Subject choice at secondary school
comparing the factors which influence post-16 participation in physics and modern languages

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Subject Choice at Secondary School: Comparing the factors which influence post-16 participation in physics and modern languages

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Abstract

Students' subject choices at post-compulsory levels have important implications for access to future study and career paths. This thesis compares the factors influencing post-16 participation in physics and modern language education and begins with a critical review of the literature on subject choice, comparing across the literature on participation in these school subjects. Both physics and modern languages have been identified as strategically important and vulnerable subjects due to a growing demand for qualified graduates. However, while there have been considerable resources invested in understanding the underlying causes of declining participation and inequalities between different science subjects, there has been relatively little research into other subjects. Moreover, physics and modern languages are disproportionately studied by students who are white and middle-class, though physics students are predominately male and modern language students are predominately female. This study offers insights into inequalities in participation in both science and modern languages education by drawing comparisons between these subjects, an approach that is distinctive from other studies.

The empirical research draws on qualitative data collected through focus group discussions with 67 students and one-on-one interviews with 14 teachers at 5 secondary schools and sixth form colleges in London and the West Midlands regions in England. The analysis of this data draws upon two main theoretical perspectives, Bourdieu's theory of social reproduction and sociocultural theorisations of identity as well as academic work by scholars who have adopted and extended these ideas when researching subject choice and participation in science and modern language education. The thesis argues that these theoretical perspectives provide useful analytical lenses to interrogate the data at different levels or magnifications. Bourdieu's theory foregrounds the influence of structural factors on reproducing existing patterns of social inequality, particularly related to social class. Sociocultural theorisations of identity shift focus to individual agency and the ways that individuals are actively constructing their identities.

The main contribution of this study is an in-depth understanding of the role that social contexts play in shaping students' subject choices. Post-16 participation in physics and modern languages was found to be restricted by school policies and pedagogical practices which reproduce existing inequalities related to gender, ethnicity and social class. The examples in this study illustrate how students' choices were limited by school curricular offers and attainment-based gate-keeping practices in physics and modern languages. This thesis argues that students' choices should be understood within the context of the opportunities available at their schools and greater attention should be given to the impact of school practices in the research literature on subject choice.

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Glossary of Acronyms and Abbreviations

A-Level	Advanced Level (post-16 qualification)
AS-Level	Advanced Subsidiary Level (post-16 qualification, many were discontinued in 2017)
AQA	Assessment and Qualifications Alliance
ASPIRES	(Research Project at UCL)
BERA	British Education Research Association
BTEC	Business and Technology Education Council (post-16 qualification)
CV	Curriculum Vitae
DfE	Department for Education
EAL	English as an Additional Language
EBacc	English Baccalaureate
EPQ	Extended Project Qualification
ESERA	European Science Education Research Association
ESRC	Economic and Social Research Council
EU	European Union
FSM	Free School Meals
GCSE	General Certificate of Secondary Education
HE	Higher Education
HEFCE	Higher Education Funding for England
IB	International Baccalaureate (post-16 qualification)
ICT	Information and Communication Technology
IOP	Institute of Physics
ISI	Independent Schools Inspectorate
JCQ	Joint Councils for Qualifications
KCL	King's College London
LOTEs	Languages Other Than English
MFL	Modern Foreign Language
NEU	National Education Union
NPD	National Pupil Database
NVivo	(Qualitative Data Analysis Software produced by QSR International)

OECD	Organisation for Economic Co-operation and Development
OFFA	Office for Fair Access
Ofqual	Office of Qualifications and Examinations Regulation
OfS	Office for Students
Ofsted	Office for Standards in Education, Children's Services and Skills
Oxbridge	Oxford and Cambridge universities
POLAR	Participation of Local Areas (in Higher Education) Classification
Pre-U	Pre-University (post-16 qualification)
PSHE	Personal, Social, Health and Economic
RE	Religious Education
RSA	Royal Society for Arts
RSC	Royal Society of Chemistry
SEN	Special Educational Needs
SES	Socio-Economic Status
SIVS	Strategically Important and Vulnerable Subjects
SLT	Senior Leadership Team
SOAS	School of Oriental and African Studies (University of London)
STEM	Science, Technology, Engineering and Mathematics
UCAS	Universities and Colleges Admissions Service
UCL	University College London
UK	United Kingdom
UPMAP	Understanding Participation in Post-16 Maths and Physics (Research Project at UCL)
USA	United States of America

Preface

This project arose out of an interest in understanding the reasons underpinning inequalities in participation in science at post-compulsory levels, specifically within physics. My studentship is funded by the Institute of Physics (IOP) and King's College London. There has been considerable research interest in this topic, spanning many decades, coupled with attempts to attract a more diverse student population into post-compulsory science education and careers. My own educational and professional background is in science – I studied biology at the University of California, Berkeley, which is very close to where I grew up. During my first degree, I was a member of a student society for first-generation university students, women and other underrepresented groups in science disciplines. We studied and socialised together, organising our own study groups for all the compulsory undergraduate courses. At the time, I knew our group was not a representative sample of science undergraduates. This was important because creating a community of students who were navigating science disciplines and university without a road map made the experience of studying at a large research-focused university less isolating. After graduation, my participation in this group inspired my own professional pathway into science education, coordinating science outreach and teacher training in schools, as well as my current academic interest in researching inequalities in science participation.

When I began this thesis, much of the previous research on participation in physics tended to draw comparisons with other science subjects, notably biology and chemistry, or with mathematics. However, less is known about how physics compares to non-science subjects, such as humanities and social sciences. As my PhD evolved, I decided to include modern languages as a counterpoint to physics due to similar concerns about equity and access to languages at the secondary school level. Although I began my doctoral study with limited knowledge about modern languages education, I was already aware of reports on the declining numbers of students choosing to study languages beyond compulsory levels in the UK. Among the perceived causes of this decline are negative attitudes towards modern languages in countries whose main official language is English, which are rooted in the global status of the English language.

I began this PhD in 2016, the same year that the United Kingdom voted to leave the European Union in the 'Brexit' referendum and Donald Trump was elected president of the United States. These two events brought debates about immigration policy and language learning in English-speaking countries into the spotlight. These events were the backdrop of the thesis which reinforced my interest in understanding the factors influencing the declining participation in modern languages education in the UK. In the following years, the #MeToo and Black Lives Matter movements

prompted national conversations about gender, race and social justice in both the USA and UK. These conversations were also a motivation to investigate issues of gender and racial inequities in students' subject choices.

This thesis compares the factors influencing post-16 participation in physics and modern languages in England. There has been considerable research and policy interest in understanding the factors which influence participation in these subjects separately, however, there is very little research into how the factors influencing participation in science compares with non-science subjects. This thesis aims to address that gap in the literature. This study draws on the literature in science education, modern languages education and subject choice as well as qualitative data in the form of interviews and focus groups collected at four secondary schools and a sixth form college. Specifically, I address the following research questions:

1) What are the main factors impacting students' post-16 subject choices in physics and modern languages?
2) To what extent are the factors shaping students' post-16 subject choices similar or different for physics and modern languages?
    a) How are these factors influenced by structural inequalities related to gender, ethnicity and socioeconomic background?

To address these research questions, I adopted an approach which is underpinned by Bourdieu's theory of social reproduction and influenced by sociological and sociocultural theorisations of identity, particularly the concepts of *celebrated subject identities* developed by Carlone et al. (2014) and *figured worlds* developed by Holland et al. (1998). Based on these theoretical underpinnings and an initial review of the literature, I began a conceptual mapping of the factors influencing participation in physics and modern languages which is represented in the figure below.

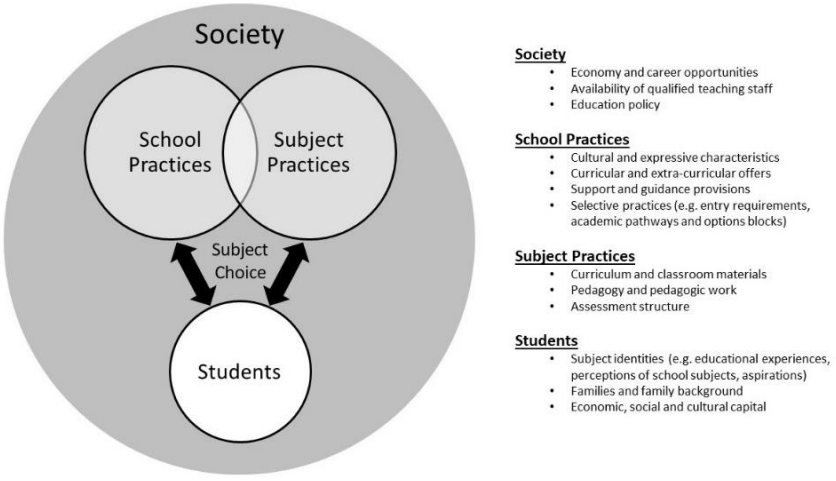

Figure 1 Conceptual mapping of factors influencing students' subject choices

The diagram illustrates how students' subject choices are influenced by a matrix of factors represented by spheres of society, school practices, subject-specific practices and individual students. Each circle represents a different 'level' of factors which can shape students' subject choices. The relative importance of these factors is not only different for individual students but can also shift and change over time. Bourdieu's theory, and specifically the concepts of *institutional habitus* and *pedagogic work,* foreground the influence of schools and subject-specific pedagogic practices on reproducing existing inequitable patterns of participation in certain school subjects. This is represented in the corresponding spheres of school practices and subject practices in the diagram. Carlone et al.'s concept of *celebrated subject* identities describes the cultural models of who counts as successful and legitimate participants in school subjects to shift focus to individual agency and the ways that individuals are actively constructing identities. This is represented by the arrows between students and schools and subjects in the diagram. Initially, my intention was to prioritise students' voices and choice narratives which is reflected in the research questions. As the study evolved, it became clear that schools and institutions played a key role in students' subject choices. This meant that the role of institutions became more central in my analysis. In framing students' subject choices in this way, this thesis problematises the notion of subject 'choice' as a rational and individual process by examining the role of broader social, cultural and structural factors.

Chapter overview

Chapter 1 introduces the thesis by setting out the background and policy context for this study including the key policies which have influenced post-compulsory participation in physics and modern languages. This background information will enable a greater understanding and appreciation of the wider context shaping both school practices and students' subject choices.

Chapter 2 reviews the literature on participation in post-16 participation in physics and modern languages and draws comparisons across these subjects. The chapter draws together findings from previous studies on student engagement with physics and modern languages which provide insights into the reasons for persistent inequalities in relation to gender and socio-economic background.

Chapter 3 outlines the theoretical resources I draw upon in this study to examine how broader social inequalities can influence students' subject choices and post-school aspirations. First, I discuss Bourdieu's theory of social reproduction which proposes that social practices result from the interactions between an individual's dispositions ('habitus') as well as cultural, social and economic resources ('capital') which have their value determined by the norms and expectations of a

particular social context ('field'). These conceptual tools have been especially helpful for examining broader structural and institutional factors which influence students' subject choices. Second, I discuss sociological and sociocultural theories of identity, specifically the concept of *celebrated subject identities* developed by Carlone et al. (2014) which builds on the notion of *figured worlds* developed by Holland et al. (1998). These concepts explore how individuals negotiate identities within the systems of power that constrain choices.

Chapter 4 discusses the methodology and methods of the study which involved school case studies as well as semi-structured interviews and focus group discussions with students and teachers. The chapter provides details for how the schools and participants were recruited. The research includes in-depth case studies of 5 sixth forms including two state-funded coeducational schools, one state-funded girls' school, one independent boys' school and a sixth form college. In total, 67 students and 14 teachers were interviewed at all 5 sixth forms. In this chapter, I discuss the choice of methods and how I recorded and analysed my data.

In **Chapters 5 through 7** I present the findings guided by the research questions and using the theoretical resources outlined in **Chapter 3**. The analysis in **Chapter 5** illustrates how Bourdieu's theory of social reproduction and *institutional habitus* can be applied to analyse school practices at the 'median-level' by examining the practices at individual schools while remaining sensitive to wider structural conditions, such as the differences between more and less affluent schools. The analysis in **Chapter 6** explores the subject-specific school practices which can influence student participation in physics and modern languages using Bourdieu's concepts of *pedagogic work* and *symbolic violence*. **Chapter 7** discusses how students negotiated success in these subjects by drawing on the concept of *celebrated subject identities* developed by Carlone et al. (2014).

Finally, in **Chapter 8**, I summarise the key findings of the three data chapters along with wider literature to outline the key empirical and theoretical contributions of the thesis. This is followed by a discussion of the limitations and implications of the study and offers some thoughts regarding possible directions for future research as well as recommendations for educators and policymakers.

Chapter 1: Introduction and Policy Context

1.1 Introduction

This chapter introduces the thesis by setting out the rationale and explaining my interest in comparing the factors influencing participation in physics and modern languages at post-compulsory levels. In the United Kingdom, education is devolved to the four nations and policies vary between England, Northern Ireland, Scotland and Wales. This study focuses primarily on post-16 education in England, though some of the issues discussed may be similar across the four nations. Over several decades, much policy and research attention has focused on participation in science, technology, engineering and mathematics (STEM) subjects which are widely recognised as being important for national economic competitiveness (e.g. Royal Society, 2014; OECD, 2008). Improving the recruitment, retention and training of STEM professionals has long been an area of political priority and concern in the UK (Smith & Gorard, 2011). Ongoing concerns about the shortage of skilled scientists and engineers are reflected in the numerous media and government reports and substantial investment in interventions which seek to solve this 'crisis' – arguably more than in any other subject discipline (Smith & Gorard, 2011; Smith, 2017; Bøe, et al., 2011). However, this discourse of 'crisis' in STEM education has only seemed to apply to physics, engineering and computer science. While the numbers studying mathematics, biology and chemistry have been increasing, the numbers for physics have remained relatively stable or unchanged (IOP, 2018a).

In addition to STEM subjects, modern languages have also been identified as 'strategically important and vulnerable subjects' due to growing demand for qualified graduates (HEFCE, 2008). Yet overall participation in post-16 physics, one of the least popular science subjects, is still relatively high compared to modern languages as illustrated by the entries for A-level exams in these subjects. In 2019, there were over 36,000 entries in A-level physics compared to only 7,600 entries for A-level French (Ofqual, 2019a). Government statistics show that participation in modern languages has been declining since the mid-1990s in both schools and universities, raising concerns among educators, employers and politicians about a growing 'language deficit' in the UK (Long & Bolton, 2016). A British Academy report (2011) cites 'the perceived global dominance of English' as a key reason for the declining numbers studying the most commonly taught modern languages in England: French, German and Spanish. These claims are supported by studies in which schools and teachers have reported the difficulty of motivating students to study languages in the face of an 'English is enough' attitude (e.g. Coleman, et al., 2007; Taylor & Marsden, 2014). There is evidence of a similar lack of

motivation towards language learning across other countries where English is the dominant language (Board & Tinsley, 2016; Lo Bianco, 2014; Bense, 2014; Berman, 2011).

These debates are ongoing and growing in relevance in the context of what Lanvers et al. (2018) describe as the 'Brexit-induced politicization of language learning'. The Brexit referendum in 2016 seems to have only intensified these concerns as teachers have reported worsening learner attitudes to language learning and schools report they may struggle with staffing since the vast majority of schools employ EU citizens to teach languages (Lanvers, et al., 2018; Tinsley & Dolezal, 2018). The majority of state schools are already finding it difficult to recruit teachers for some languages; finding language teachers of sufficient quality has been reported as a concern for 60 percent of state-funded schools and more than half of independent schools (Tinsley & Dolezal, 2018, p.8). Recent policy initiatives have included setting a government target of 90 percent of pupils completing a modern language GCSE by 2025 (Long, et al., 2020) and the creation of a national modern language centre to improve the teaching of Spanish, French and German (Speck, 2019). Despite these efforts to increase participation in physics and modern languages (separately), there appears to have been little change in current trends.

Alongside concerns about overall participation in physics and modern languages, there has been increasing attention aimed at increasing diversity and widening participation in these subjects at secondary and higher education, particularly in relation to social class and gender. Physics and modern languages have quite similar patterns of participation with respect to socioeconomic status, where the majority of students taking these subjects come from middle-class backgrounds in more affluent areas (Gorard & See, 2008; Board & Tinsley, 2015; Codiroli Mcmaster, 2017). Conversely, they offer interesting counterpoints for comparison due to contrasting patterns in participation by gender; physics students are predominately male and modern language students are predominately female (JCQ, 2018). Some of these inequalities in participation are partially explained by the educational policies which will be discussed in this chapter. The following chapter (Chapter 2) will discuss some of the sociocultural explanations for the gendered and classed patterns of participation in physics and modern languages by reviewing the literature on student choice and participation in these subjects.

In this study, I will be comparing the factors which impact post-16 participation in physics and modern languages in England. At this point it is important to mention that while I offer comparisons between physics and modern languages throughout the thesis, I recognise that, unlike physics, 'modern languages' refers to several school subjects with their own distinct issues and challenges. Across the research literature on language learning and teaching, a wide range of other terms are

also used including languages other than English (LOTEs), minority languages, foreign languages and others. Since this research study focuses on subject choices at secondary schools in England, I will refer to these subjects as 'modern languages' which is widely understood in this context and to differentiate them from ancient or classical languages such as Latin. In schools in England, the most common modern languages taught are French, German and Spanish, and these will be the main languages discussed. This study will not address consideration of other modern languages and community languages as this would be beyond the scope of this thesis. Although the language may differ, many of the concerns about access and participation at secondary school are shared between the different modern languages. Throughout most of the thesis I will refer to modern languages together, except where there are major differences between the individual languages.

In this chapter, I provide some background and policy context for this study. I begin by outlining the structure of the National Curriculum in England as it relates to physics and modern language provision at Key Stage 4 (ages 14 to 16). Then, I describe the landscape of choices available to students at Key Stage 5 (ages 16 to 19) and how this influences the participation in post-16 physics and modern languages. I will close this chapter by discussing the recent policy initiatives which have further shaped the landscape of physics and modern languages provision in schools, specifically the English Baccalaureate ('EBacc'), and Progress 8 school performance measures as well as recent changes to assessment. This background information will enable a greater understanding and appreciation of the wider context shaping both school practices and students' subject choices.

1.2 Science and modern languages provision at Key Stage 4

The decline in participation in physics and modern languages appears to begin at secondary school. This section describes the structure of the National Curriculum in England as it relates to physics and modern languages provision at Key Stage 4. The provision of these subjects can vary widely between schools and this has many implications for students' post-16 subject choices. The current National Curriculum includes the mandatory provision of three 'core subjects' throughout compulsory education from age 5 to 16: English, mathematics and science (DfE, 2014b). Modern languages became compulsory at primary schools in England from 2014, though many primary schools have struggled to deliver modern languages alongside other curricular offers (Tinsley & Dolezal, 2018). In secondary school (age 14 to 16), students are entered for national General Certificate of Secondary Education (GCSE) examinations in various subjects specified in the National Curriculum including core subjects English, mathematics and science. Modern languages were removed as a compulsory subject from the secondary curriculum in 2004 though some schools, mostly independent and selective schools, have maintained the compulsory status (Board & Tinsley, 2014, 2016). While the

pathways for completing the mathematics and English GCSEs are relatively straightforward, there is considerably more variation in the options available for science. The main routes range from traditional academic routes to more applied and vocational options. For the purposes of this research, I will focus most of my attention on academic routes in physics and modern languages as they are the most common.

Although terminology and policies vary, the main academic routes for science in secondary school are commonly referred to as 'double science' and 'triple science'. The most common is the 'double science' or 'core and additional science' route which incorporates aspects of biology, chemistry and physics and results in two GCSE qualifications. In contrast, the 'triple science' or 'separate sciences' route results in three separate GCSE qualifications and grades in each of the three 'traditional' sciences (biology, chemistry and physics). The availability of different routes makes science distinctive from most other GCSE subjects in terms of structure. Following curriculum reforms in 2006, triple science was introduced as an entitlement for higher attaining students to enable them to study science in greater depth and breadth. Government, industry and science education policy organisations have strongly advocated for increasing the number of entries in triple science since students who take triple science are more likely to continue studying science subjects post-16 and to do well in those subjects (Ofsted, 2013). Since then, there has been steady growth in the numbers and proportions of students on the triple science route from 5.6 percent in 2006 to just over 24 percent in 2016 (DfE, 2018). The growth in triple science entries has been matched by a decline in the proportion of students taking double science from 69 percent in 2006 compared to 51 percent in 2016.

