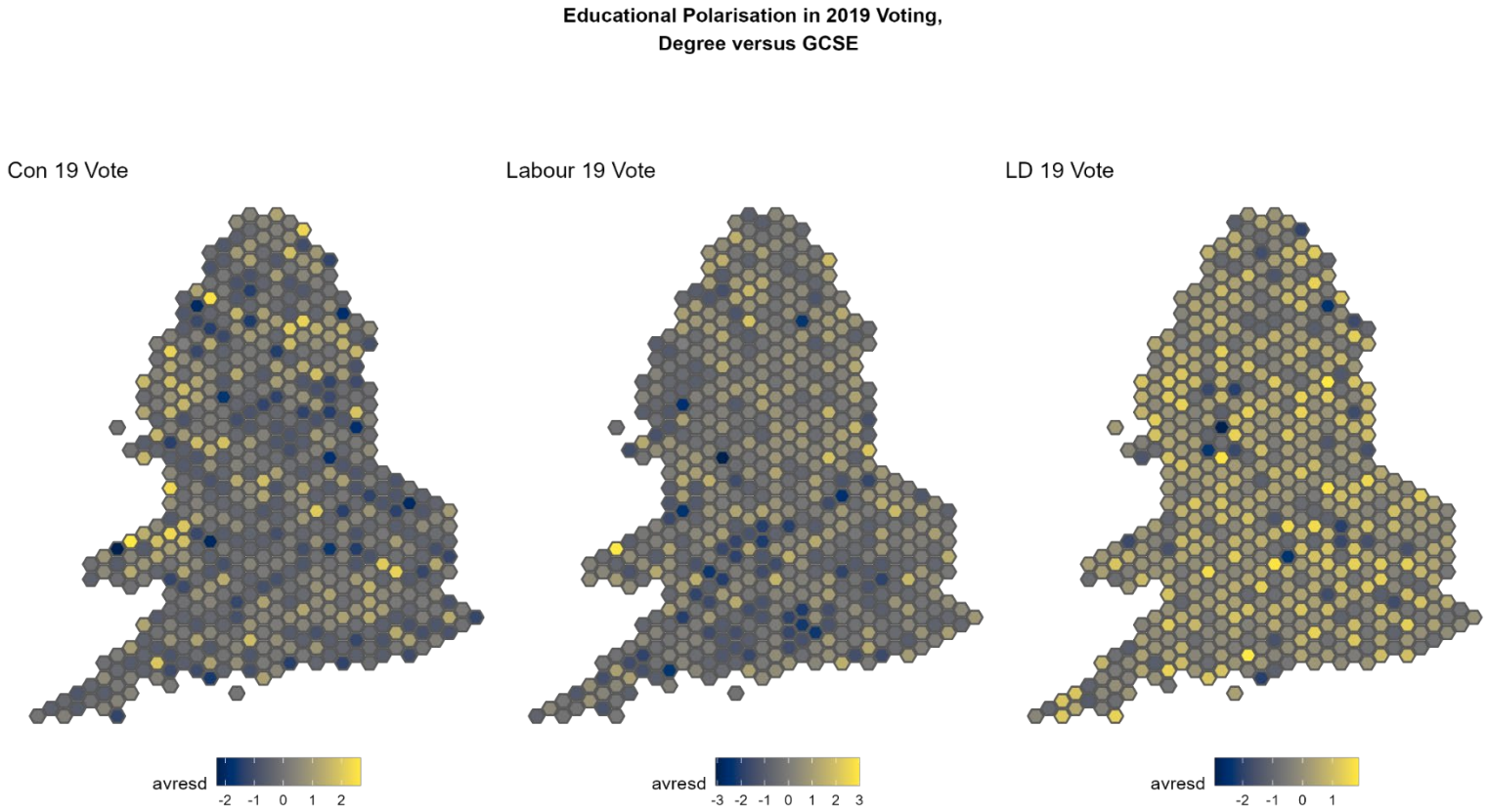


**Figure Y-2 - Educational Polarisation in 2019 General Election Voting, A-level versus GCSE**