While the number of triple science entries has grown steadily, there is considerable variation in the student profile of those who complete the award. In relation to gender, the DfE (2014a) figures show that more boys than girls took triple science GCSEs in 2014, though this gender imbalance has become less prominent over time and, currently, approximately equal numbers of boys and girls take triple science (IOP, 2018b; JCQ, 2018). In relation to single-sex schools, a study by Anders et al. (2018) found that students at boys' schools were more likely to study triple science relative to co-educational (mixed) schools, whereas there was no significant difference in the likelihood for students for at single-sex girls' schools. However, the largest differences in participation on the various GCSE science routes relate to students' socioeconomic status, along with factors like the school's geographic location and whether it is in an area of economic deprivation. For example, research by Homer et al. (2013) revealed that students who are eligible for Free School Meals (FSM) are under-represented on triple science, proportionally represented on double science and over-

represented on other applied science routes. Moreover, DfE data from 2012 showed that 84 percent of state schools offered triple science GCSE, but more recent findings by the RSA (2015) suggest that there is considerable variation between which types of state schools offer triple science, with students in areas of high socioeconomic deprivation being much less likely to attend schools that offer the route.

The availability of these different GCSE science routes has implications for progression into science subjects post-16 and beyond. Evidence suggests that students are more likely to progress to science A-levels and to achieve higher grades on those courses when they have studied triple science at GCSE (National Audit Office, 2010; Ofsted, 2013; IOP, 2018b). For physics specifically, separate analyses of the National Pupil Database (NPD) undertaken by the Institute of Physics (2018b) and Gill and Bell (2013) both found that students who took physics as part of the triple science route were more likely to continue physics at A-level compared to other science subjects biology and chemistry. The Institute of Physics (2018b) study found that students are between six to seven times more likely to study physics A-level having done triple science. By comparison, students are only six times more likely to take chemistry A-level and five times more likely to take biology A-level after taking the triple science route (IOP, 2018b).

Unlike science subjects, modern languages are not compulsory at Key Stage 4 and some students do not study any modern languages at GCSE and are, therefore, unlikely to study modern language A-levels. Compared to science, the gender imbalance in modern languages is more pronounced at GCSE. A recent report commissioned by the British Council found that gender is a stronger predictor than economic disadvantage and prior attainment of whether a student would be entered for languages at GCSE (Mills & Tinsley, 2020). Boys are far less likely to be taking languages compared to girls, especially French and Spanish (Mills & Tinsley, 2020). According to DfE data from 2017, girls made up 56 percent of the GCSE entries in languages compared to only 44 percent from boys (Tinsley & Board, 2017, p.16). In addition, girls consistently outperform boys in attainment on GCSE languages and the disparity in performance between boys and girls is significantly greater in modern languages than in other areas of the curriculum (Clark & Trafford, 1996; Mills & Tinsley, 2020).

Modern languages were removed as a compulsory subject from the secondary curriculum in 2004 and then made compulsory from primary school starting in 2014 (Tinsley & Dolezal, 2018). Currently, modern languages are not compulsory beyond age 14 and individual schools are free to set their own policies. Some have argued that these policy changes have led to disparities in access to and participation in modern languages between different schools, or a 'social divide in language learning' (Lanvers, 2018). For example, independent and selective schools are more likely than state-funded

comprehensive schools to offer multiple languages and to make them compulsory for all students (Tinsley, 2019; Lanvers, 2017b). According to the 2015/16 Language Trends survey, 74 percent of independent schools compared to only 20 percent of state-funded schools make languages compulsory for all students at Key Stage 4 and these numbers have decreased in both sectors from previous years (Board & Tinsley, 2016, p.95). However, the largest differences have been found between schools that control for admissions, namely grammar schools and independent schools, and those that do not, schools with comprehensive intakes (Lanvers, 2017b). The average academic achievement of a school has also been linked to language uptake where the highest performing schools also have the highest proportions of pupils taking languages at GCSE (Board & Tinsley, 2014, p.84).

As with access to triple science, there are considerable differences in access to modern languages between state-funded schools. Previous studies on participation in modern languages education have indicated that not all students are able to study a language at Key Stage 4 since schools may limit the numbers taking modern languages through academic pathways and timetabling restrictions (Board & Tinsley, 2016; Abrahams, 2018). In the 2019 Language Trends survey, more than a quarter (27 percent) of state-funded schools reported that 75 percent or more of the Key Stage 4 cohort were taking a language while less than a quarter (21 percent) have only small numbers studying languages (less than 25 percent of the cohort) (Tinsley, 2019, p.12). State-funded schools with less than 25 percent of the cohort taking a language are statistically more likely to have a higher proportion of students eligible for free school meals and Pupil Premium, both indicators of economic disadvantage (Tinsley, 2019, p.12). In addition, there is a growing trend in both the state and independent sectors, but particularly in state-funded secondary schools, to exclude or excuse pupils from studying languages for a variety of reasons. The practice of restricting access to language study in Key Stage 4 is also associated with socio-economic disadvantage. In the most economically deprived category of schools, 44 percent of schools reported excluding some pupils from language study at Key Stage 4 (Board & Tinsley, 2015). Thus, students from the most disadvantaged backgrounds are the least likely to learn a language at school.

In sum, the provision and availability of different science pathways and modern languages at Key Stage 4 can vary widely between schools, particularly between independent and state-funded schools. Moreover, schools in the most socio-economically deprived areas are also less likely to offer the triple science GCSE route and modern languages and more likely to restrict access to these subjects if they are offered. In relation to gender, approximately equal numbers of boys and girls take triple science however, the gender imbalance in modern languages is more pronounced and

boys are less likely to study languages at GCSE. These inequalities may be further exacerbated by the recent introduction of school performance measures which are discussed in the next section.

1.3 School performance measures: EBacc, Attainment 8 and Progress 8

In recent years, the Department for Education (DfE) has introduced several policies to increase participation in academic subjects, including physics and modern languages, at secondary school and beyond. This section will provide an overview of the major policies and their impact on participation in physics and modern languages. The Wolf Report (2011) argued that the increase in the number of vocational qualifications between 2004 and 2009 had resulted in pupils, especially those from disadvantaged backgrounds, taking less rigorous qualifications that limit their progression to both the next level of study and employment. In order to increase the take-up of 'core' academic qualifications, the Department for Education (DfE) introduced the English Baccalaureate (EBacc), a school performance measure that publishes the numbers of students who get a C grade or above at GCSE in a set of academic subjects including: English, mathematics, science (double or triple), at least one language and a humanity subject (history or geography) (DfE, 2015, 2019b). The DfE identified these subjects as those that "keep young people's options open to future study and future careers" (DfE, 2019b). At that time, the DfE stated an ambition for 75 percent of students to study EBacc subject combination by 2022. The introduction of the EBacc appears to have had a positive impact on participation in science and humanities subjects; entries in at least two science GCSEs are now above 95 percent compared to 80 percent in 2010 and entries in the humanities subjects (geography and history) is now over 78 percent compared to only 50 percent in 2010 (DfE, 2019c). In modern languages, entries rose to 49 percent in 2014 from a low of 40 percent in 2010, however, numbers have not continued to increase (Long, et al., 2020). In other words, while these performance measures have appeared to have a positive impact on uptake and participation in science and humanities subjects at Key Stage 4, this does not appear to have been the case for modern languages.

A few years after the introduction of the EBacc, the government introduced new headline accountability measures, Attainment 8 and Progress 8, to incentivise schools to ensure that all students, even those with low prior attainment, are taking qualifications in eight key subject slots: English, mathematics, three other EBacc subjects (e.g. science, computer science, geography, history and languages) and three further qualifications. Attainment 8 is a total score across the eight subjects and Progress 8 measures students' progress across those eight subjects based on Key Stage 2 attainment (DfE, 2016). When schools do not show adequate Progress 8 scores, an Ofsted inspection may be triggered and schools that perform well in Progress 8 will normally be given an

inspection reprieve during the following year (DfE, 2016). Thus, student attainment in these subjects, including science and modern languages, can have significant consequences for schools. For instance, the 2014/15 Language Trends survey found that schools with high take-up of languages at GCSE may underperform on school performance 'league tables' (Board & Tinsley, 2015, p.120). Moreover, several studies which have investigated the impact of EBacc on school practices found that some schools actively discourage students with low prior attainment from studying subjects which may jeopardise the school's performance on league tables (Parameshwaran & Thomson, 2015; Greevy, et al., 2013; Davies, et al., 2008; Board & Tinsley, 2015). The impact of assessments and 'grade severity' on participation in physics and modern languages will be discussed later in this chapter (see Section 1.5).

1.4 Subject choice at Key Stage 5

After age 16, there is no standardised curriculum in England and students have a wide array of options for subjects and qualifications they can study, including diplomas, vocational qualifications, International Baccalaureate (IB) and others. These qualifications can vary widely in their perceived value and status to universities and employers. The most common post-16 options in England are Advanced level (A-level) qualifications, offered at around 97 percent of schools and colleges in England (Jin, et al., 2011). A study by Dilnot (2015) reported as many as 96 separately certified A-levels available for teaching in England, including 20 different modern languages. In practice, the number of options available students are more restricted and vary by school; typically schools and further education colleges offer around 20 to 30 different A-level subjects and sixth form colleges offer around 30 to 50 (Dilnot, 2015, p.4). Students typically complete a combination of between three and four qualifications and students' post-16 subject choices can have important consequences for their future academic and career pathways.

Providing students with choices and flexibility in the curriculum is often framed as a positive feature of education systems by not "forcing all students, regardless of interests, into the same curriculum" (Noddings, 2011, p.4). Moreover, encouraging students to develop in-depth knowledge of a smaller number of subjects is widely perceived by educators to be a benefit of the current A-level system (Higton, et al., 2012). However, numerous studies have found that students' subject choices vary significantly by gender, socioeconomic background and ethnicity (Dilnot, 2016; Davies, et al., 2008; Vidal Rodeiro, 2007) and these differences tend to reinforce existing social inequalities and gender stereotypes in academic and employment outcomes (Iannelli & Duta, 2018; Dilnot, 2018; Moulton, et al., 2018). For example, there is a well-established link between social class and progression to higher education which has informed government policy aimed at 'widening participation' and

access to higher education (DfES, 2003; OFFA & HEFCE, 2014). The inequalities in access to university are illustrated by the fact that only 14 percent of pupils who are eligible for free school meals participate in higher education at age 18-19 years, compared with 33 percent of pupils who are not eligible for free school meals (Chowdry, et al., 2013).

The Russell Group, which represents the 24 highest ranked UK research universities, has suggested that part of the reason for this unequal representation is that students from less privileged backgrounds apply to university with the 'wrong' subjects and qualifications for the courses for which they apply (Russell Group, 2015). In order to provide better advice and guidance to students on their university applications, the Russell Group previously identified eight 'facilitating subjects' which are perceived to provide better preparation for further academic study at university. These subjects include mathematics, English Literature, physics, biology, chemistry, geography, history and (modern or classical) languages. The Russell Group advised students to study at least two facilitating subjects if they were unsure which degree they want to study (Russell Group, 2016, p.29). While the Russell Group stopped publishing a list of facilitating subjects in 2019, the DfE has continued to use the notion of 'facilitating subjects' as one of their accountability measures for schools (DfE 2019). The most recently introduced of these performance indicators for schools and sixth forms at Key Stage 5 is the proportion of students obtaining the grades AAB in at least two facilitating subjects (DfE, 2014c).

Both physics and modern languages are included on the facilitating subjects list, however, as at Key Stage 4, the participation and provision of the different options can vary widely between schools and local authorities. In their report on the role of schools in explaining individuals' subject choices in secondary school, Anders et al. (2018) found that schools accounted for about one third of the variation in subject choices at secondary school in England, and that this variation reduced to a quarter once school demographics were considered. One report by the Russell Group (2015) found that in 2013/14, independent schools made up 14.5 percent of A-level entries overall, but they accounted for 19.3 percent of entries in physics, compared to 17.7 percent in chemistry and 15.3 percent in biology (p. 27). In physics, much of the focus on schools has been on comparing single-sex schools to coeducational schools. The proportion of schools that enter no girls to A-level physics is almost four times higher in co-educational maintained schools than single-sex maintained schools (IOP, 2018b). By comparison, the link between schools and access to modern languages in England has been documented in much more detail. The same report by the Russell Group (2015) quoted earlier found that while independent schools made up 14.5 percent of A-level entries overall, they accounted for 27.9 percent of entries in French, 24.4 percent in German and 28.4 percent in Spanish

and in classical languages the proportion is much higher. These patterns in participation have the potential to reproduce existing inequalities related to socioeconomic status and gender.

Provision of various post-16 qualifications are more difficult to assess that GCSE provision because they are not monitored by the DfE. Most reports use the number of A-level entries at schools, which are published by the DfE, to assess provision of various subjects. A research report by the Institute of Physics and Royal Academy of Engineering (2015) found that 9 percent of school sixth forms had no entries for A-level physics and the proportion of schools sixth forms with no entries to A-level physics has remained relatively stable for the previous decade. The majority of these school sixth forms that did not enter students for A-level physics had fewer than 60 students and single-sex girls' schools were more likely than single-sex boys schools to have no entries for A-level physics (IOP, et al., 2015). After contacting a sample of schools that had no students entered for A-level physics, the report found that the main reasons for not offering the subjects included insufficient student demand, low class size and the lack of a specialist physics teacher at the school (IOP, et al., 2015).

In modern languages, the same report by the Institute of Physics and Royal Academy of Engineering found that nearly 48 percent of school sixth forms had no entries for A-level French and this proportion has increased by around 10 percent from the previous decade (IOP, et al., 2015, pp.18–19). This general trend towards a decline in the participation and provision of A-level modern languages at state-funded schools has been consistent for most languages, including French and German. The 2018 Language Trends survey found that more schools reported withdrawing provision than schools reporting new provision and the main reasons that schools gave for this decline were related to the new assessment structure and the perception (by students) that languages are not as useful or important as STEM subjects (Tinsley & Dolezal, 2018, p.15).

Prior to 2017, students had been able to obtain an AS-Level qualification for each of their subjects after the first year of sixth form and then continue all or some of the courses to complete the full A-level course after the second year. Since 2017, however, AS-Levels in many subjects have been decoupled from A-Levels, and no longer count towards A-Levels. One notable consequence of these reforms has been a sharp decline in the number of Year 12 students taking four A-levels from 54 percent in 2015 to 35 percent in 2016 (Thomson, 2017). The decline in students taking four A-levels has been seen by teachers as a significant factor leading to declines in students taking modern language A-levels since students often chose a language as their fourth option at AS (Tinsley & Dolezal, 2018; Tinsley, 2019).

In sum, the availability of Key Stage 5 subjects and qualifications varies widely between schools and sixth forms, though it is somewhat more difficult to find reliable data on this variation than at Key

Stage 4. From the data that is available, there is strong evidence of a social divide in provision of science and modern language subjects. Independent schools account for a much higher proportion of A-level entries in classical and modern languages as well as science subjects than state schools. In addition, state-funded sixth forms are more likely to have only boys entered for physics A-levels or to have no entries at all for physics and modern language A-levels. It is important to point out that the proportion of state sixth forms with no entries for modern language A-levels is much higher than for other subjects and is likely to continue increasing as a result of recent changes to the structure of A-level qualifications and assessments which are discussed in the next section.

1.5 Assessment: Inter-subject comparability and 'grade severity'

Post-16 participation in physics and modern are also thought to be affected by assessment and grading which may also influence school practices (see Section 1.3). There is evidence to suggest that science and modern languages exams are graded more harshly than other subjects at both GCSE and A-level though attempts to quantify the difficulty of various subjects in relation to one another have posed numerous methodological challenges (Murphy & Whitelegg, 2006 p 35). Proponents of developing an objective measurement of 'subject difficulty' argue that measurements of 'inter-subject comparability' are necessary to understand why students choose to drop some subjects more than others at A-level. This debate has been driven largely by subject communities particularly for modern languages, science and mathematics since these subjects are believed to be graded more harshly than others (Newton, 2012; Ofqual, 2015, 2018).

In recent surveys, educators at secondary and higher education in physics and modern languages have argued that students may be discouraged from studying these subjects due to their perceived difficulty compared to other subjects (Ofqual, 2018). Grade severity and the perceived difficulty was one of the factors which has been found to influence post-compulsory participation in physics and other science subjects (Tripney, et al., 2010; Murphy & Whitelegg, 2006). In the most recent Language Trends survey, exam issues emerged as the biggest concern for secondary school teachers with more than half of the teachers surveyed commenting negatively about the new exams, their difficulty, grading, and the new tier structure (Tinsley, 2019, p.17). Other studies have found that while many schools are working hard to increase participation in modern languages at GCSE and A-level, teachers frequently cite concerns about student and league table outcomes as major barriers to increasing numbers (Parrish, 2019; Lanvers, 2018).

Studies which have attempted to measure inter-subject comparability have found that science (including physics) and modern language subjects are graded more severely than other subjects at GCSE and A-level, meaning it is more difficult for students to achieve top grades in these subjects

(Coe, et al., 2008; Fitz-Gibbon & Vincent, 1994; He & Black, 2019). According to analysis of the National Pupil Database by Vidal Rodeiro (2017), performance in A-level languages was worse than average A-level performance and 60 percent of the students who completed A-level French obtained their worst grade in it, confirming earlier findings by Coe et al. (2008). Additionally, a recent Ofqual report by Taylor and Zanini (2017) provides some evidence that native-speakers outperform non-native speakers on modern language A-levels, particularly in A-level German, when controlling for prior attainment, gender and school type. The Ofqual report also found a smaller effect size for French and Spanish A-levels, but the authors suspect this is due to the much smaller proportion of native speakers entering exams in these languages. After their analyses, Ofqual concluded that there was not compelling evidence to adjust grading standards in physics, chemistry, biology, French, German or Spanish A-levels (Ofqual, 2018). The decision statement argued that while A-levels specifically in physics, chemistry, French and German do appear to be graded more severely than other subjects, this was has not significantly impacted A-level entries in these subjects (Ofqual, 2018, p.20). More recent analysis by He and Black (2019) found that GCSE exams in French and German are more severely graded in comparison to GCSEs in other subjects. In November 2019, Ofqual announced that it would align French and German GCSE grading with Spanish (Ofqual, 2019b). It is unclear how these changes to the grading schemes in GCSE will impact participation in modern languages in the future since some schools may currently be discouraging lower attaining students from studying these subjects.

1.6 Summary

In this chapter, I have provided an overview of how recent policy changes have impacted participation in physics and modern languages in schools. I argue that current education policies have led to disparities in access to physics and modern languages, since provision of these subjects varies widely between schools and sixth forms at GCSE and A-level. Moreover, the introduction of new school performance measures, EBacc and Progress 8, have impacted the provision of physics and modern languages by incentivising schools to focus on 'traditional' academic subjects. These performance measures appear to have had a positive impact on uptake and participation in science and humanities subjects at Key Stage 4, however, this does not appear to have been the case for modern languages. Finally, there is evidence to suggest that science and modern languages exams may be graded more harshly at both GCSE and A-level and this can impact which students take these subjects in schools as well as whether students will choose to participate in these subjects once they are no longer compulsory. In the following chapter I will address the literature on post-16 participation in physics and modern languages in relation to broader social inequalities.

Chapter 2: Subject choice and participation in physics and modern languages

2.1 Introduction

In the previous chapter, I outlined the policy context which has created inequalities in access to physics and modern languages. I argued that specific policies have shaped school practices and created disparities in access to physics and modern languages at secondary school. In this chapter, I review the literature on subject choice and participation in physics and modern languages. The chapter begins with a discussion on how 'subject choice' has been conceptualised in the research literature and my own approach in this study. As I argued in the previous chapter, post-16 participation in physics and modern languages has been found to follow certain patterns along the lines of gender, social class and ethnicity. These inequalities are influenced by multiple social, cultural and structural factors which will be explored in this chapter. Specifically, this chapter will consider how students' subject choices interact with other aspects of their identities in relation to gender, social class and ethnicity. While it is often difficult to separate the impact of these factors, this chapter aims to provide some insight into the sociocultural factors behind the persistent inequalities in these subjects.

2.2 Conceptualising subject choice

Students' post-compulsory subject choices have long been an area of international research, focused particularly on the USA and UK. Previous studies on student choices have used different perspectives drawing from sociology, psychology and economics. For example, the rational choice approach based on generalised economic theory, frames students as rational actors and assumes that individuals "make the best possible decision from the choices available to them, given the information at their disposal" (Jin, et al., 2011, p.5). Rational choice approaches assume that individuals will make choices that are entirely based on self-interest and will seek to maximise the benefits they will gain from their choices (Foskett & Hemsley-Brown, 2001). Interventions to support students' subject choices based on rational choice models have focused on providing more or better careers guidance. However, more recent work in psychology and behavioural economics has demonstrated that individuals do not always make rational decisions and are often influenced by emotions, attitudes, values and beliefs (Jin, et al., 2011; Foskett & Hemsley-Brown, 2001). Moreover, the rational choice approach is often criticised for ignoring sociocultural factors including tastes, traditions and stereotypes that change over time (Swidler, 1986; Payne, 2003).

Another model developed within psychology by Eccles and Wigfield (2002) aims to capture the many significant components important for students' choices including their goals, beliefs, values and

expectations for success. Their 'expectancy-value' model emphasises the role of students' self-concept, or self-assessment of their own abilities, as well as the importance they attach to certain tasks in guiding choices (Eccles, 2009). Like rational choice approaches, expectancy-value models focus on cognitive processes, attitudes and motivation but with less emphasis on the context and cultural influences on students' choices. More recent literature on subject choice has moved away from comprehensive choice models towards approaches which emphasise students' role in constructing choices and how this interacts with the way that choices are socially structured in society in general (Holmegaard, Ulriksen, et al., 2014; Pike & Dunne, 2011; Mendick, 2005). These approaches often employ qualitative methods to explore how individual students come to develop a sense of fit with school subjects rather than to identify the components which affect students' choices.

In this study, I have adopted an approach which is underpinned by Bourdieu's theory of social reproduction and influenced by sociological and sociocultural theorisations of identity, particularly the concepts of *celebrated subject identities* developed by Carlone et al. (2014) and *figured worlds* developed by Holland et al. (1998). Bourdieu's theory of social reproduction focuses on the way in which different economic, cultural and social capitals are possessed by different social classes which result in the formation of internalised dispositions towards learning that inform students' educational choices (Bourdieu, 1984, 1990, 1986). Holland et al.'s (1998) theorisations of *figured worlds* incorporates influences from Bourdieu regarding the power of social structures such as gender, ethnicity and social class to position individuals within particular social practices. Individuals engage in *identity work* within educational settings as they develop understandings of school subjects, position themselves and are positioned by others in relation to these subjects, including through their subject choices (Holland, et al., 1998). Drawing on the notion of *figured worlds*, Carlone et al.'s concept of *celebrated subject* identities describes the cultural models of who counts as successful and legitimate participants in school subjects to shift focus to individual agency and the ways that individuals are actively constructing identities. These theoretical underpinnings of this thesis will be discussed in greater detail in Chapter 3. In the following sections, I will review the literature on the participation in physics and modern languages considering interactions with student identities, particularly in relation to gender, social class and ethnicity.

2.3 Gender and participation in physics and modern languages

Much of the research on understanding post-16 subject choices has tended to focus specifically on gender differences (e.g. Stables & Stables, 1995; Stables, 1996; Lightbody, et al., 1996; Whitehead, 1996; Colley, 1998; Francis, 2000). Physics and modern languages offer interesting subjects for

comparison due to contrasting patterns of participation in relation to gender. In the physical sciences, computing and engineering fields, post-16 participation is especially low for women and students from lower socio-economic backgrounds. Recent figures on post-16 uptake show that, in physics, boys outnumber girls more than three to one and, in computing, boys outnumber girls ten to one. By comparison, the gender balance is roughly equal in chemistry and girls actually outnumber boys three to two in biology (Ofsted, 2015). In modern languages, boys are far less likely than girls to be studying post-16 modern languages though the gender balance differs slightly between the different languages (Ofsted, 2015). In French and Spanish, girls outnumber boys more than two to one, though the ratio is slightly lower in German and other modern languages (Ofsted, 2015). Investigating the factors contributing to these contrasting gendered patterns of post-16 participation in physics and modern languages is a particular interest of this study.

Historically, the curriculum was segregated by gender. Prior to the introduction of the National Curriculum in 1988, students could choose between three separate science subjects at the age of 14. At this time, girls tended to drop physics and boys tended to drop biology (Fairbrother & Dillon, 2009). The introduction of the National Curriculum was important in assuring that more girls studied science beyond the age of 14 (GCSEs) though it has not had the intended impact on post-16 participation in science education (A-level) (Murphy & Whitelegg, 2006). Recent government data shows that gender differences in science participation are relatively minimal before the age of 16 (IOP, 2018b; JCQ, 2018), however, despite numerous efforts to improve the gender balance over the past several decades, participation in physics A-levels continues to be predominately male. Similarly, modern languages previously featured prominently in formal boys' education through a curriculum which emphasised grammar and translation in preparation for university entry exams (McLelland, 2018). Language study, including classical languages (Latin and Ancient Greek) and modern languages (French and German), was seen to be a good indicator of intellectual capabilities and was often a pre-requisite for university entry (Carr & Pauwels, 2006, p.6). By comparison, language teaching at girls' schools emphasised conversational fluency since most girls were not expected to sit university entrance examinations (McLelland, 2018; Carr & Pauwels, 2006). Both science and modern language education became more universally accessible for both boys and girls with the introduction of the National Curriculum in England in 1988. At that time, the majority of students learned a language, with a high point in 1997, when 82 percent of boys and 73 percent of girls were entered for a modern language at GCSE (Vidal Rodeiro, 2009). However, in contrast to science subjects, the trend in modern languages has since reversed and participation has declined. By 2018, only 38 percent of boys and 50 percent of girls were entered for a modern language GCSE (Mills & Tinsley, 2020).

The research literature on science engagement documents a long-standing association of science with men and masculinity which is perhaps most apparent within the physical sciences (e.g. physics and chemistry). Science has been associated with rationality and objectivity, which have traditionally been considered masculine characteristics (Brickhouse, 2001; Francis, et al., 2017; Walkerdine, 1988). This research has illustrated that young people tend to associate most science careers with masculinity (Archer, et al., 2012) and children perceive science as being 'for boys' (Francis, 2000; Mendick, 2005). Several studies have explored how these associations between physics and masculinity prevent girls and women from identifying with physics (Gonsalves, 2014; Archer, Moote, et al., 2017). Recent work from the ASPIRES 2 project in England shows that secondary school students and parents perceive STEM subjects, especially physics, as difficult, masculine and incompatible with a feminine or 'girly girl' identity (Francis, et al., 2017; Archer, Moote, et al., 2017). This work has also illustrated how girls and women who do continue to study physics at post-compulsory levels must perform significant identity work in order position themselves and be recognised as successful and legitimate physics students in relation to the dominant constructions of physics (Carlone & Johnson, 2007; Archer, Moote, et al., 2017; Danielsson, 2012; Gonsalves, 2014). For example, the 'exceptional physics girls' in the ASPIRES study utilised their high academic attainment and distanced themselves from 'girly' femininity by investing in alternative identities (e.g. being proud to be different from other girls) (Archer, Moote, et al., 2017).

There is an extensive body of research, mainly in gender studies, which shows that gender stereotypes have a strong influence on students' subject preferences and career aspirations (e.g. Colley, 1998; Francis, 2000; Francis, et al., 2003). For example, a survey of high school and university undergraduate students in the USA found that male students were more likely than females to rate themselves highly in terms of ability for and identification with subjects such as maths, science or business (Lips, 2004). In contrast, female students were more likely than males to rate themselves highly in ability for and identification with subjects relating to art, literature or communication (Lips, 2004). The UPMAP study, which surveyed a nationally representative sample of secondary school students (Year 10, age 14-15) in the UK, found that boys reported more positive perceptions of physics lessons and higher confidence in their physics abilities than girls, despite having similar attainment on physics exams (Mujtaba & Reiss, 2013b). Similarly, survey data from the ASPIRES 2 project in the UK showed that boys (age 15-16) from more affluent, predominately White or South Asian, backgrounds were the most likely to report planning to continue studying physics post-16 (Archer, Moote, et al., 2017). Conversely, girls (age 15-16) who responded to the ASPIRES 2 survey were more likely to name physics as their most difficult subject and were less likely to report planning to continue studying (post-16) physics or to aspire to be an engineer in the future (Archer,

Moote, et al., 2017). These patterns have persisted even though the gap in attainment between girls and boys has narrowed, and girls now outperform boys in science subjects at both GCSE and A-level (Smith, 2011; EngineeringUK, 2018). These studies highlight the significance of gender stereotypes in shaping students' subject choices and aspirations, particularly in science subjects.

Gender stereotypes related to school subjects are so pervasive, they can also impact the type of advice, support and encouragement students receive from their teachers, families and peers. For example, in the USA, research by Carlone (2004) illustrated how a teachers' gendered expectations of the students in their high school physics class reproduced gender stereotypes by positioning the male students in the class as having 'raw talent' for the subject, whereas the female students were seen as having succeeded in the subject through hard work. Mendick (2005) made similar observations in her research on gender and participation in A-level mathematics. In the UPMAP study, Mujtaba and Reiss (2013a) found that one of the key factors that relates to physics uptake is whether students have sustained motivational support over time from a key adult (usually a parent or teacher) to continue with the subject. Similarly, the ASPIRES survey found that boys were more likely to agree with statements such as 'My teacher thinks I am good at physics' than girls (Archer, Moote, et al., 2017, p.97). In other subject areas such as mathematics, Smith and Golding (2015) found that advice and encouragement to continue with mathematics from a teacher or family member was particularly important for girls and could potentially mediate the effect of lower self-concept.

In contrast with science, there has been less research and policy attention focused on gender issues in modern languages education (Williams, et al., 2002; Carr & Pauwels, 2006; Mills & Tinsley, 2020). Many authors have offered explanations for the higher uptake of girls studying modern languages including a diverse range of interacting factors including a range of social influences, such as teachers reporting more positive views on the achievement and behaviour of female students in the language classroom and female students reporting that they received more encouragement to study languages than their male peers (e.g. Clark and Trafford, 1996; Coleman et al., 2007; Jones, 2009; Sunderland, 2000). Several studies have also suggested that adolescent boys might be particularly susceptible to peer pressure causing some boys to reject language learning because of its feminised associations (Barton, 1997; Bartram, 2006; Williams et al., 2002). Bartram concluded that if learning French in is seen to compromise male identity, some boys may be more inclined to choose other options where possible (2006, p. 51). More recently, Taylor and Marsden (2014) reported that the boys in their study generally held more negative attitudes towards language learning than girls. An even more recent study in secondary school language classrooms in England by Lanvers (2020),

found that students' self-efficacy in modern languages improved after a teaching intervention which challenged subject-specific negative beliefs (i.e. monolingual mindsets) and encouraged a growth mindset for language learning. The study found that boys' self-efficacy improved more than girls' after the intervention, offering a potential strategy to narrow the gender gaps in modern languages. Most of these reports are at least a decade old and based on small scale qualitative studies therefore further research is needed in this area. In sum, the literature on gender and subject choice has highlighted persistent inequalities both in students' perceptions and in their patterns of participation in school subjects. Numerous studies have highlighted how young people and their families have come to associate physics and engineering with masculinity which can impact students' subject choices, aspirations and the types of advice and guidance they receive. Meanwhile, there has been less research focused on gender issues in modern languages, though there is some evidence to suggest that boys have less positive attitudes to language learning and receive less encouragement to continue than girls. In the next section, I will discuss the research literature on social class and participation in physics and modern languages.

2.4 Social class and participation in physics and modern languages

Government data and research literature has shown that students from socioeconomically disadvantaged backgrounds are particularly unlikely to study physics and modern languages post-16. Researchers began to highlight a class divide in access to modern languages at GCSE in 2007 (e.g. Canning, 2007; Dearing & King, 2007). Vidal Rodeiro (2007) found that the probability of a student choosing one or more modern language is significantly lower for children of routine and manual workers compared to the probability of those whose parents were higher professionals. Similarly, in science education, Gorard and See (2009) found that students from poorer families are less likely to take sciences in post-compulsory education than many other subjects. More recent quantitative findings from a survey of Year 11 students (age 15-16) in the ASPIRES 2 project demonstrate that "the pursuit of physics is strongly related to social class, with almost all students planning to pursue physics A-Level coming from the highest social class categories" (Francis, et al., 2017, p.160).

While educational inequalities related to social class are widely recognised, there is less agreement on a definition of social class. In one example, Van de Werfhorst et al. (2003) used a theoretical framework informed by Bourdieu's theory of cultural reproduction which proposes that social class inequalities in educational attainment lie in the social distribution of 'cultural capital' or familiarity with the dominant culture in a society. Using parental occupation and parental reading behaviour to operationalise social class and analysis of longitudinal data collected from a nationally representative cohort of children born in the Britain in 1958, they argued that students' choice of

subject can be understood within the parents' position in both the economic and cultural hierarchy (Van de Werfhorst, et al., 2003). Similarly, Davies et al.(2008) used a combination of school factors such as the proportion of students eligible for free school meals as well as parents' occupation and number of books found in the family home to indicate socioeconomic status. Since social class is socially constructed the significance of these markers such as parents' occupation and the number of books in the home can vary in importance by context. I do not plan to debate the strengths and weaknesses of different measurements of socio-economic status, however, the literature on subject choice has revealed with some consistency that the least privileged social groups are less likely to participate in traditional academic subjects such as physics and modern languages.

The previous chapter highlighted several institutional barriers in access to science and modern languages education, for example, between independent and state-funded schools as well as among schools in the state sector. At Key Stage 4, schools in the most socio-economically deprived areas are least likely to offer the triple science GCSE route and modern languages and are more likely to restrict access to these subjects if they are offered. This has implications for post-16 participation in these subjects since students who take triple science are between six to seven times more likely to study A-level physics (IOP, 2018b). Similarly, having a modern language GCSE is the factor with the largest positive effect on whether students will study the subject at A-level (Vidal Rodeiro, 2017). Further studies on school practices have highlighted the 'classed nature' of curriculum choice as many schools restrict access to more 'academic' subjects through academic pathways and other forms of gatekeeping (Abrahams, 2018; Lanvers, 2017a; Constantinou, 2019). In research by Abrahams (2018) exploring 'opportunity structures' in three secondary schools in England, independent and more affluent state-funded schools were able to draw on their extensive resources to provide students with greater freedom to choose their GCSE and A-level options by offering a wider range of subjects, planning timetables after students have submitted their preferences and supporting students' choices with extensive careers advice and guidance. Meanwhile, the smaller, less affluent state-funded school in Abrahams' study did not have the resources to offer students as much freedom and choices were more restricted by the school's option block system. Similarly, Constantinou's (2019) mixed methods research study utilising survey and interview data with university educators, highlights how school timetables reinforce curriculum hierarchies by preventing students from studying certain combinations of A-level subjects (e.g. combining science and humanities).

In addition to studies which have highlighted the institutional barriers which can restrict access to physics and modern languages, there is also a large body of research investigating students'

attitudes and motivation towards different school subjects. A large scale survey on students' A-level subject choices conducted by Vidal Rodeiro (2007) found that a high percentage of students from all socioeconomic backgrounds reported that they perceived STEM subjects, including physics, to be 'very important' (Vidal Rodeiro, 2007, p.35). For these subjects, 'usefulness for a future career' featured as the most important reason students gave for choosing these subjects (p.32). More recent studies have highlighted the importance of having strong family science networks and 'science capital' for engagement and participation in science education. Recent work from the ASPIRES 2 project in England shows that high-achieving students from middle-class backgrounds with higher science capital were much more likely to aspire to a career in science and to feel, and to be recognised by others as being a 'science person' (Archer, Moote, MacLeod, et al., 2020).

Within the curriculum, science or STEM subjects have received considerable support both in the UK and internationally, arguably at the expense of arts and humanities subjects. Not only are STEM subjects widely recognised as being important for national economic competitiveness (e.g. Royal Society, 2014; OECD, 2008), but improving the recruitment, retention and training of STEM professionals has long been an area of political priority and concern in the UK (Smith & Gorard, 2011). In her analysis of the school curriculum, Bleazby (2015) argues that science subjects, particularly mathematics and physics, have risen to the top of the traditional curriculum hierarchy due to "a problematic epistemological ideal that equates knowledge with certainty" (p. 684). Bleazby contends that that this hierarchy in the school curriculum contributes to inequalities in compulsory education since high-status subjects are more often aligned with middle-class culture, university and high-paying professions (p. 677). Many have argued that these notions of a curriculum hierarchy have been further reinforced by education policies, such as the EBacc and others discussed in the previous chapter, which emphasise a narrow range of 'traditional academic subjects' (Bleazby, 2015; Constantinou, 2019).

In modern languages, students whose parents work in higher managerial backgrounds were more likely to rank German and Spanish as 'very important' subjects than children in other groups and French was not perceived as important compared to German and Spanish by all groups (Vidal Rodeiro, 2007, p.35). Similarly, a small scale qualitative study by Clark and Trafford (1996) found that students from lower socio-economic groups were less convinced of the value of learning languages offering a possible explanation that these families are less likely to take a holiday to France, for example. Another study by Jones (2009) compared two schools, one from an affluent residential area ('Leafy High') and the other described by Ofsted as being in an inner-city 'area of considerable social disadvantage' ('Pit Hill High'). Although Jones admits that the small sample size makes it

difficult to draw conclusive results, she did note that the parents and students at the less advantaged school, Pit Hill High, perceived modern languages as "less important, less useful and more difficult" than the more affluent school, Leafy High (Jones, 2009, p.96).

In the UK, as in other Anglophone countries, the study of prestigious world languages, such as French or German, in school and university settings has been increasingly framed as an 'elite project' (Coffey, 2018, p.31). The dominance of English for global communication has led to an unprecedented bias towards English as *the* language to learn (Pennycook, 1994) and the success of the global English language teaching industry illustrates the relationship between economic capital and the prestige of standard English as linguistic capital. In a recent study of modern language education in secondary schools in England, Coffey (2016) found that secondary school students (age 14-16) most commonly articulated the value of language study as a form of cultural capital rather than purely as an instrumental goal to acquire skills and students from independent schools had the most positive views towards learning languages compared to students at state-funded schools in the study. More broadly, uptake of modern languages has been identified as one of the indicators of inequality in accounting for the significant difference in uptake of subjects benchmarked for school performance league tables between the richest and poorest students (i.e. according to family income) (Jin, et al., 2011; Clemens, 2011). Furthermore, previous studies report that students from 'cultured' backgrounds (families with higher cultural capital) may also perceive the benefits of cultural fields of study, such as modern languages, as being particularly high since they value 'cultural' occupations and cultural participation highly (Van de Werfhorst, et al., 2003, p.45). Of course, these findings have clear implications for which students choose to study languages (or not) beyond post-compulsory levels.