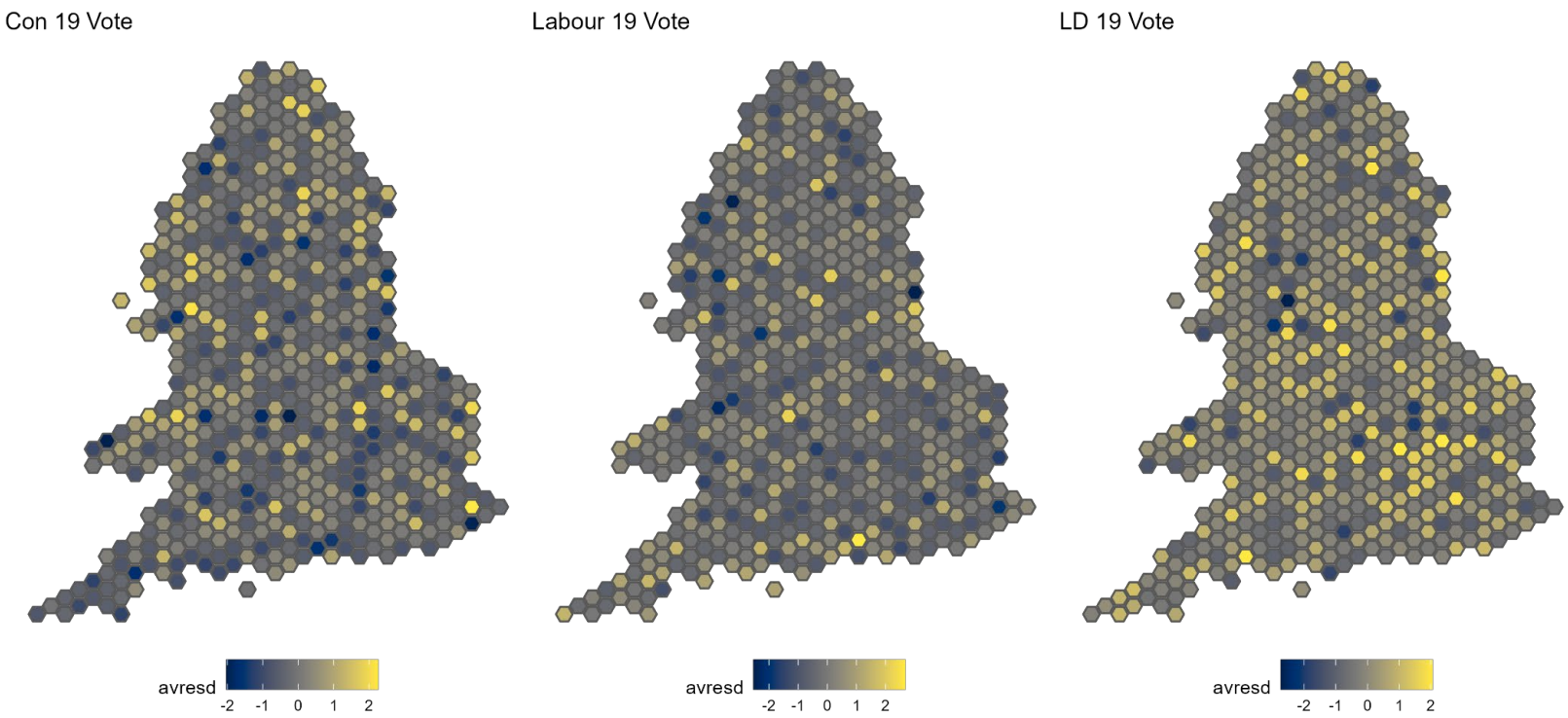


**Table Y-3 - Educational Polarisation in 2017 General Election Voting, Degree versus GCSE**

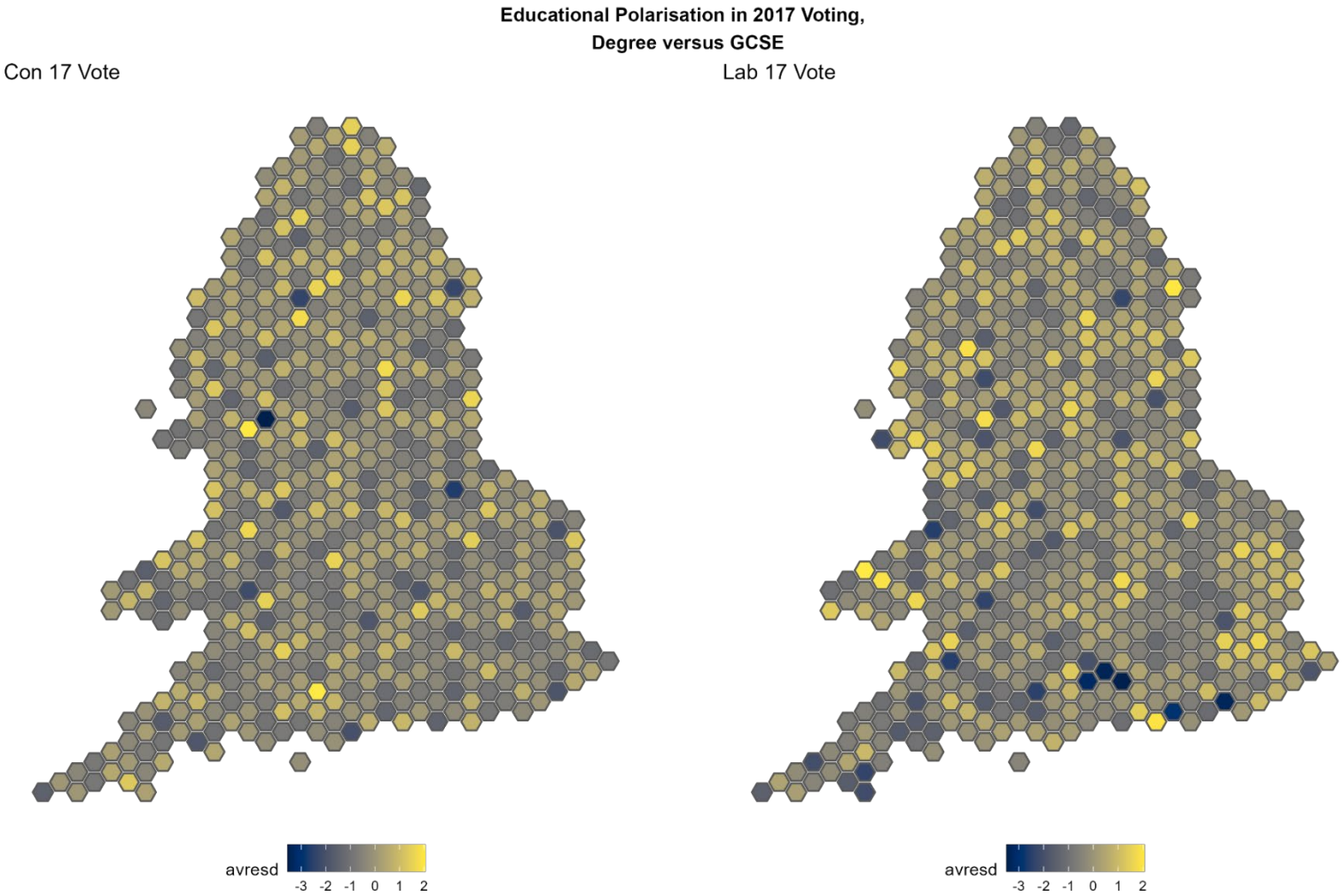


**Table Y-4 - Educational Polarisation in 2017 General Election Voting, A-level versus GCSE**