2.5 Ethnicity and participation in physics and modern languages

In addition to gender and social class, patterns of post-16 participation in science and modern languages education have been found to be stratified by ethnicity (Vidal Rodeiro, 2007; Jin, et al., 2011), though the influence of ethnicity is often difficult to separate from the influences of gender and social class. It is important to acknowledge that forms of structural oppression such as racism or sexism are often difficult to separate from one another. Crenshaw (1989), coined the term 'intersectionality' to describe how the experiences of women of colour fell between the cracks of both feminist and anti-racist discourse. The intersectional approach recognises that identities which serve as organising features of social relations (e.g. social class, gender, ethnicity) "mutually constitute, reinforce and naturalise one another" (Shields, 2008, p.302). In this section, I will review

the literature on ethnicity and participation in physics and modern languages and note where these patterns intersect with gender and social class when possible.

In physics, there are striking differences in the participation rates between different ethnic groups. According to analyses by the Royal Society of Chemistry (RSC) and the Institute of Physics (IOP), Chinese and Indian students are more likely to achieve an A-level in physics than White students and are significantly more likely to achieve three or more science A-levels than students from any other ethnic group (Elias, et al., 2006). These observations hold for male and female students in these groups. However, Black Caribbean students are only one-sixth as likely to achieve an A-level in physics as their White counterparts, though the rates are slightly higher for girls than boys (Elias, et al., 2006). These differences in post-16 participation in physics are partially explained by GCSE attainment, which is lower for students from Black Caribbean, Pakistani and Bangladeshi backgrounds. The RSC and IOP report did not account for students' socioeconomic background which may have a stronger influence on both prior attainment and post-16 participation in STEM subjects (Codiroli Mcmaster, 2017; Gorard & See, 2008).

In modern languages, there is less data on ethnicity and post-16 participation since overall participation is so low. Vidal Rodeiro (2007) found that some groups such as Indian, Pakistani and Bangladeshi students are less likely than others to study modern languages at A-level (Vidal Rodeiro, 2007). At Key Stage 4, children from Black ethnic backgrounds are significantly less likely to study EBacc subjects than White children, which appears to be driven by lower participation in humanities and modern languages (Jin, et al., 2011). These differences were slightly reduced when controlling for school characteristics and prior attainment. More recent studies on participation in modern languages education have tended to focus mainly on socioeconomic background.

In education, research on ethnic minority groups has tended to focus on issues of racism, attainment and exclusion (e.g. Strand, 2007, 2014; Gilborn, 1990, 2008). Research specifically on subject choice has shown differences between different ethnic groups in their attitudes, motivation and aspirations in specific school subjects which are often attributed to differences in attitudes within families, or cultural differences or biases (Vidal Rodeiro, 2007; Jin, et al., 2011; Strand, 2007; Elias, et al., 2006). These studies have often faced methodological challenges given the complexities of separating the influence of ethnicity from other student characteristics such as gender and socioeconomic background.

There have been some studies, mostly in the USA, which have focused on the experiences of students from ethnic minority groups in relation to specific school subjects. In physics, this work has primarily concentrated on the experiences of female students using an intersectional approach. A

longitudinal study by Ong (2005) followed 10 (ethnic) minority female physics students at a large research university, and found that the young women had to expend considerable effort to be accepted in physics, since their ethnicity and gender identities are conspicuously "inscribed on their bodies" through their hair, skin colour and other physical traits (p. 612). Ong explains, the "widespread image of ordinary scientists as White men effectively discourage many talented young women and underrepresented minorities from exploring physics as an option" for further study or career (p. 596) since individuals from minority backgrounds are positioned as "representatives of their respective groups, while White scientists effectively speak as individuals" (p. 599). Another study by Rosa and Mensah (2016) found that Black women in physics experienced unique challenges of socialisation in STEM, particularly by being excluded from study groups during their undergraduate courses. In other words, minority groups are disadvantaged by their racial, ethnic and gender backgrounds in physics. In science education more broadly, research on students' aspirations has revealed that South Asian students (i.e. students of Indian, Pakistani, Bangladeshi or other South Asian heritage) had stronger aspirations in science compared with White students and also tended to express more positive attitudes towards school science (DeWitt, et al., 2013). Another study by Wong (2016) investigated how students from Black Caribbean, Bangladeshi, Pakistani, Indian and Chinese ethnic backgrounds participated in science education using in-depth interviews and classroom observations. Wong's research highlighted the diverse ways that minority ethnic students participate in science and cautions against treating students from these groups as a homogenous group (Wong, 2016).

The link between ethnicity and language is perhaps more intrinsic since the relative value that one attributes to different languages can be closely linked to an individual's identity, background and personal experiences. Many children may be exposed to multiple languages constantly in their homes and their local communities. Some sociolinguists have used the term 'superdiversity' to describe the state of affairs in today's post-industrial cities (Mitchell, 2014). Nationally, the UK School Census reports around one million students in state-funded primary schools and around half a million students in state-funded secondary schools who are recorded to have English as an additional language (DfE, 2019d). Students are recorded to have English as an additional language (EAL) if they are "exposed to a language at home that is known or believed to be other than English" (DfE, 2019d, p.9).

Within the literature on language education, 'disciplinary ring-fencing' has drawn sharp distinctions between, on one hand, elective multilingualism (where students choose to develop proficiency in a foreign language) and, on the other hand, sites of 'natural' multilingualism which include second

language learning and naturally occurring multilingualism (growing up speaking different languages at home as a result of bilingualism or parental mobility). As Coffey and Wingate (2018) have argued, such distinctions risk atomising applied linguistics research and further essentialising the linguistic and cultural experiences that constitute a multilingual repertoire. The reality is that many people may fall somewhere on a spectrum between 'elective multilingualism' and 'natural multilingualism'. Individuals and communities may have multiple and complex personal and political motives for studying languages which may or may not correlate directly to ethnic backgrounds or nationality. From a sociolinguistic perspective, the 'native/non-native' binary is controversial and widely debated (e.g. Cook, 1999; Davies, 2003; Medgyes, 1992; Rampton, 1990; Coffey & Wingate, 2018). Rampton (1990) explains that the idea of being a native speaker tends to imply that a language is inherited either through genetic endowment or through birth into a social group stereotypically associated with it; that inheriting a language means being able to speak it well and people are either are or are not native-speakers; being a native speaker involves a comprehensive grasp of a language; and just as people are usually citizens of one country, people are native speakers of only one mother tongue (p. 97). Rampton argues that these beliefs are problematic because they conflate language as an instrument of communication with language as a symbol of social identification (Rampton, 1990).

The school curriculum can have a profound impact on how multilingual students engage with language learning in schools. In multiple studies, students gave clear importance to the major European languages and most commonly taught non-European languages (Parrish, 2019; Coffey, 2016). For students who speak additional languages at home, one report by Coffey (2016) suggests that only students who spoke French, German or Spanish thought that speaking other languages had any bearing on language learning in school, and opted to continue these languages at GCSE. In contrast, community or heritage languages, those spoken by minority communities in the UK such as Urdu and Panjabi, were considered less important to learn (Parrish, 2019) and those who spoke these languages reported that they did not feel there was a connection to school languages (Coffey, 2016).

2.6 Summary

This chapter has attempted to bring together the research literature on participation and engagement with physics and modern languages education which has never been done before in this way. This chapter has drawn on studies which apply critical sociocultural perspectives to explore the relationship between these social axes as they relate to participation in these subjects. This comparative approach is both novel and important to address persistent inequalities in these subjects in relation to gender, social class and ethnicity. I have argued that the norms and values

within these subjects tends to privilege certain groups. For example, the alignment of physics with 'objectivity' and 'certainty' has tended construct physics as a more masculine subject and privilege students from predominately White and middle-class backgrounds. While much of the research on participation in modern languages education has tended to focus on socioeconomic status, there is also evidence to suggest that some practices in modern languages may privilege girls and students from certain ethnic backgrounds. In the next chapter I present the theoretical perspectives I have used in this study to examine how interactions of gender, social class and ethnicity shape participation in physics and modern languages.

Chapter 3: Theoretical Resources

3.1 Introduction

In Chapters 1 & 2, I argued that the inequalities in participation for physics and modern languages are influenced by multiple social, cultural and structural factors. In order to examine how these factors shape post-16 participation in these school subjects, it is necessary to sketch out the theoretical perspectives and conceptual tools which inform this research. The two main bodies of research I draw upon in this study are Bourdieu's theory of social reproduction (1984) and the concept of 'celebrated subject identities' developed by Carlone et al. (2014) which builds on Holland et al.'s (1998) notion of *figured worlds*. Bourdieu's theory foregrounds the influence of structural factors on reproducing existing patterns of social inequality. Carlone et al.'s concept of *celebrated subject* identities describes the cultural models of who counts as successful and legitimate participants in school subjects to shift focus to individual agency and the ways that individuals are actively constructing identities. Both bodies of theory provide helpful theoretical lenses for interrogating what happens within different social contexts. I treat these two theoretical perspectives as complementary since both acknowledge a tension between structure and agency. However, I found it useful to consider them separately because they have been developed within different academic traditions. As a result, these perspectives do not lend themselves to be combined into a single unifying theoretical framework but, instead, provide different analytical lenses through which to examine students' subject choices.

In this chapter, I begin by introducing the original concepts and discuss how these theories have been used previously in education research. In addition, I consider academic work by scholars who have adopted and extended these ideas when researching subject choice and participation in science and modern languages education. At the end of this chapter and in Chapter 8 (Section 8.2.5) at the end of this thesis, I reflect on the usefulness of these theoretical perspectives for investigating patterns of engagement and participation in physics and modern languages.

3.2 Bourdieu's theory of social reproduction

Bourdieu's theory of social reproduction attempts to explain how structural inequalities are reproduced through day-to-day interactions between individuals. Bourdieu mainly discussed social reproduction in relation to socioeconomic status, which he considered to be the most important factor in producing and reproducing inequalities, since individuals are socialised with values and resources that are specific to people from their own social class background. Both Bourdieu and more recent scholars have applied this theoretical framework extensively in education and more

specifically in studies about educational choice (e.g. Bourdieu & Passeron, 1990; Reay, et al., 2005; Bathmaker, et al., 2016). Within this framework, Bourdieu proposed three methodological tools: *field, capital and habitus* which overlap and interact to generate a "logic of practice" (Bourdieu, 1990), as explained through a pseudo-mathematical expression: "[habitus x capital] + field = practice" (1984, p.101). Through this expression, Bourdieu argues that practice results from the relationship between habitus and capital within a specific field. This section will explain each of Bourdieu's concepts in turn, followed by discussion of how these concepts have been applied in the literature on educational choice, particularly in science and modern languages education. *Field* is the social space in which interactions, transactions and events occur (Bourdieu, 2005, p.148). Although such interactions may occupy a physical space, field does not necessarily refer to a physical setting. Rather, field represents a system of power and social relations that acts to structure what is imaginable or possible for individuals, either perceived or actual (Bourdieu, 1984). To use an analogy, field constitutes the "rules of the game" structuring both habitus and capital in day-to-day interactions. Field also refers to the different social spaces that individuals inhabit. For example, this study is concerned with the fields of secondary and post-16 schooling, higher education, science education and modern languages education. Each of these fields has its own values or rules which serve to differentiate one field from the next. As a methodological tool, field is concerned with locating the object of investigation in its specific historical and relational context as well as interrogating the ways in which knowledge about the object has been generated, by whom, and whose interests were served by those knowledge generating practices (Thomson, 2008).

Capital describes the resources in a society that can generate forms of social advantage within specific fields for those who possess it (Bourdieu, 1984, 1986). In *Forms of Capital* (1986), Bourdieu identified three key types of capital – economic, social and cultural capital – which interact with a person's habitus within a field or social context to produce relations of privilege or subordination within society. *Economic capital* refers to resources that are most immediately converted into money or financial wealth. *Social capital* is made up of 'social obligations', relationships or networks. Finally, *cultural capital* exists in three main states/formations: institutionalised (e.g. educational qualifications and credentials), embodied (e.g. socialised forms of knowledge) and objectified (e.g. cultural goods and artefacts). Capital is portable, individuals carry these symbolic resources across different social spaces (fields). Skeggs (2004) argues that it is the process of legitimation of capital, rather than the actual content or form of the capital itself, that is key to the production of advantage or privilege. Therefore, within any given field, the most powerful forms of capital will be those whose intrinsic value can be most readily and precisely converted into symbolic forms that match the requirements of the field. For instance, Bourdieu considers education as a form of symbolic

capital that works together with other capitals to confer advantages and disadvantages and the position social agents in multiple fields (Thomson, 2008, p.76).

Habitus refers to a set of deeply embedded and internalised dispositions acquired through social experiences, which informs and shapes practices. Bourdieu describes habitus as a person's internalised ways of thinking or acting as well as tastes or dispositions that guide values and behaviour. However, habitus is not composed solely of attitudes and perceptions, but is also embodied, expressed through the "durable ways of standing, speaking, walking and thereby thinking and feeling" (Bourdieu, 1990, p.70). According to Bourdieu, habitus is significantly shaped by early socialisation, most commonly through the influence of family, communities and schooling (Bourdieu, 1990; Bourdieu & Wacquant, 1992). Therefore, people who have similar experiences are consequently more likely to acquire a similar set of dispositions for evaluating and understanding the world (Bourdieu, 1990). While habitus is shaped throughout one's life, it is argued that early socialisation carries a disproportionate weight, producing the so-called 'primary habitus' that is the basis for all subsequent formations of habitus (Bourdieu & Passeron, 1990; Bourdieu & Wacquant, 1992).

3.2.1 Institutional habitus

Bourdieu's conceptual tools have been widely adopted within education research (e.g. Reay, 2004; Ball, 2003; Archer and Dewitt, 2017) and are used to provide a valuable framework for understanding how uneven patterns in participation in education might result from and contribute to broader patterns of social inequality. One concept that has been particularly useful for exploring the role of schools in reproducing patterns of social inequality is the notion of *institutional habitus*. As discussed in the previous section, Bourdieu describes habitus as 'a complex internalised core' which is 'the source of day-to-day practices'. By extending this concept to institutions, institutional habitus might be as understood the internalised ways of thinking, tastes and/or dispositions of a cultural group, which are embodied by an organisation such as a school, and can influence an individual's behaviour (McDonough, 1997). Much of the research on institutional habitus and educational choices has focused specifically on transitions to higher education. Research by Reay et al. (2001) demonstrated the influence of the 'school effect' or institutional habitus over and above the 'direct impact of the family background' in accessing elite universities, confirming that there are 'specific effects' (sec.1.6) or benefits from attending particular schools. For example, they found that regardless of class or attainment, being privately educated meant a student was "significantly more likely" to go to an elite university (Reay, et al., 2001, sec.1.1).

Although institutional habitus is not so clearly defined in the literature, research by McDonough (1997) in the U.S. and Smyth and Banks (2012) in Ireland has suggested that school habitus is manifested through curricular offers and through the guidance provided for students as they apply for and choose universities. Reay et al. (2010) conceptualise institutional habitus as constituted of several interrelated elements including curricular offers, support and guidance, organisational practices (e.g. subject entry requirements) as well as cultural and expressive characteristics (e.g. how the school presents itself and the attitudes of the teachers and students) (Reay, et al., 2010). Since students' subject choices can be influenced by several different 'spheres of influence' (individual, family, peers, and institutions) and the relative weight of these can change over time (Reay, et al., 2001), the different elements of institutional habitus proposed by Reay et al. are useful to disentangle the effects of institutional habitus from individual and family habitus (Reay, et al., 2005).

Institutional habitus provides a framework to understand how social structures are reproduced through institutions at the 'median level' (Burke, et al., 2013, p.166), in relation to the 'macro level' of societies and the 'micro level' of individual students. Through curricular offers and guidance provisions, schools play an important role in establishing what gets normalised as *doxa*, the term Bourdieu uses to describe particular relations of order and ways of thinking or being that can become self-evident (Bourdieu, 1984, p.471). For example, schools may convey particular views of higher education to its students through providing a curriculum which emphasises the kinds of subjects that facilitate university entry (McDonough, 1997) and forms of socialisation that help prepare students for higher education such as organised school visits to university open days (Smyth & Banks, 2012). These practices then normalise the expectations of attending university for their students and applying for top (elite) universities. The concept of *institutional habitus* is an important organising concept for the analysis in Chapter 5, which examines how the schools and school practices influenced students' subject choices.

3.2.2 Pedagogic work and symbolic violence

Bourdieu devoted considerable time and effort to the analysis of education and its role in reproducing social privilege and disadvantage (Bourdieu, 1984; Bourdieu & Passeron, 1990). For Bourdieu, the education system undertakes 'pedagogic work' to impose the cultural arbitrary or taken for granted 'culture', normative assumptions and power relations. *Pedagogic work* refers to the mechanisms and practices undertaken by institutions (schools) to produce long-lasting and durable dispositions in the habitus and involves a process of socialising young people to 'know their place' in the social order and reproducing dominant group values by 'inculcating' students to accept these values and unequal social order as legitimate, 'natural' and 'the way things are' (Bourdieu &

Passeron, 1990). An important way that pedagogic work is achieved is through *symbolic violence* which refers to a process through which individuals, through their lived experiences, come to develop taken-for-granted ways of thinking and behaving which reflect the unequal power structures which created them. For example, Bourdieu and Passeron argued that those who benefitted from the French schooling system were those who already possessed social and economic advantages since the system rests on the knowledge of, and rewards the practices of, the empowered upper- and middle- classes. As a result, working-class students saw certain education practices, for instance, higher education, as "not for the likes of us". Bourdieu and Passeron argued that working-class students participated less in certain branches of the education system because they choose not to pursue certain school subjects, certain levels of qualification and places at more prestigious institutions (Bourdieu & Passeron, 1990, pp.155–157). The concepts of *pedagogic work* and *symbolic violence* are important for the analysis in Chapter 6 which examines the subject-specific selective practices within physics and modern languages that can reinforce existing inequalities in these subjects.

3.2.3 Applying a Bourdieusian lens to science education

In science education, Archer et al.(2015) proposed the concept of 'science capital' to extend Bourdieu's concepts to make sense of the differential patterns in science engagement and participation. Building on Bourdieu's concepts of habitus and cultural capital, science capital is structured, but not wholly determined, by the field or social context of schooling. They argue that science capital offers a useful concept to recognise science-related configurations of habitus and cultural capital which had previously been under-explored in the educational literature (DeWitt, et al., 2016). Rather than viewing science capital as a separate type of capital, they view it as a lens for 'zooming in' on science-related aspects of students' habitus and cultural capital that might help to identify the factors promoting, or constraining, science participation between students who, otherwise, appear to share a similar social location (DeWitt, et al., 2016). Using their model, science capital is comprised of what science you know, who you know (science-related social capital), how you think about science and what science-related activities you do (Archer, et al., 2015).

The concept of science capital offers a useful lens to understand the relationship between school subjects and student identity. Based on findings on survey data from 3,658 secondary school students in England and longitudinal interviews with over sixty young people from age 10 to 18, Archer et al. (2015) reported that science capital tends to be unequally distributed in society and is patterned by other social axes such as social class, ethnicity and gender. For instance, five percent of students could be classed as having high science capital and twenty-seven percent as having low

science capital; the former being predominately White and South Asian boys from middle class backgrounds (Archer, et al., 2015). The researchers noticed that children with higher science capital seemed more likely to aspire to a science-related career and/or plan to study at least one science post-16 (e.g. Archer, et al., 2012; Archer, Dewitt, et al., 2014).

Since Bourdieu did not apply his theory to specific school areas, I found it useful to draw on more recent work by Archer et al. (2020) which applies Bourdieu's concepts within the context of A-level physics. The authors proposed four main criteria that could be interpreted as evidence or indicators of pedagogic work being undertaken within and by specific school subjects (i.e. physics): examples of *symbolic violence* (when students blame themselves for not continuing), examples of compliance and acceptance of the status quo (when students describe unequal participation as 'just the way things are'), examples of disbarring and expulsion (when educational systems, processes or figures prevent a students from continuing) and examples of socialisation (when students views and dispositions appear to shift and converge over time) (Archer, Moote, & MacLeod, 2020, p.10). Previous work by Archer et al. (2016) explored how selective practices around the triple science GCSE route create and perpetuate social inequalities through the construction of triple science as an 'elite' route for 'clever' students. The culture of physics in particular is similarly associated with masculinity and 'cleverness' which has implications for the types of students who participate in physics at post-compulsory levels (e.g. Francis, et al., 2017; Gonsalves, et al., 2016). Building on Bourdieu's concepts, the criteria for *pedagogic work* proposed by Archer et al. (2020) were used for the analysis in Chapter 6.

3.2.4 Bourdieu and modern languages education

In his book Language and Symbolic Power, Bourdieu states that language is not only a means of communicating but also a mechanism of power through which individuals pursue their own interests and display their practical competence. Dominant groups within a society legitimise their position through complex historical processes, sometimes involving extensive conflict, to promote 'standard' forms of speech using cultural institutions such as schools (Bourdieu, 1991; Bourdieu & Passeron, 1990). Linguistic utterances can be understood as a product of the relation between a *linguistic market* (or social field) and a *linguistic habitus*. Thus, different uses of language tend to reiterate the respective positions of each participant and the representation of linguistic habitus (or identity) can be subdivided into language, dialect and accent. When individuals use language in particular ways, they deploy their accumulated linguistic resources and implicitly adapt their words to the demands of the social field or market that is their audience. Hence, every linguistic interaction, however personal or insignificant it may seem, bears traces of the social structure that it both expresses and

helps to reproduce. In this way, Bourdieu views language as intrinsically linked to social class, where the linguistic habitus is one dimension of social class habitus (1991, p.83).

Using Bourdieu's framework, socially valued languages and language varieties are forms of *linguistic capital* and individuals from different backgrounds can possess unequal amounts of such capital. Bourdieu's concept of cultural capital has provided an important analytical tool to talk about the 'material resources, linguistic skills and social networks' that learners bring to language learning contexts (Darvin & Norton, 2015) and examine social inequalities within language education (e.g. Coffey, 2016; Menard-Warwick, 2005). As Darvin and Norton argue, the concept of capital acknowledges that learners are not empty vessels: rather, they enter language learning contexts equipped with symbolic capital because of their personal histories and lived experiences (Darvin & Norton, 2016).

This symbolic capital is particularly relevant because learners operate across many different contexts in both online and offline spaces. The rise of globalisation and potential for transnational mobility across learners' educational and professional pathways have made multilingualism and other forms of cultural capital increasingly significant markers of sociocultural distinction (Weenink, 2008). Carlson et al. (2017) coined the term *transnational cultural capital* to conceptualise the "skills and dispositions needed to act in social fields that transcend the nation state – for example, foreign languages, openness towards other cultures" (p. 750). Other scholars have developed terms such as *intercultural capital* (Pöllmann, 2013) and *cosmopolitan capital* (Weenink, 2008) to describe similar ideas. As discussed in Chapter 2 (see Section 2.4) the study of prestigious world languages, such as French or German, in school and university settings has been increasingly framed as an 'elite project' in the UK and other English-dominant countries (Coffey, 2018, p.31). Moreover, the dominance of English for global communication has led to an unprecedented bias towards English as *the* language to learn (Pennycook, 1994) and the success of the global English language teaching industry illustrates the relationship between economic capital and the prestige of standard English as linguistic capital.

3.2.5 Limitations of Bourdieu

For the current study, the application of Bourdieusian theory is used to examine the role of structural factors mediated through institutions (schools) can influence students' subject choices in post-compulsory schooling. This thesis also adopts a broader understanding towards the notion of (cultural/social) capital, acknowledging a diverse range of subject-specific resources, skills and knowledge that may influence students' engagement and participation in physics and modern languages education at post-compulsory levels.

Bourdieu's theoretical tools, particularly habitus, are sometimes criticised for their limited scope for agency and transformation (Jenkins, 2002; Nash, 2005; Holland, et al., 1998). Bourdieu and his proponents have challenged this criticism, arguing that the theory of habitus does not rule out strategic choice and conscious deliberation and that individuals are active agents in their thinking and decision-making. In Bourdieu's own words, 'habitus may very well be accompanied by a strategic calculation of cost and benefits, which tends to carry out at a conscious level the operations that habitus carries out in its own way' (Bourdieu & Wacquant, 1992, p.131). As Reay puts it, habitus is a product of an individual's experiences and history but is also permeable and responsive to current circumstances and that choices are bounded by a framework of opportunities and constraints which make "some possibilities inconceivable, others improbable and a limited range acceptable" (2004, pp.434–435). The importance of habitus lies in its ability to inform and generate practices, through "a complex internalised core from which everyday experiences emanate" (Reay, 2004, p.435). In other words, while Bourdieu maintained that there is space for agency and individual choice, his theory is predominately concerned with explaining the patterns of disadvantage and the most likely outcomes of that condition. Bourdieu's habitus is therefore helpful for examining factors that reproduce social inequality at large, rather than unpacking the reasons behind individual action.

3.3 Identity as a lens to understand students' educational choices

The following sections explore sociological and sociocultural theorisations of identity as a lens to understand students' engagement and participation in school subjects, physics and modern languages, in relation to their subject choices in post-compulsory schooling. *Identity* has many different meanings, making it ambiguous within social science (Côté, 2006). My understanding draws on post-structuralist theorists such as Judith Butler (1990) and postcolonial theorists such as Stuart Hall (1996) who view identity as an ongoing process that people are constantly 'doing', rather than something that is fixed. From this perspective, identities are produced within and through discourses (Anthias, 2001; Gee, 2000; Burman & Parker, 1993) which are structured by relations of power (Foucault, 1978). Viewing identity as a process has been particularly helpful to consider students' decision-making processes in relation to wider structural inequalities.

Social practice theory and the notion of *identity in practice* developed by Holland et al. (1998) provide a useful bridge between Bourdieu's theory of social reproduction and post-structuralist theories of identity developed by Butler (1990) and Hall (1996). In social practice theory, identities are produced within the context of *figured worlds*, which are the "frames of meaning in which interpretations of human actions are negotiated" (Holland, et al., 1998, p.271). People 'figure' who

they are through activities and in relation to the social types that populate these figured worlds as well as through social relationships with the people who populate these worlds (Holland, et al., 1998, pp.40–41).

Categories such as gender, ethnicity, social class are described as 'social positions' within social practice theory. Holland et al. (1998) argue that social positions are aspects of identity which play an important role in shaping how individuals perceive possibilities and limitations. Higher social positions represent an "entitlement to social and material resources" which are accorded to those "genders, races, ethnic groups, castes and sexualities privileged by society" (p. 271). These are the positions 'offered' to people in different figured worlds (e.g. "good student" or "bad student" or "successful student"). Individuals negotiate these social positions by doing *identity work* or "arranging the identifiable social discourses/practices that are one's resources" (p. 272). In this way, Holland et al. provide a framework to focus attention on the ways that identities are both actively constructed by individuals but also constrained by systems of power within society. In the following sections, I discuss the notion of *identity* through Holland et al.'s (1998) social practice theory, alongside the work of other scholars on young peoples' engagement and participation in science (e.g. Carlone & Johnson, 2007; Carlone, et al., 2014; Danielsson, et al., 2019; Holmegaard, Ulriksen, et al., 2014) and modern languages education (e.g. Coffey & Street, 2008; Norton Peirce, 1995; Darvin & Norton, 2015).

3.3.1 Celebrated subject positions

This thesis explores students' identity work by drawing on the concept of 'celebrated subject positions' developed by Carlone et al. (2014) which describes the cultural models of who counted as successful and legitimate participants in school subjects (i.e. science). Carlone et al's work draws on Holland et al's concepts of *figured worlds* and *identities in practice* which have been very influential within education research to consider how learner identities take shape within different educational contexts, rather than focusing on the presumed attributes of individual learners (e.g. Urrieta, 2007; Rubin, 2007). As Rubin (2007) argues, identities are not solely located in the individual, but rather negotiated in social interactions that take form in cultural spaces (figured worlds). Within these figured worlds of schools and classrooms, students develop understandings of school subjects and position themselves and are positioned by others in relation to this notion of learning in various ways as "willing or unwilling participants, resisters, questioners, successes or failures" (Rubin, 2007, p.221).

The notion of *celebrated subject positions* conceptualise how each classroom celebrates certain kinds of social performances and marginalises others, making some macro-level figured worlds more

relevant than others (Carlone, et al., 2014). For example, mathematics education researchers Boaler and Greeno (2000) describe figured worlds as 'places where agents come together to construct joint meanings and activities'. In their view, a subject area classroom can form a figured world with the power to shape students' sense of themselves as learners of that school subject. Similarly, Horn (2008) expands the application of figured worlds from the individual classroom level to the level of curriculum, envisioning the mathematics curricula of two high schools as distinct figured worlds. In Horn's case study, the two figured worlds were marked by distinct (and opposing) understandings of mathematics and the nature of mathematical learning which led to the differential construction of mathematical identities in the two settings. The concept of *celebrated subject identities* was used to centre the discussion in Chapter 7 around how the students' experiences in physics and modern languages influenced their subject choices.

3.3.2 Science identity and identity work

Within science education, the concept of 'science identity' has been gaining interest as a lens to understand the ongoing underrepresentation of women and minority ethnic groups in post-compulsory science education. Previous research in science education suggests that identity is important both when students make their subject choices (Bøe, et al., 2011) and when they decide to stay or leave the course they have entered (Ulriksen, et al., 2010). As Brickhouse and Potter (2001) argue "if students are to learn science, they must develop identities compatible with scientific identities" (p. 443). Building on Holland et al.'s (1998) social practice theory, 'science identity' scholars view the "science classroom as the interweaving of various figured worlds" (Carlone, et al., 2014, p.838). In this way, each science classroom, and their associated norms and practices, celebrate certain kinds of identity performances and marginalise others. For example, the image of scientists as 'brainy' can make it difficult for some students to recognise and perform themselves as a 'science person'; school practices which emphasise science as a finished body of knowledge can promote students with very narrow science identities and exclude a broad range of students from constructing a science identity which is recognisable within the field of science (Carlone & Johnson, 2007).

Carlone & Johnson's (2007) model of 'science identity' has been influential as a lens for exploring participation (and non-participation) in science education. Through interviews with female science undergraduates, the authors explored the ways in which these women both "make meaning of science experiences and how society structures possible meanings" (p. 1187). By following these women throughout their undergraduate studies as well as subsequent follow-up interviews, Carlone and Johnson found that the women in their study who were most successful academically were

passionate about science, recognised themselves as science people and repeatedly received recognition from 'meaningful scientific others' and established members of the scientific community. In contrast, the women in the study whom the authors described as having 'disrupted science identities' had to overcome many obstacles to achieve success and rarely received recognition for their achievements by meaningful others within the science departments at their universities.

More recent studies on science identity have focused on students' *identity work*, based on Holland et al.'s (1998) notion of *identity in practice*, rather than identities themselves. These studies draw attention to identity as an ongoing process of negotiation that is contingent upon the resources an individual has access to and the specific social context where those individuals seek to author themselves with and against the expectations of others (e.g. Calabrese Barton, et al., 2013; Holmegaard, Ulriksen, et al., 2014; Danielsson, et al., 2019). The concept of *identity work* has been particularly useful to understand students' subject choices and participation in science subjects at post-compulsory levels (Holmegaard, Madsen, et al., 2014; Ulriksen, et al., 2015). Research by Holmegaard, Madsen and Ulriksen (2014) applied the notion of *identity work* to examine Danish secondary school students' narratives about their choice of subject at higher education, including how these students perceive and ascribe meaning to crucial factors in their choice strategies. Holmegaard et al. (2014) found that a substantial number of students interviewed struggled to make the 'right' choice of study. While students found the process of choosing a subject specialism exciting, they also expressed a sense of uncertainty which put pressure on students and could manifest itself as a fear of making the 'wrong' choice or a choice that does not match their idea of who they are and who they wish to become. The study also found that almost all the students' narratives included some discussion about career possibilities and how this influenced their choice of study. The study also highlighted a tension between students' perceptions that their subject choices are individual and "can only be made by themselves on their own" (p. 32) while at the same time the student has to make their choice "appear plausible to their families and friends that the choice matches their interests and the person they are" (p. 33). Thus, while subject choices are understood as an individual task, the process of choosing what to study is a "complex, ongoing and social process" (p. 36).

3.3.3 Identity and investment in modern languages education

Learning a new language is often compared to learning a new identity (Pavlenko & Lantolf, 2000; Taylor, et al., 2013) and there has been growing research interest in the relationship between identity and language learning (Block, 2007; Norton, 2014). It would be beyond the scope of this

thesis to explore applications of identity research in literacy, adult education and teaching English as an additional language. Therefore, the following section focuses primarily on how the concepts of *identity work* and *figured worlds* have been applied to learning languages at schools in primarily English-speaking contexts as these are most applicable to this thesis.

The concepts of *identity* and *investment* (in language learning) developed by Norton (1995) have become foundational in applied linguistics and foreign language education since her original publication in 1995 (e.g. Block 2007; Kramsch 2013). This work was inspired by Bourdieu's social reproduction theory and applied to language learning in response to what she viewed as the limitation of research on language learning using psychological constructions of attitudes and motivation which focus on individual learners. Significantly, she expands on Bourdieu's conceptual tools to account for an increasingly globalised world where learners 'operate across transnational contexts' and move between online and offline spaces (Darvin & Norton, 2015, p.45) and construct new identities for themselves in the new social fields they encounter (Norton Peirce, 1995; Norton, 2010). While Norton and colleagues do not directly draw upon the concepts of *celebrated subject positions* or *figured worlds*, their work is similar in that they both consider identity as a dynamic process that individuals negotiate within social spaces.

In her model of *investment*, Norton describes *identity* as "a struggle between habitus and desire", explaining that although habitus predisposes individuals to think and act in certain ways, it is through "desire and imagination" that learners exercise agency to *invest* in practices that can transform their lives (such as learning a new language) (Darvin & Norton, 2015, p.46). Norton also draws attention to the both real and imagined nature of identities which can impact a learner's engagement with educational practices (Kanno & Norton, 2003; Norton, 2001). Kinginger (2004) offers an extended example of this in a longitudinal study of a USA university student learning French where the student imagined France to be "populated with refined, interesting, cultured people who are in turn interested in her" (2004, p.228). Similarly, Coffey and Street (2008) demonstrated how dominant cultural narratives of France/French and Germany/German have been used in the language learning narratives of British language learners. In other words, students' investment in second language and literacy practices may often be linked to hoped-for *future* identities as well as their *current* sense of their own identities (Ryan & Irie, 2014). Thus, as Norton would argue, learning a language is not an isolated act of cognition, but a way of positioning oneself in society.

Since Norton first published her work on investment, several researchers have applied her work to foreign language education in schools. For instance, McKay and Wong (1996) extended Norton's

concept of investment to their ethnographic study following four Chinese immigrant students in middle school classrooms in California. They found that students were subjected to multiple discourses and exercised agency in terms of their positioning in relations of power at the school. Thus, McKay and Wong concluded that 'investment' can be highly selective in any one or a combination of the four language skills: listening, speaking, reading and writing. They go on to argue that, "contrary to common belief, the four skills do not develop sequentially, nor is proficiency in one necessarily an indicator of proficiency in another" (McKay & Wong, 1996, p.604). The separation of the four skills – reading, writing, speaking and listening – was also found to be a source of difficulty by participants in a study by Carr and Pauwels (2006) on gender and modern languages education in Australian secondary schools. Participants, especially the young men, in Carr and Pauwels' (2006) study felt that separating these skills represented an 'unreal' and decontextualized way of using languages. In short, these language teaching practices had a significant influence on the ways that students positioned themselves and were positioned by others within the modern language classroom. A lack of engagement in the language classroom or poor performance on assessments are not necessarily a reflection of low motivation. On the contrary, learners may still be highly motivated to learn languages but less able to identify with the practices and figured worlds of languages as they are taught in school.

As in other school subjects, the notion of *identity work* has been used to understand participation in modern languages. In a study of the narratives of British language learners, Coffey and Street (2008) focus on the performative dimension of language learning, where "the language learning project" is described as an ongoing enterprise that leads the individual to occupy and participate in a series of figured worlds. Participants in the study describe the language learning project as a site for increasing symbolic power, often through increased opportunity to integrate new areas of experience into their lives as they participate in new figured worlds (p. 457). Additionally, participants commonly commented on the "benefits" of speaking a foreign language as a freedom from the scrutiny and understandings of shared first language cultural conventions (p. 459). Coffey and Street (2008) concluded that "the act of becoming bilingual allows conscious commitment to certain ways of being and doing that constitute construction of new identities" within and across real and imagined figured worlds (p. 453). These studies indicate that language learning can only be successful to the extent that language learning practices are congruent with the learners' sense of their gender roles, societal positions, class backgrounds, and ethnic histories while also allowing some 'space for authorship' (Holland, et al., 1998). In any case, they suggest that identity questions are important for understanding participation and non-participation in language learning.

3.4 Summary

In this chapter, I have introduced the theoretical resources I used in this study and critically examined their applications to previous research related to educational decision-making and within science and modern languages education. The current study draws on Bourdieu's theory of social reproduction and as well as the concept of *celebrated subject identities* developed by Carlone et al. (2014). I argue that these theoretical tools allow me to interrogate the data at different levels, including the institutional level of schools as well as at the level of individual students.

In the following chapters, the analysis and findings of this study are presented in discussed, moving from a focus on schools to subject-specific practices in physics and modern languages and then to students. Bourdieu's concepts of *institutional habitus*, *symbolic violence* and *pedagogic work* offer useful tools to examine structural factors, educational policies and school practices, which can influence subject choice and post-16 participation in physics and languages. In Chapter 5, the concept of *institutional habitus* is an important organising concept for my analysis of school practices. In Chapter 6, the concept of *pedagogic work* is used to examine subject-specific selective practices within physics and modern languages which can reinforce existing inequalities. However, given the limitations of Bourdieu's tools for analysing agency and choice at the individual level, Carlone et al.'s (2014) concept of *celebrated subject positions* and Holland et al.'s notion of *identity in practice* were used to analyse and understand students' engagement and participation in school subjects. The concept of *celebrated subject identities* was used to centre the discussion in Chapter 7 around students.

Chapter 4: Methodology and Methods

4.1 Introduction

After reviewing the literature in Chapters 1 and 2, several factors were found to influence student participation in physics and modern languages at post-compulsory levels. Some of these factors are thought to overlap between physics and modern languages, but there are very few studies which offer comparisons across these school subjects. This chapter presents the methodology and methods for the current study which aims to address this gap in the literature. Specifically, this thesis will address the following research questions:

1) What are the main factors impacting students' post-16 subject choices in physics and modern languages?
2) To what extent are the factors shaping students' subject choices similar or different for physics and modern languages?
    a) How are these factors influenced by structural inequalities related to gender, ethnicity and socioeconomic background?

The chapter begins with a discussion of the ontological and epistemological positions underpinning this research and the rationale for my methodological choices. Then, I present my research design including my strategy for recruiting participants. Next, I describe the research tools that I used for data collection, namely semi-structured interviews and focus groups. Qualitative data was gathered between July 2017 and June 2018 in five schools in London and West Midlands regions of England. During this time, a total of 67 students (age 16-18) were interviewed as well as 14 teachers including the physics and modern languages teachers at each school. After describing the research tools used to collect my data. This section includes my reflections on the ethical considerations of relevance to this study. Then, I will introduce the school settings and study participants. The chapter concludes with an outline of how I analysed the data and a summary of the chapter.

4.2 Methodological approach

In social science, it is generally considered good practice to begin any discussion of methodology by presenting the ontological, epistemological and axiological positions of the research (Bourdieu & Wacquant, 1992; Cohen, et al., 2018). Ontology is concerned with the nature of the world, what constitutes reality and whether reality exists independently of our interpretations while epistemology describes the nature of knowledge, ways of knowing and whether it is possible to know 'the ultimate truth' about the social world (Bryman, 2012; Burr, 2015). Axiology refers to the

study of values, principles and ethics guiding the research (Cohen, et al., 2018, p.53). This section will introduce my own positions as the researcher as well as how these positions guided the methodological approach of this study and fit with the theoretical perspectives used in my analysis.