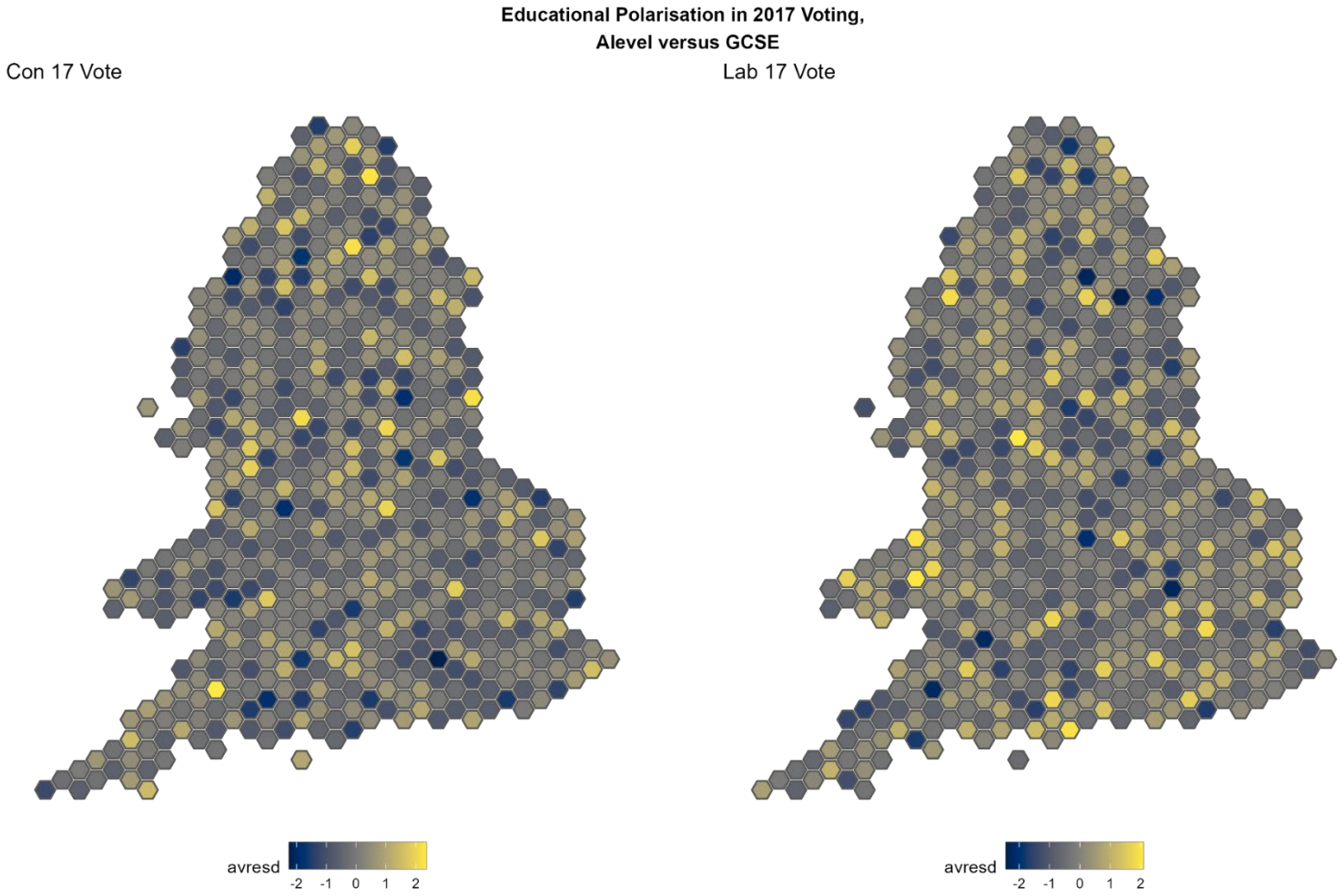
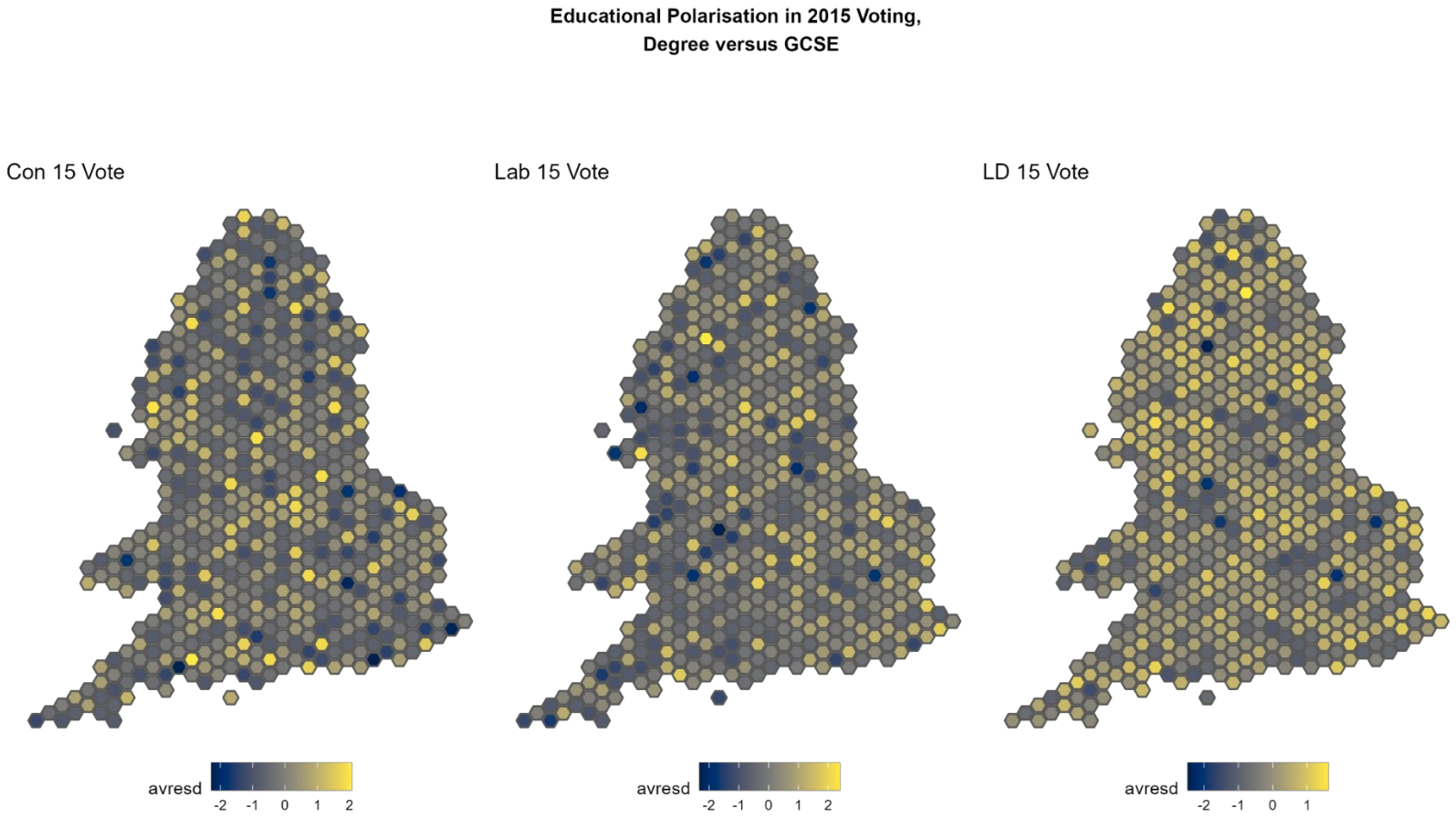
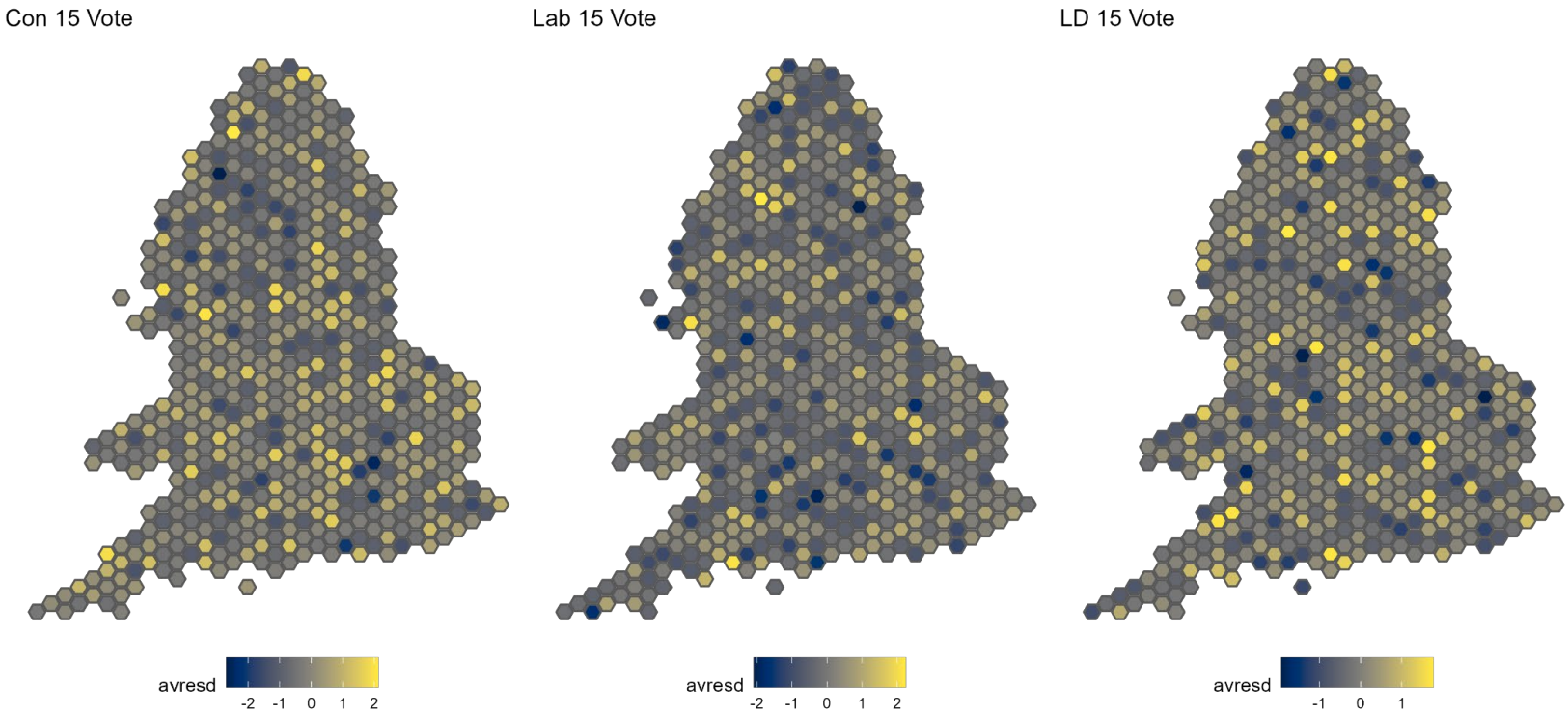


**Table Y-5 - Educational Polarisation in 2015 General Election Voting, Degree versus GCSE**



## Table Y-6 - Educational Polarisation in 2015 General Election Voting, A-level versus GCSE

**Educational Polarisation in 2015 Voting,**
**Alevel versus GCSE**



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