In the natural sciences, research designs predominately follow positivist epistemology, which assumes that the nature of the world can be revealed by observation, and a realist ontology, which assumes that observations reveal the 'truth' about an external reality (Cohen, et al., 2018, p.10). In other words, a positivist orientation assumes that reality exists "out there" and it is observable, stable and measurable; knowledge gained through the study of reality is presented through generalisable theories or "laws" (Merriam, 2009, p.8). While positivism may provide a useful framework for research in the natural sciences, I have found it less convincing when applied to the study of social interactions and structures which are less easily measured and reduced to generalisations.

Critical realism is another well recognised perspective in education research which offers a less extreme epistemological position than positivism. Critical realism views knowledge as socially constructed but still aims to uncover some essential truth (Bhaskar, 1998). Advocates of critical realism propose that while people may hold different interpretations of reality, some external reality still exists beyond a human capacity to know about it (Nash, 2005; Scott, 2007). I considered critical realism in earlier stages of this research, however, I found it difficult to imagine that there would be an external reality to compare my findings against. First, physics and modern languages, the school subjects compared in this study, have developed through separate academic traditions, each with their own ontological and epistemological positions. Second, participants' perspectives on and experiences with these school subjects can be messy and sometimes contradictory. Drawing meaningful comparisons between these subject disciplines requires a framework which can accommodate multiple perspectives.

Considering the above, I have adopted an approach informed by *social constructionism* which means that I consider social reality to be elusive and socially constructed. The social constructionist research paradigm follows the epistemology of interpretivism which acknowledges the existence of multiple discourses and ways of knowing (Burr, 2015). The goal of research is to offer interpretations of the social world rather than objective accounts about some external reality (Merriam, 2009, pp.9–10). In addition, claims to knowledge about social interactions and human behaviours must be understood as specific to particular social and historical contexts (Burr, 2015). This approach is consistent with the theoretical perspectives discussed in Chapter 3 which considers not only how

inequalities are reproduced but also the capacity for individuals to exercise agency in their educational choices.

Critics of social constructionism have argued that by accepting multiple realities as equally viable, it does not provide any meaningful contributions to knowledge (e.g. Osborne, 1996). While social constructionism may not be able to make comparisons against an external reality, this should not imply that it fails to make comparisons completely. The different constructions can be compared against one another and evaluated by their 'acceptability' in terms of inclusivity and the needs of the community (Longino, 1990). I believe the criticisms of social constructionism can be defended in terms of social justice which emphases the importance of responsible and ethical research which resonates with the focus and aims of this study.

4.2.1 Reliability and validity

All research is concerned with producing reliable and valid contributions to knowledge, that is, whether a study is 'trustworthy' (Merriam, 2009). This section will discuss reliability and validity along with some of the challenges of applying these criteria in qualitative research. I will also discuss how I have addressed reliability and validity for the current study throughout this chapter to demonstrate how they were used to guide the research throughout the research process. The concepts of reliability and validity were originally developed in the natural sciences and have been associated with the positivist paradigm and quantitative methods. Reliability is the requirement that the research findings are repeatable and not a product of fleeting, localised events, while validity is the requirement that the scientist's description of the world matches what is 'really there' (Burr, 2015, p.177). In quantitative research, validity can refer to 'measurement validity' (whether a research instrument measures what it claims to measure), 'internal validity' (whether evidence supports the conclusions) and 'external validity' (whether the findings are generalisable to a wider population) (Cohen, et al., 2018, p.246). The standards for rigour in quantitative research are inevitably different in qualitative research which aim to offer description and interpretations rather than measurements and predictions.

There has been much debate about whether the same criteria for validity and reliability are suitable for qualitative research. Several authors have argued that qualitative researchers should avoid the need for research to demonstrate predictive, internal and external validity altogether as qualitative research does not seek to generalise but only to represent the phenomenon being investigated fairly and fully (Cohen, et al., 2018; Guba & Lincoln, 1994; Maxwell, 1992). Lincoln and Guba (1985) have instead proposed renaming the concepts to credibility, transferability and dependability as substitutes for internal validity, external validity and reliability. Credibility establishes whether the

research findings represent plausible interpretations of the data, transferability is the degree to which the results of qualitative research can be transferred to other contexts or settings and dependability refers to the stability of findings over time. Lincoln and Guba (1985) argue that, within these criteria for validity, rigour can be achieved by careful audit trails of evidence, member checking/respondent validation (confirmation by participants) when coding or categorising results, drawing on multiple data sources or methods of data collection ('triangulation'). Similarly, Taylor (2001) outlines a number of criteria that have been proposed as a way of enhancing the general coherence and rigour of research, for example, by showing that analysis has been carried out systematically and the interpretation has been soundly argued.

This current chapter aims to provide in-depth information about the steps in sampling participants and data analysis to enable the reader to make judgements about their suitability and adequacy. The use of triangulation through drawing on multiple data sources from students, teachers and government databases was an important validation technique. During the interviews and focus groups, validity was ensured through the 'reflexive management' of the relationship between participants' accounts and their subsequent analysis (Wainwright, 1997). Interview questions were asked in an open manner so as not to lead participants to believe there was a preferred response and, throughout the interviews and focus groups, I would summarise responses back to participants to enable them to react to my account of their experiences. In this way, I was able to check both the descriptive and interpretive validity of the data. Reflexivity has been central to this process to consider my own role as a researcher from the conception of this study to the co-construction of the data with participants. In the next sub-section, I will examine this role in greater detail.

4.2.2 Role of the researcher

Since social constructionism recognises the role of power in the creation and normalisation of particular knowledge or understandings, I acknowledge my own involvement in the research process by reflecting on my role in the co-construction of knowledge with the participants (Burr, 2015, p.172). Accordingly, complete objectivity is not possible since social constructionism recognises and acknowledges the existence of multiple discourses and ways of knowing (Burr, 2015). As a researcher, my identity and background no doubt influenced the research processes as well as the knowledge produced (Denscombe, 2010; Harding 1991).

To begin, I describe my own social background. I would describe myself as an (East) Asian-American woman in my early-thirties. I was a relative 'outsider' at the schools (Merriam et al, 2001), most notably in terms of my nationality, ethnicity and age. These characteristics shaped the ways I related to the research participants (and how they related to me), how I collected and analysed the data and

how I interpreted the findings. For example, many participants were curious about my background due to my accent and appearance. Responding to students' questions about differences between the UK and USA education systems were sometimes a useful conversation starter about students' subject choices since the USA does not have an equivalent to A-levels.

In addition, as someone from an ethnic minority background in the USA and UK, I was particularly sensitive to the complex relationship between language, ethnicity and identity. For many ethnic or language minority groups, ethnic identity is closely related to a 'heritage language' or the language associated with an individual's cultural background (Baker, 2011; Cho, 2000). Learning heritage languages can be an important way to nurture and maintain positive ethnic identities in English-dominant environments (You, 2005; Cho, 2000; De Capua & Wintergerst, 2009; Endo, 2013). Young people from bilingual or multilingual backgrounds may have varying degrees of spoken and written competence but, whatever their expertise in language and culture, the heritage language represents more than just a tool of communication and may carry deep emotional resonances (Anderson, 2008). Conversely, individuals from ethnic minority groups can also experience periods of 'ethnic ambivalence' when they have little or no interest in their ethnic heritage and actively reject any ethnic identification, including learning or speaking heritage languages (Tse, 2000). During the student focus groups and in analysing the data, I was aware that students may fall somewhere along that spectrum and tried to avoid making assumptions about students' linguistic backgrounds and ethnic identities. However, when these issues did arise, I tried to capture this in both the transcripts and my analyses. It is possible that some students from ethnic minority backgrounds may have felt more comfortable discussing these issues with me than with a researcher from a different background.

For the teachers, my status as a researcher was also complex since they could relate to me (or not) in a range of domains such as age, gender, social class, ethnicity and educational background. I am a similar age to many of the teachers interviewed in this study and have worked in education for over a decade. In addition, my parents are both university-educated and my own status as a researcher at a university would suggest that I would be described as middle-class, similar to many of the teachers. During the interviews, most teachers were interested to know my subject specialism, namely whether I had a background in science or modern languages education. As a former scientist and science educator, science teachers may have found it easier to relate to me initially. However, through the process of conducting this research, from reviewing the literature on modern languages education to speaking with modern language educators, I did not find my lack of experience as a language teacher to be a major obstacle. On the contrary, several of the modern language teachers

said they were impressed by my understanding of the issues and grateful that my research draws attention to the declining participation in modern languages education at post-compulsory levels. In sum, my position as 'an outsider' both in terms of my social background and institutional affiliation, may have been an advantage in some respects as I am less likely to take for granted phenomena familiar to participants (Rhodes, 1994) though it is difficult to say with confidence to what extent these differences between myself and the research participants contributed to the research process.

4.2.3 Pilot Study

In case study research, Yin (2014) suggests conducting a pilot study to help refine data collection plans with respect to both the content of the data and the procedures followed (p. 96). The pilot study is a formative tool to assist in developing relevant lines of questions and possibly even provide some clarification of the research design as well (Yin, 2014, p.97). A pilot case may be identified in a number of ways, either selecting a site in a convenient location or where the researcher already knows some of the participants (Yin, 2014). Another consideration is that the site might represent a complicated case so that nearly all relevant data collection issues will be encountered (Yin, 2014). For my pilot study, only state-funded, coeducational (mixed) schools with a comprehensive intake were approached to include both male and female students from diverse backgrounds.

An exploratory pilot study was conducted at Ashford Academy at the end of the 2016/17 academic year. Ashford Academy (see Section 4.5.1) was one of the first schools to agree to participate in this study and I had already met the physics teacher through her involvement with the Institute of Physics (IOP) teacher network. I first visited the school in July 2017 and collected data through interviews and focus groups. In total, I interviewed two teachers and ten students. Both teachers were interviewed individually and most of the students were interviewed in focus groups, one had four students studying A-level physics and another with four students who were studying neither physics nor languages. Although efforts were made to include both male and female students for each focus group, there were no female students taking A-level physics in the 2016-17 academic year. In addition, due to scheduling constraints, I was not able to conduct a focus group with the three students at the school who were studying A-level French in Year 12. Instead, I interviewed two of these students individually and the other was not available to be interviewed.

Since I had never conducted focus groups before, the pilot study allowed me to get a 'feel' for the interview process (e.g. questioning and probing) with secondary school students and determine how long focus groups were likely to take. During the focus groups and interviews, I 'tested' the structure, wording and sequence of interview questions to see the extent to which students and teachers appeared to comprehend the questions being asked. Following each interview or focus

group, I gave participants copies of the topic guides with sample questions and asked each person to comment on their clarity and make suggestions for how to improve the experience. Most of the students gave positive feedback, said that they enjoyed participating in the focus group and would be happy to participate in a follow-up interview. A few students gave suggestions about how to improve questions that were vague or unclear. Teachers were very forthcoming about advice for ways to make the questions clearer and improve the order.

As a result of the pilot study, some minor changes were made to the interview procedure. First, I requested to speak to a member of senior leadership in later school visits as the subject teachers were sometimes less aware of careers advice provisions across the school and external support provided for students when they were choosing their subjects. Second, I requested to speak to the students without a teacher present as I noticed that some students felt uncomfortable sharing their reasons for dropping a subject when that subject teacher was present in the room. However, this was not always possible due to school safeguarding policies. Third, where possible, I asked to speak to the students in single-sex groups in order to ask more probing questions about their experiences in the classroom, particularly as they related to student's gender identities either as a minority or majority in their different A-level subjects. No alterations were made to the content of the interview guides, but I did modify the order and phrasing of certain questions based on the feedback from students and teachers.

The pilot study also provided a valuable opportunity to build relationships with teachers. Since the primary purpose of the pilot study was to refine data collection plans rather than replicate results, I have included the data from the interviews and focus groups I conducted in July 2017 in the data analysis for the present study. In the next section, I will introduce the participating schools including Ashford Academy.

4.2.4 Ethical considerations

As this research involved human participants, the ethical issues were considered prior to undertaking the data collection and the necessary ethical approval was sought. The current study followed the ethical guidelines as drawn up by the British Education Research Association (BERA, 2011) and was also approved by the Research Ethics Committee at King's College London (REC Reference Number: LRS-16/17-4601). A copy can be found in Appendix A.

All gatekeepers and participants were informed about the nature and purpose of the research and given several opportunities to ask questions via email, over the phone and in person. Often the initial invitations were sent to the physics or modern language teachers through various teacher

networks. Before beginning this research, I did not have any prior relationship with any of the teachers or schools that might constitute a conflict of interest or impose any kind of obligation to participate in my research.

Once the teachers agreed to participate, they would put me in touch with other teachers at their school and members of the Senior Leadership Team to obtain their consent to proceed with the research. I sent all the teachers a copy of the Information Sheet and Consent Forms and invited them to ask me any questions via email and in person. As a formality before confirming any school visits, I generally spoke to the Head of Sixth Form via telephone to explain the study, answer any questions and make sure that they had no concerns. In some cases, I was also able to interview the Head or one of the Assistant Heads of Sixth Form for the study as well.

School visits were scheduled at a time convenient for participants, usually in an empty classroom or meeting room at the school. Students were told by their teachers in advance and given the opportunity to decline participation if they wished. Before each interview and focus group, all participants were given a physical copy of the Information Sheet and asked to read it over and ask any questions before signing the Consent Form to signify that they understood the purpose of the project and are willing to participate. Some schools were able to send the Information Sheets and Consent Forms to participants in advance and they were then asked to bring the completed form to the interview or focus group. Participants were informed through the Information Sheet and verbally that they could withdraw their participation at any point until the data was transcribed and anonymised roughly six months after the date of the interview. A copy of the Information Sheets can be found in Appendix C.

To ensure the privacy of participants, all data and recorded interviews and have been stored digitally under password protection. The confidentiality and anonymity of all participants has been maintained throughout this report and all features which might identify either them or their school have been removed.

4.3 Research design

I was interested in the factors which influence students' A-level subject choices from a sociological perspective. The literature reviewed in Chapters 1 and 2, identified several factors which can influence students' subject choices, ranging from the level of individual students and families up to the organisational level of schools. For this reason, I adopted a multi-level approach to explore the structural as well as personal influences on students' subject choices.

A purposeful sample of schools was chosen in order to 'ensure strength and richness to the data, their applicability and their interpretation' (Cohen, et al., 2018, p.157). Evidence from multiple cases is often considered more compelling and the overall study is therefore regarded as more robust (Herriott & Firestone, 1983). I attempted to include a range of school types and sizes, including schools that were co-educational (mixed), single-sex, state-funded and independent or fee-paying schools. The aim of selectively sampling different types of schools was to find contrasting 'cases' to compare the various school practices which can influence post-16 participation in physics and modern languages. Schools were recruited through the physics and modern language teachers who assisted me in contacting school administrators who are usually the 'gatekeepers' who can grant access to schools and students. Once both teachers and administrators at a school agreed to participate, I coordinated with teachers to schedule dates to visit schools and recruit students to participate in focus groups. An example recruitment email can be found in Appendix B.

Before visiting schools, I read through the school websites and recruitment materials and made note about anything related to physics and modern languages. This was useful to familiarise myself with the school structure and ethos and provided some interview prompts when speaking with students and teachers. Besides teacher interviews, additional information regarding school policy was supplemented by school websites and school recruitment materials. Data on the school demographics including gender, socio-economic background, English as an Additional Language (EAL), Special Educational Needs (SEN) and academic performance were collected from publicly available information in the Department for Education database (www.education.gov.uk) except for Elmwood Independent Boys' School. As an independent school, Elmwood Independent Boys' School is not included in the Department for Education database, however, some information was available publicly from the Independent Schools Inspectorate (ISI).

Qualitative data was collected at each of the schools using semi-structured interviews and focus groups which are detailed later in this chapter. In total, 67 students (age 16-18) as well as 14 teachers participated in this study. Students were recruited to participate in focus groups by their teachers based on their A-level subjects. I conducted separate focus groups for students taking physics A-level, one or more modern language A-level and students who are taking 'other' subjects (not taking physics or modern languages). Efforts were made to recruit an equal number of students in each of the three groups. This was difficult at some of the schools as I will explain in the next section which outlines my recruitment strategy as well as some challenges that arose during that process.

4.3.1 Participant recruitment

Recruitment began in the March of 2017 and initially limited to schools located in the West Midlands region of England to reduce cost and travel time since I have lived in the area throughout my PhD. After encountering some difficulties recruiting schools in the West Midlands explained below, I expanded recruitment efforts to include London where I had contacts in both physics and modern language teachers through my affiliations with King's College London and the Institute of Physics. These contacts turned out to be crucial for accessing participants, as schools are often understandably reluctant to allow access to unknown researchers.

During the initial recruitment phase, I discovered that some schools did not offer AS/A level courses in both physics and modern languages. In one local authority, almost half (12 out of 28) of the secondary schools were unsuitable for the study because they did not offer AS/A-levels and 7 others did not offer French, German or Spanish at AS/A-level. Some of these schools advertised A-levels in other languages such as Arabic, Dutch, Polish, Russian and Urdu and published A-level results in these subjects from previous years on their websites. However, it was unclear whether these languages are offered every year or if students completed these A-levels outside of school time. In contrast, nearly all the schools that offered AS/A levels did offer physics as well as other science subjects, biology and chemistry. Several schools that I initially contacted were hesitant to participate in the study due to the time demands on their teachers, especially in the modern language departments. Despite these challenges, I was able to recruit four schools and one college to participate in this study which are described in detail later in this chapter.

The physics and modern language teachers were usually my main points of contact at the schools since I had used teacher networks in these subjects to recruit schools. My aim was to interview a physics teacher, a modern languages teacher and a member of senior leadership at the sixth form in each of the schools. I was not able to interview a member of senior leadership at two of the schools due to scheduling conflicts, though I was in contact with a member of senior leadership at all the schools via phone or email prior to beginning data collection. Originally, I had only intended to interview the physics and modern language subject teachers at each school but decided to include interviews with senior school leaders as a result of the pilot study.

Students were recruited to participate by their teachers based on their A-level subjects in three groups: physics students, modern language students and students taking 'other' subjects (taking neither physics nor modern languages). Efforts were made to recruit an equal number of students in each of the three groups, however, this was difficult in schools where there were relatively small numbers taking physics and modern language A-levels. At some schools I interviewed the entire A-

level class when there were fewer than five students but usually the focus groups represented only a subset of students taking physics or modern languages. Two of the schools did not have any students taking modern language A-levels at the time of my visit even though both had students when they agreed to participate in the study. While I was not able to speak to any modern language A-level students at these schools, I was able to speak with a language teacher at the school as well as several students who had completed modern language GCSEs at the school. An effort was also made to include a balance of male and female students in each of the A-level subject groups. This was also challenging due to the relatively low numbers of girls taking physics and boys taking modern languages, which reflect the broader national trends in participation for these subjects.

4.4 Research tools and data collection

The primary tools used for data collection in this study were semi-structured interviews and focus group discussions. The use of these qualitative methods generally offer researchers more flexibility to probe beyond surface responses (Cohen, et al., 2018). In line with the theoretical and philosophical positions adopted for this research, a semi-structured qualitative interview approach was selected to give focus to conversations while allowing participants the ability to "co-construct the interview" (Walford, 2001, p.90). Semi-structured interview guides were developed for each subject, physics and modern languages, using a combination of closed and open-ended questions that explored topics and themes that emerged from the literature review. Similar topics were discussed in all the interviews and focus groups so that emerging themes could be compared across the interviews and between different subject areas. A copy of the topic guides for the student focus groups can be found in Appendix D and for the teacher interviews in Appendix E. Details of the student focus groups and teacher interviews are discussed in greater depth below.

All focus groups and interviews were audio recorded. The recordings enabled me to 'listen attentively' during the discussion and give my full attention to participants while still capturing our conversation for subsequent analysis (Cohen, et al., 2018). Permission to audio record was sought through written consent forms and again verbally at the beginning of each data collection session. During the focus groups and interviews I also took detailed field notes, generally during breaks between sessions or while riding public transportation after leaving the school. These field notes included my initial impressions of the school and the participants as well as anything I observed that might not be captured in audio recordings alone. For example, I might make notes about additional side conversations that were not audio recorded or a poster advertising a school trip to France. Afterwards, I transcribed the recordings to familiarise myself with the data which aided in subsequent stages of analysis.

4.4.1 Student focus groups

Since I am older than the students I was interviewing, I was sensitive to the power imbalance between myself as the researcher and the participants. I used focus groups when speaking to students to address the 'power and status dynamic' that is created in research settings involving young people (Eder & Fingerson, 2003). Focus groups aim to create an environment where participants feel more comfortable to challenge each other and participate in a way that may not happen in a one-to-one, adult-child interview (Cohen, et al., 2013, p.433). Participants are encouraged to discuss specific topics in order that underlying issues (norms, beliefs, values), common to the lives of all participants might be uncovered (Bloor, et al., 2001; Kitzinger & Barbour, 1998).

It is useful to make the distinction between 'focus groups' and 'group interviews' which are often used interchangeably in the literature on social science research (Cohen, et al., 2018; Parker & Tritter, 2006; Wilson, 1997). While both involve a 'group conversation with a research purpose" (Wilson, 1997), group interviews are often directed by the researcher who may engage in dialogue with specific participants in a more structured manner (Parker & Tritter, 2006; Wilson, 1997). In other words, a group interview is similar in nature to one-on-one interviews only with more than one participant at the same time. In contrast, focus groups or group discussions encourage interaction between participants and the researcher plays the role of 'facilitator' or 'moderator' (Parker & Tritter, 2006). Patton (2002) explains that, in a focus group, participants get to hear each other's responses and add to them so the object is to collect rich qualitative data in a social context where participants can consider their own views in relation to the views of others. One limitation of carrying out focus group interviews is the possibility students may not feel completely comfortable sharing their thoughts in a group with others. However, as Holmegaard et al. (2014) argue, focus groups do provide an understanding of what can be expressed in a peer group and what cannot; what is questioned and what is culturally acceptable.

The topic guides used for the student focus groups were loosely based on the interview guides developed for the ASPIRES 2 project which I had used previously as a research assistant on that project. ASPIRES 2 is the second phase of an Economic and Social Research Council (ESRC) funded ten-year longitudinal research project which studies young people's science and career aspirations. The interview guides that I adapted were used to interview Year 13 students (age 17-18) who are in their final year of A-levels and explored students' experiences with science both in-school and outside of school, including how they chose their A-level subjects, as well as career aspirations. Since the ASPIRES 2 study focused on science education and science-related career aspirations, I adapted

some of the questions to focus on modern languages. I attempted to mirror the questions in the topic guides for physics and modern languages as much as possible to allow for comparisons to be made between the students' responses for each school subject. A copy of the topic guides can be found in Appendix D.

In the current study, focus groups had between 2 and 5 students and typically lasted approximately 45 minutes, though one focus group lasted over an hour because it was at the end of the day and the students were particularly enthusiastic. Most of the focus groups were conducted in empty classrooms at the school during free periods, either study breaks or over lunch. I began all the focus groups by asking students to share what subjects they are taking and how they came to study those subjects. After these introductory questions, I would ask more specific questions about students' experiences with science and modern languages, varying the order of these questions depending on the group. Every group was asked about their experiences and perceptions of physics and modern languages, even if they were not taking those subjects. Although specific topics were highlighted in the interview guides, new ideas often emerged that were not part of the original guide and I encouraged participants to elaborate on these ideas, especially when they pertained to their constructions of various subject areas, A-level subject choice or concerns about future plans such as career options and university applications.

As a researcher, I attempted to moderate the focus group discussions rather than elicit responses from individual students (Hydén & Bülow, 2003; Parker & Tritter, 2006). Students were encouraged to discuss, debate and explain their perspectives which may have helped some to clarify and refine their thoughts. However, I was inevitably drawn into some of the discussions; several students asked me what it was like attending high school and university in the USA. These questions were often a useful opening to invite students to discuss experiences with schooling and university choice and helped to make the interview process feel more conversational. Since I did not complete my primary or secondary education in the UK, the focus groups placed students in the position of 'expert' while also allowing them to debate a topic of relevance to their lives (e.g. choosing A-level subjects) (Smithson, 2000). Also, since I was not affiliated with any of the schools, students may have felt more comfortable sharing their views about their schools and subject choices. Cotterill (1992) has suggested that some participants might be more at ease when there is distance between themselves and the researchers; when they feel like they are talking to a 'friendly stranger'. This co-constructed quality of the focus groups provided another dimension to the data regarding individual students and supported some aspects of the data analysis and interpretation explored later in this chapter.

4.4.2 Teacher interviews

Interviews with teachers were around one hour, usually taking place in a classroom or the teacher break room. When I first arrived at the schools, I usually spent several minutes chatting informally with the teachers to establish a rapport (Walford, 2001). Most of the teachers were interested in my research, especially as it related to their own subject specialism and how they could entice more students to study physics or modern language A-levels. A few teachers also had concerns about inequalities in participation and/or attainment in these subjects at their schools due to new regulations to monitor attainment for different groups of students (e.g. gender, ethnicity, pupil premium or socioeconomic status). This meant that the teachers often had a lot to contribute to our conversations. The primary aim of the teacher interviews was to get data on what factors they thought might influence students' subject choices and who they recognised as 'good students' in their respective subjects. Teachers were able to explain their pedagogical strategies in science and modern languages and thus provided an additional perspective on students' experiences in the classroom.

Teacher interviews were also useful to provide contextual information about the schools and the structure of physics and modern languages teaching at the school. I began all the interviews by asking teachers closed questions about their educational background, how many years they had been teaching their subject and if they had taught at any other schools previously. Then, I began asking more open questions about the schools, the size of the sixth form, when A-level subject choices were made and what kinds of support is provided for choosing those subjects. When interviewing specialist teachers, I also asked open-ended about their subject areas, the structure of the departments and about the students who are studying them. Teachers who had been at the school for a long time were able to discuss how their subjects and the number of students taking them had changed from previous years. A copy of the interview guides can be found in Appendix E.

4.5 School settings

In this section, I will describe the five participating schools/colleges and the structure of the physics and modern language departments at each. Some background information about these schools is summarised in the table below including the size and location of the school, school type and demographic information.

Table 4-1 School information

	Ashford Academy	**Birch High School**	**Daffodil Girls' School**	**Elmwood Independent Boys' School**	**Cedar Sixth Form College**
Location	West Midlands	West Midlands	Greater London	Greater London	Greater London
Mixed/ Single-Sex	Mixed	Mixed	Single-Sex (Girls)	Single-Sex (Boys)	Mixed
Denomination (if applicable)	None	Catholic	Catholic	None	None
Age Range	13 to 18	13 to 18	11 to 18	11 to 18	16 to 19
School Type	State-funded	State-funded	State-funded	Independent	State-funded
Intake	Comprehensive	Comprehensive	Comprehensive	Selective	Comprehensive
Dates Visited	***Pilot – July 2017*** **February 2018**	**November 2017**	**April 2018**	**June 2018**	**February & March 2018**
School Performance and Demographic Information					
Most recent Ofsted outcome	Outstanding	Outstanding	Outstanding	N/A	Outstanding
% Achieving Grade 5 in English & Maths GCSEs (2018)	38%	58%	64%	100%	N/A
% Achieving English Baccalaureate (2018)	16%	31%	53%	100%	N/A
% Eligible for Free School Meals (FSM) in past 6 years	43.3%	14.9%	37.3%	N/A	N/A
% English as Additional Language (EAL)	6.9%	11.9%	25.3%	15.6%	N/A
% Special Educational Needs (SEN) plans	1.5%	0.3%	0.3%	13.4%	N/A

As mentioned previously, schools were recruited to form a purposeful sample, including a range of school types and sizes. The aim of selectively sampling different types of schools was to find contrasting 'cases' to compare how the school context can influence post-16 participation in physics and modern languages. There were several notable characteristics of these institutions which have influenced participation in physics and modern languages, including their geographic location, religious affiliation, whether they are single-sex or co-educational and, finally, whether they are single-sex or co-educational (mixed). This section will now reflect on how these characteristics may be relevant to the study at hand.

Two of the schools in this study, Ashford Academy and Birch High School, are located in the West Midlands while the rest are in Greater London. Within education and research, there has been increasing interest in how the geographic location of schools may influence student attainment and success in education. Several studies have focused on the understanding the 'London effect', where London students in compulsory education have shown higher attainment and levels of progress, particularly at GCSE, compared to the rest of England over the past two decades (Baars, et al., 2014; Burgess, 2014). These studies have found that students from socioeconomically disadvantaged backgrounds appear to perform better in London schools compared to students from similar backgrounds in the rest of England. Some have suggested that various educational policies and

interventions implemented in London, like the London Challenge and improved support from local authorities, have helped to improve student attainment and progress (Baars, et al., 2014). The London schools in this study did have a higher average attainment than the schools in the West Midlands which may be a result of the 'London effect'. In addition, the teachers at the London schools (Elmwood, Daffodil, Cedar) reported having access to a wider range of resources including continuing professional development for staff and enrichment activities for students compared to the two Midlands schools (Ashford and Birch).

Another study by Burgess (2014)argues that the higher student attainment is due to the ethnic composition of schools since students from certain ethnic backgrounds, particularly those from families who have recently immigrated to the UK, typically have higher "higher aspirations and ambitions and place greater hopes in the education system" (Burgess, 2014, p.16). Interestingly, Burgess' study also found that schools in Birmingham, in the West Midlands, had a similar proportion of high-attaining ethnic minority pupils to London and those Birmingham schools similarly out-perform students in the rest of England. Similar to the schools in Burgess' study, the West Midlands schools in this study had a higher proportion of students from White-British backgrounds and the London schools, Daffodil Girls' School and Elmwood Independent Boys' School, had more ethnically diverse student bodies and higher proportion of students with English as an Additional Language (EAL). Both London schools also had much higher numbers of students studying modern languages at GCSE. The findings in this study confirm that geographic location and student intake were both important influences on participation in academically selective subjects like physics and modern languages. Unsurprisingly, participation in these subjects was higher at both GCSE and A-level at the London schools in this study, as compared to the two Midlands schools. The influence of each schools' location is discussed throughout Chapters 5 and 6, though it was not the main focus of my analysis.

Another potentially relevant difference between the schools is that Birch High School and Daffodil Girls' School are faith schools, specifically Catholic. There is almost no research in the literature on the relationship between faith schooling and students' subject choices. One recent study suggested that students at faith schools perform well on exams up to age 16 regardless of family background in contrast to independent and grammar schools where the advantage for students at these schools appears to lessen when controlling for family background (Sullivan, et al., 2018). Since students who study physics and modern languages at A-level tend to be high attaining at GCSE, there may be a higher likelihood of students from faith schools taking these subjects. However, it would be difficult

to comment on the relationship between faith schools and post-16 participation in physics and modern languages based on such a small number of schools and this was not a focus of the study.

This study is about A-level subject choices which are heavily influenced by students' GCSE subjects. Below is a table of numbers of students entered for science and language GCSEs at each of the schools from the 2018/19 academic year, with the percentage of GCSE cohort taking each subject shown below in brackets.

Table 4-2 Indicative numbers entered for science and modern language GCSEs by school

Data from 2018/19		Ashford Academy	Birch High School	Daffodil Girls' School	Elmwood Independent Boy's School	Cedar Sixth Form College
Total pupils at school		735	925	1064	927	1327
Number of pupils completing KS4 in 2018/19		180	229	182	137	N/A
Science	Science: Double Award	140 (78%)	176 (77%)	181 (99%)	Data unavailable	N/A
	Physics	35 (19%)	51 (22%)	Not offered	116 (85%)	N/A
	Biology	34 (19%)	51 (22%)	Not offered	116 (85%)	N/A
	Chemistry	34 (19%)	51 (22%)	Not offered	116 (85%)	N/A
Modern Languages	Any language	41 (23%)	108 (47%)	138 (76%)	137 (100%)	N/A
	French	26 (14%)	59 (26%)	94 (52%)	105 (77%)	N/A
	German	0 (0%)	46 (20%)	Not offered	16 (12%)	N/A
	Spanish	14 (8%)	Not offered	41 (23%)	47 (34%)	N/A

4.5.1 Ashford Academy

Ashford Academy is a small, co-educational (mixed), 13-18 comprehensive school, part of a local multi-academy trust, located in a mid-sized town in the West Midlands. The school has a higher than average proportion of students eligible for the pupil premium and free school meals, which are both indicators of economic disadvantage. The proportion of students from minority ethnic heritages is below the national average as is the proportion speaking English as an additional language.

Academic attainment at Ashford Academy and the surrounding area are just below the national average at the secondary school and sixth form. Past Ofsted reports show that the intake at Ashford Academy in Year 9 (age 13) has lower than average attainment in English and mathematics and the proportion of higher attaining students is below the national average. However, despite a student intake with such low academic attainment, Ashford Academy scored similarly to other secondary

schools in the same local authority in terms of educational attainment at the end of Year 11 (age 16). The sixth form at Ashford Academy is smaller than the other schools included in this study. Student attainment in A-levels and academic qualifications is just below the national average, however, attainment in vocational qualifications and occupational qualifications ('Tech Levels') are both several points above the national average. Most students were taking a combination of A-level and vocational qualifications.

4.5.2 Birch High School

Birch High School is a co-educational (mixed), 13-18 Catholic High School located in a mid-sized town in the West Midlands. The proportion of students eligible for free school meals and statements of special educational needs at Birch High School were both well below the national average. The proportion of students speaking English as an additional language was also lower than the national average but relatively high compared to other schools in its local area. Most of the students had attended nearby Catholic primary and middle schools before starting at Birch High School in Year 9 (age 13).

Academic attainment at Birch High School is well above both the national average and the average for state-funded schools in its local area in both the school and sixth form. From Year 9, students are placed onto guided pathways based on their prior attainment. The school has a relatively large sixth form and over twenty-five percent of students at Birch High School went on to top universities including Russell Group institutions, though an increasing number of students are pursuing higher level apprenticeships. The Deputy Head of Sixth Form (Ms. BL) explained that Birch High School prioritises 'facilitating subjects' at A-level because most of their students will attend university after sixth form. Banners in the school lobby showcase their students' achievements in STEM subjects and alumni who have gone on to study at prestigious universities.

4.5.3 Daffodil Girls' School

Daffodil Girls' School is an average-sized, 11-18, Catholic single-sex girls' comprehensive school located in an urban area of North London which is well connected to Central London by public transportation. Teachers described the area as being 'quite deprived' and the proportion of students who have been eligible for free school meals in the past six years is well above the national average. Students come from a broad spectrum of social and ethnic backgrounds; the proportion of students from minority ethnic groups and students who speak English as an additional language are both well

above the national average. Although Daffodil Girls' School has had a sixth form for a long time, new buildings had been constructed in the past five years to accommodate the growing sixth form.

Academic attainment at Daffodil Girls' School is well above both the national average and the average for state-funded schools in its local area in both the school and sixth form, even though prior attainment of the student intake is around the national average before coming to the school. In the sixth form, Daffodil Girls' School has 'excellent' outcomes on vocational courses and while attainment on academic courses is below the national average, they are improving rapidly. The school also has higher than average progression rates for students going on to higher education (75 percent). Government data from the most recent years shows that a high proportion of Daffodil's students have been successful in gaining places at high tariff universities, including Oxbridge and Russell Group universities. A smaller proportion of students at Daffodil (5 percent in 2017) have also been successful in obtaining competitive degree apprenticeships and employment.

Daffodil Girls' School is one of two single-sex schools in this study along with Elmwood Independent Boys' School. In relation to single-sex schools, the literature suggests that while students at single-sex boys' schools are more likely to study triple sciences, the same is not true for single-sex girls' schools (Anders, et al., 2018; Bennett, et al., 2013). The two single-sex schools in this study do appear to confirm the findings in the literature as the triple science pathway was taken by the majority of students at Elmwood Independent Boys' School but not offered at all at Daffodil Girls' School. Nonetheless, single-sex schools appear to be better than co-educational schools at countering gender imbalances in A-level subject choices, particularly for physics, and girls are much more likely to study A-level physics if they attend a single-sex school (IOP, 2013, 2018b; Bennett, et al., 2013). Daffodil did have a higher number of girls studying A-level physics than either of the other two state-funded co-educational schools in this study, Ashford Academy and Birch High School. While there is less research on the relationship between single-sex schooling and studying modern languages, a recent report by Anders et al. (2018) found that students at single-sex schools are more likely to study academically selective subjects at A-level, which includes science and modern languages.

4.5.4 Elmwood Independent Boys' School

Elmwood Independent Boys' School is an independent (fee-paying), 11-18, single-sex boys' school located in London. Although the school has four main entry points, most students enter at Year 7 (age 11) and only a small number joining the school for sixth form (age 16). The proportion of

students who speak English as an additional language is much higher than the national average as is the proportion of students with special educational needs. While the school's website advertises the availability of "generous bursaries" to supplement the school fees of over £16,000 per year, most students are from relatively affluent backgrounds.

Elmwood Independent Boys' School is a selective school and, as a result, the student intake is very high attaining. The school's website advertises that ninety percent of their pupils attend Russell Group Universities and around twenty-five percent take up places at Oxbridge every year. The sixth form offers a range of different courses including A-levels and 'Pre-U' qualifications which are offered primarily independent schools and designed to provide better preparation for university by covering subjects in greater depth. Students in the sixth form typically study four A-level or Pre-U subjects or, alternatively, three subjects with an additional qualification such as, Financial Services, Information and Communication Technology (ICT) or Extended Project (EPQ).

As an independent school, Elmwood was able to draw on significantly more resources and staffing to support students in their subject choices. As discussed in Chapter 1, the provision and availability of different science and modern language courses can vary widely between schools, particularly between independent and state-funded schools. At Key Stage 4, triple science and modern languages are more likely to be compulsory at independent schools (e.g. RSA, 2015). At Key Stage 5, students from independent schools make up a greater proportion of entries for A-levels in physics, French, German and Spanish (Russell Group, 2015). This was particularly evident at Elmwood, where all students were required to study triple science and modern languages at Key Stage 4. Elmwood had particularly high uptake of A-level physics relative to the other schools in this study, which is typical of independent (single-sex) boys' schools (e.g. IOP, 2018b). In addition, Elmwood had a particularly strong language programme, offering five modern languages (French, German, Spanish, Mandarin and Russian) and two classical languages (Latin and Ancient Greek) at both Key Stages 4 and 5. The language provision at Elmwood is not necessarily typical of single-sex boys' schools, though modern and classical languages are more common at independent schools. Elmwood's curricular offers and support for post-16 choices will be discussed in greater depth in Chapter 5.

4.5.5 Cedar Sixth Form College

Cedar Sixth Form College is an average-sized, co-educational (mixed), 16-19 sixth form college located in Greater London. The college draws students from seventy-five different feeder schools from eleven different local authorities including a mixture of state-funded and independent schools

as well as co-educational (mixed) and single-sex schools. Consequently, the students had a range of different experiences from their primary and secondary education prior to beginning their studies at Cedar Sixth Form College. The proportion of students from ethnic minority backgrounds is well above average as is the number of students speaking English as a second language. The proportion of students eligible for free school meals is below the national average.

Student attainment on entry to the college is well above average, largely due to the minimum GCSE grade requirements in core subjects. Cedar Sixth Form College offers a combination of A-levels and BTEC courses and most students start with four subjects in Year 12 and drop down to three subjects in Year 13. Academic attainment at the college is above the national average as well as the average for the local area and most students achieve better grades than those predicted from their prior GCSE attainment. Around ninety percent of the students at the college progress into higher education every year including prestigious Russell Group universities and some students go on to pursue degree and higher apprenticeships, training and employment after leaving the sixth form.

4.6 Participants

4.6.1 Students

In total, 67 students participated in this study including 25 taking physics, 17 taking at least one modern language and 28 taking 'other' subjects (taking neither physics nor modern languages). Three students were taking both French and physics A-levels which is reflected in these numbers. An effort was made to recruit equal numbers in each of the three subject groups. However, two of the schools, Ashford Academy and Daffodil Girl's School did not have any students taking modern language A-levels at the time of my school visits in 2017-18 academic year. As a result, fewer modern language students were included compared to the other groups. Despite not being able to speak to any modern language A-level students at these schools, I did speak with students who had completed modern language GCSEs at these schools. The table below shows the number of students at each school taking physics and modern language A-levels at the time this study was conducted as well as how many of these students participated in the focus groups at each school.

Table 4-3 Numbers taking physics and modern language A-levels with participants by school

Data from 2017/18		Ashford Academy	Birch High School	Daffodil Girls' School	Elmwood Independent Boy's School	Cedar Sixth Form College
Number of Students in Sixth Form		**142**	**239**	**167**	**281**	**1216**
Numbers taking A-level Subjects in 2017/18	**Physics (Y12 + Y13)**	6 (4%)	24 (10%)	17 (10%)	77 (27%)	149 (12%)
	French (Y12 + Y13)	3 (2%)	3 (1%)	0 (0%)	45 (16%)	41 (3%)
	German (Y12 + Y13)	Not offered	2 (<1%)	Not offered	16 (6%)	7 (<1%)
	Spanish (Y12 + Y13)	Not offered	Not offered	0 (0%)	17 (6%)	26 (2%)
Students participating in current study by subject	**Physics**	6	5*	3	5*	6*
	Modern Languages	2	4*	N/A	5*	6*
	Other subjects (No physics or modern languages)	9	4	3	2	10
	Total Student Participants	**17**	**12**	**6**	**11**	**21**

* There were 3 students taking both French and physics A-levels

An effort was also made to include a balance of male and female students in each of the subject groups. This was challenging at several of the schools, especially due to the relatively low numbers of girls taking physics, which reflect the broader national trends in participation for these subjects. The table below provides a summary of the student participants included in this study (see Appendix F for a full list of student participants).

Table 4-4 Overview of student participants by A-level subject and gender

A-level Subject	Female	Male	Total
Physics	9*	16*	25*
Modern Languages	9*	8*	17*
Other subjects (No physics or modern languages)	13	15	28
Total	30	37	67

* There were 3 students taking both French and physics A-levels (1 girl and 2 boys)

As discussed earlier in this chapter, qualitative data was collected from students through semi-structured interviews and focus groups. I conducted 19 focus groups with students, including 4 with

modern language students, 7 with physics students and 8 with students taking 'other' subjects. In the pilot study, 2 of the modern language students were not available at the same time and had to be interviewed separately. The focus groups and interviews with students are summarised in the following table and diagram.

Table 4-5 Details of student focus groups

A-level Subject	Focus Groups or Interviews	Number of Students
Physics	7 x focus groups	24 students (8 girls + 16 boys)
Modern Languages	4 x focus groups 2 x one-on-one interviews	15 students (9 girls + 6 boys)
Other subjects **(No physics or modern languages)**	8 x focus groups	28 students (13 girls + 15 boys)
TOTAL	**19 x focus groups** **2 x one-on-one interviews**	**67 students (30 girls + 37 boys)**

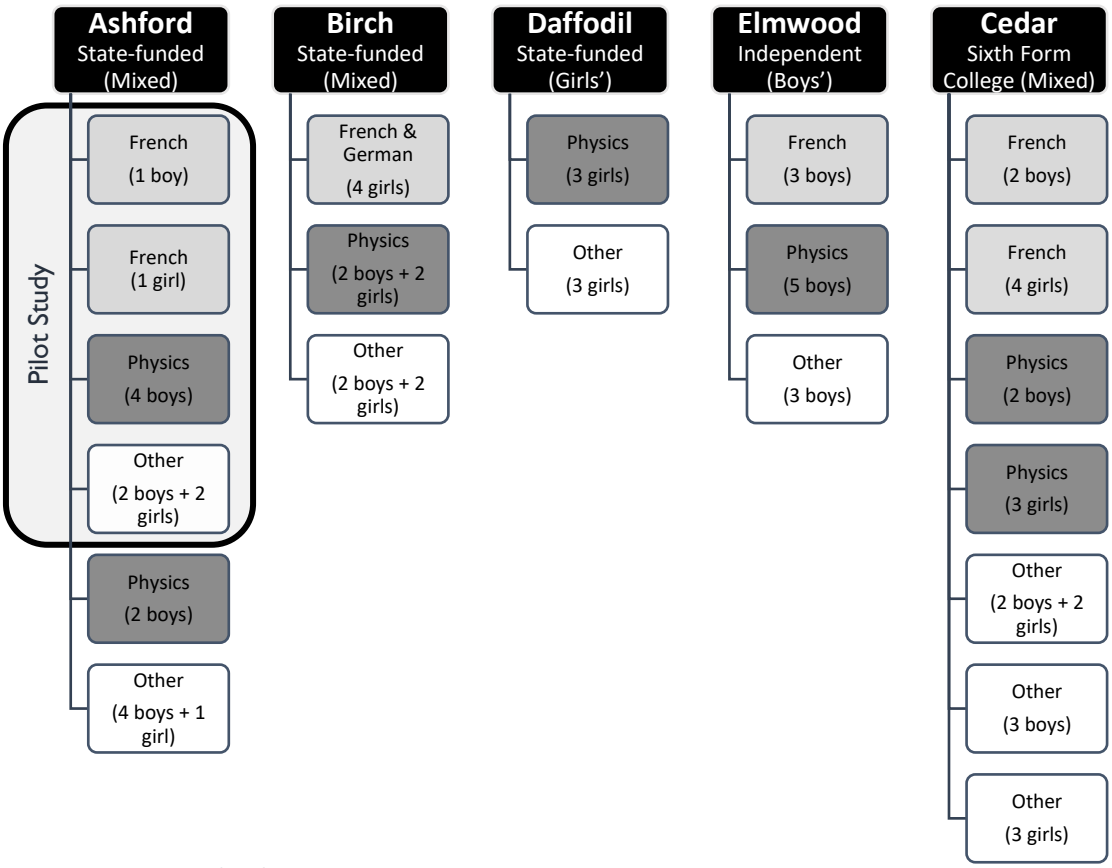

Figure 2 Focus group details

4.6.2 Teachers

In total, I interviewed 14 teachers including: 5 modern language teachers, 5 physics teachers, 3 school leaders and 1 careers advisor. I have given each teacher a two-letter pseudonym to maintain anonymity. The first letter represents their school (A-E) and the second letter their subject specialism or role (Modern languages, Physics, Leadership, Careers advisor). The table below provides an overview of the teachers who participated in this study.

Table 4-6 Overview of participating teachers with pseudonyms

School	Teacher (pseudonyms)	Subjects Taught / Roles at School	Teaching Experience
Ashford Academy	Ms. AM	A-level French, GCSE Spanish & French	10+ years
	Ms. AP	A-level Physics	20+ years
Birch High School	Ms. BL	Deputy Head of Sixth Form A-level English Language/Literature	20+ years
	Ms. BM	A-level German, GCSE German Modern Languages Subject Leader	20+ years
	Ms. BP	A-level Physics, GCSE Science	3 years
Daffodil Girls' School	Ms. DM	A-level Spanish, GCSE Spanish & French Modern Languages Subject Leader	20+ years
	Ms. DP	A-level Physics, GCSE Physics (top sets) Physics Subject Leader	10+ years
Elmwood Independent Boys' School	Mr. EL	Deputy Head of Sixth Form & Higher Education A-level Economics	5 years
	Mr. EM	A-level French, GCSE Spanish & French	5 years
	Mr. EP	A-level Physics, GCSE Science Head of Physics	8 years
Cedar Sixth Form College	Ms. CL	Assistant Principal (Staff & Student Development) Art History Subject Leader	10+ years
	Ms. CM	A-level French	8 years
	Mr. CP	A-level Physics & Chemistry, Physics Subject Leader	8 years
	Ms. CC	Careers Advisor, HE & Careers Coordinator	Unknown

4.7 Analysis

4.7.1 Phase 1: Transcription and initial mapping of the data

All interviews and focus groups were audio recorded and I transcribed these recordings myself. Cohen et al. (2018) describes transcription as a crucial step in the data collection but cautions that an audio recording can filter out visual and non-verbal aspects of the interview, creating "a potential for data loss, distortion and reduction of complexity" (p. 426). The recordings were transcribed

verbatim with some non-verbal data including pauses, silence and laughter. I decided to include selected non-verbal data in the transcripts to reduce 'data loss' while keeping the transcription process manageable. I also made notes of anything I recalled about the interview or which I found by cross-referencing with my field notes. Later, I proofread each transcript while listening to the recording once more to ensure accuracy. At this stage, the transcripts were anonymised by removing all identifiable information about the schools and participants and replacing any names with pseudonyms.

Every student that participated in this study was taking between 3 and 5 post-16 qualifications including not only A-levels but also various combinations of Pre-U, Vocational and Extended Project Qualifications (EPQs). The first stage of analysis involved creating profiles for each of the students which included their post-16 subject choices, career aspirations, some demographic data (e.g. gender, ethnicity, additional languages spoken at home) and a summary of their educational experiences related to science and modern languages education (e.g. single/double/triple science GCSE, modern languages studied, extracurricular activities). After creating profiles for the individual students, I created a profile for each of the schools using my field notes and supplemented by government data, inspection reports, school websites and recruitment materials. Creating profiles for each individual student and school helped me to familiarise myself with the data and start to organise it.

4.7.2 Phase 2: Coding the data for emerging themes

Next, I uploaded the transcripts to *NVivo 12*, a qualitative data analysis software package that enables organisation and coding of data. Using NVivo 12, I began an 'exploratory' or inductive coding of students' responses using 'in vivo' or 'emic' coding (Saldaña, 2013, pp.91–96) to map out how students articulated their reasons for taking or dropping physics and modern languages. I began by coding the physics students and modern language students separately to identify the most common reasons that students gave for choosing these subjects at A-level. Then, I coded all student focus group transcripts to identify the most common reasons that students gave for <u>not</u> choosing to study physics and modern languages at A-level. During this initial coding, I felt it was important to "prioritise and honour the participant's voice" (Saldaña, 2013, p.91), noting anything that stood out and moving back and forth between coding and memo writing throughout. In practice, I would code transcripts using NVivo 12 software package in batches of two or three, usually by school or subject group. After completing each batch of transcripts, I would go back through each code (or 'Node' in NVivo 12) to double check for consistency, consolidate any codes that were duplicates and break down any codes where there might not have been a good fit. Once I was satisfied with the codes, I

would move on to the next batch of transcripts. A list of codes with descriptions and examples from the data can be found in Appendix G.

Throughout this process, the data often took me back to the literature reviewed in Chapter 2 and a re-reading of my theoretical perspectives outlined in Chapter 3 which suggested new directions or useful concepts to guide my analysis. In this way, my analysis was an iterative process moving back and forth between the literature and my data. The categories of codes devised in Phase 2 of my analysis helped to inform a more conceptually driven (deductive) analysis through my theoretical lenses which is described in the next section.

4.7.3 Phase 3: Conceptually driven analysis

Analysing schools and school-level practices through a Bourdieusian lens: Institutional habitus (Chapter 5)

Building on the inductive 'exploratory' coding from Phase 2, I began a more deductive meta-level analysis of the student focus group data using Bourdieu's concept of *habitus*. In the previous 'exploratory' coding phase, I noticed that students' perceptions of the exchange value of physics and modern languages seemed to vary widely between the different schools and I had not fully appreciated this until I began to analyse and draw comparisons between the school settings. For instance, while coding the transcripts from Elmwood Independent Boys' School, I noticed that multiple students described modern and ancient languages as 'invaluable subjects' because they taught problem solving and helped them to appreciate forms of culture and literature. In contrast, students at the other schools focused on how learning languages could provide practical benefits for specific careers. Although the initial focus of my thesis was on students' identities and experiences, this initial analysis of the data led me to further reading by Reay et al. (2001, 2010) and Abrahams (2018) on the concept of *institutional habitus.* As my thesis evolved, the concept of *institutional habitus* became an important organising concept for my analysis in Chapter 5.

Since much of the research on subject choice has tended to focus on individual students, I applied the theoretical concept of *institutional habitus* to my data to examine the role of schools (re)producing patterns of inequality in participation in physics and modern languages. As described in Chapter 3, institutional habitus is understood as the impact of a cultural group on an individual's behaviour as it is mediated through an organisation such as a school (McDonough, 1997; Smyth & Banks, 2012). Reay et al. in the UK conceptualise institutional habitus as constituted of several interrelated elements including curricular offers, provision of support and guidance and organisational practices (e.g. school and subject entry requirements) (Reay, et al., 2010). Using these

elements as a guide, I created profiles for each of the schools drawing on the transcripts and my field notes as well as government data, inspection reports, school websites and recruitment materials. To code for *institutional habitus*, I searched the data for anything that I interpreted as indicating internalised, taken-for-granted dispositions, such as a preference towards certain subjects or universities at the schools. My coding framework for *institutional habitus,* which was applied to student focus group transcripts, teacher interview transcripts, field notes, school websites and recruitment materials can be found in Appendix L.

In order to analyse the curricular offers at each of the schools in this study, I first created tables listing the subjects offered at Key Stages 4 and 5 in each school to identify patterns and draw comparisons across the schools (see Appendix K). During the pilot study, I noticed that many students mentioned the English Baccalaureate (EBacc) when discussing their motivations for studying different subjects at GCSE (Key Stage 4), particularly for languages and humanities subjects, which are perceived as providing better preparation for university. The number of students attempting and completing EBacc subjects are reported by the DfE as indicators of school performance (DfE, 2019b). I also noticed that these subjects were treated as requirements at some schools but not others and, within schools, these requirements did not seem to be applied consistently for every student. From these initial observations as well as results of other studies in the research literature (e.g. Abrahams, 2018), I used the EBacc categories to organise the curricular offers for Key Stage 4.

At Key Stage 5, there are an even wider range of qualifications offered in schools across the UK. For this reason, I found it helpful to use a typology of subjects based on requirements for university admission and DfE school performance measures. Firstly, 'facilitating subjects' are A-level subjects identified in the publication *Informed Choices* as being required more often than the others for admission onto university degree courses (Russell Group, 2016). These subjects are perceived as particularly helpful for university admission, particularly at highly selective institutions, and holding more facilitating A-levels has been found to be associated with attending a higher ranked university (Dilnot, 2018). In addition, student attainment in facilitating subjects at A-level are used by the Department for Education (DfE) as performance indicators for schools and colleges at Key Stage 5 (DfE, 2019a). Second, based on a review of published guidance from individual Russell Group universities, Dilnot (2015, 2018) identified a further 20 'useful' subjects not included in the 'facilitating subjects' list but appear on at least one Russell Group university approved list of A-levels and absent from all non-preferred lists. A condensed list of the 'facilitating' and 'useful' subjects according to the stated preferences of Russell Group universities can be found in the table below

(see also Dilnot, 2015, 2018; Russell Group, 2016). These typologies provided a useful starting point for organising the data and identifying patterns. For example, Elmwood Independent Boys' School offered more traditional academic A-level subjects ('facilitating subjects') which appeared to anticipate the choice of traditional subjects at prestigious Russell Group universities. In contrast, the state-funded schools offered a wider selection of academic and vocational qualifications, including A-levels as well as other Level 3 courses.

Table 4-7 Facilitating and 'useful' subjects

'Facilitating'	'Useful'
Biology	Classical civilisation
Chemistry	Classics
English Literature	Computing
Geography	Economics
History	English language & literature
Mathematics	English language
Further mathematics	Environmental science
Physics	Government and Politics
Classical/Modern Languages[1]	History of art
	Music
	Philosophy
	Psychology
	Religious Studies
	Sociology
	Statistics

Analysing subject-specific practices in physics and modern languages through a Bourdieusian lens: Pedagogic work and symbolic violence (Chapter 6)

Since Bourdieu did not apply his theory to specific school areas, I drew on recent work by Archer et al. (2020) which applies Bourdieu's concepts of *pedagogic* work and *symbolic violence* to the context of A-level physics. The authors proposed four main criteria that could be interpreted as evidence or indicators of pedagogic work being undertaken within and by specific school subjects (i.e. physics): examples of *symbolic violence* (when students blame themselves for not continuing), examples of compliance and acceptance of the status quo (when students describe unequal participation as 'just the way things are'), examples of disbarring and expulsion (when educational systems, processes or figures prevent a students from continuing) and examples of socialisation (when students views and dispositions appear to shift and converge over time) (Archer, Moote, & MacLeod, 2020, p.10).

[1] Classical/Modern Languages which count towards the 16-18 Performance Tables indicator in 2019 are: Arabic, Bengali, Chinese, Dutch, French, German, Greek (Classical), Greek (Modern), Gujarati, Irish (second language), Italian, Japanese, Latin, Modern Hebrew, Panjabi, Persian, Polish, Portuguese, Russian, Spanish, Turkish, Urdu, Welsh (second language)

While coding for *institutional habitus* I also coded for any formal and informal selective practices which were specific to physics and modern languages. Then, I used the criteria proposed by Archer et al. (2020) to guide a meta-level analysis of the examples of subject-specific selective practices that I found in my data. For example, I found examples of attainment-based gatekeeping practices for physics and modern languages which are examples of 'disbarring and expulsion', where educational systems prevent students from continuing with the subject (Archer, Moote, & MacLeod, 2020, p.10). There were also examples of socialisation, where "students' views and dispositions… appear to shift and converge over time" (Archer, Moote, & MacLeod, 2020, p.10). For instance, many of the female students gave accounts of how they had felt excluded or marginalised by the masculine culture in physics classrooms which appeared to show a process of socialisation, compliance and acceptance which could be interpreted as evidence or indicators of pedagogic work being undertaken within/by school physics (Archer, Moote, & MacLeod, 2020). My coding framework for *pedagogic work,* which was applied to student focus group transcripts, teacher interview transcripts, field notes, school websites and recruitment materials, can be found in Appendix M. The concepts of *pedagogic work* and *symbolic violence* are used to organise my analysis in Chapter 6.

Analysing students' constructions of *celebrated subject positions* in physics and modern languages (Chapter 7)

After analysing the school-level and subject-specific factors, I shifted the focus of my analysis to students. I revisited my initial 'exploratory' codes developed in Phase 2 and the literature on participation in physics and modern languages which focused on student experiences. My reading of research on student identities by Carlone et al. (2014) and Archer et al. (2017) suggested the notion of *celebrated subject identities* as a sensitising concept to understand how students interpreted and negotiated success within physics and modern languages. *Celebrated subject identities* describe the cultural models of who counted as successful and legitimate participants in school subjects (i.e. science).

The themes identified in earlier stages of coding were then analysed discursively by exploring the ways in which students were positioned (by themselves and by others) in relation to the *celebrated subject identities* in physics and modern language classrooms. Inspired by the ethnographic studies by Carlone et al. (2014), I reviewed the student focus group transcripts while asking "What counts as success in physics and modern languages? What counts as being a 'good' participant in these subjects?". Based on this coding of the student focus group transcripts, I identified the *celebrated subject identities* for physics and modern languages which are presented in the tables below. In line with the literature on science identity, I coded transcripts for references to 'cleverness' and

'masculinity' in relation to physics. Similarly, I coded transcripts for references to possible future selves (fluent speakers) and gender in relation to modern languages. Since this study seeks to offer comparisons between and across physics and modern languages, I would often check to see if any of the codes applied to the other subject area (e.g. 'cleverness' or gender). Throughout this process, I would discuss the codes with my supervisors who would make suggestions to my coding framework as I wrote up my findings. The tables in Appendix N show the frequency these codes appear in the student focus group transcripts. I have only included those codes which appear more than once. After coding the students focus group transcripts, I began to code the teacher interview transcripts to identify any overlaps or conflicts between the students' and teachers' perspectives. I began with the codes identified from the student focus group transcripts as a starting point and added to them as new codes emerged from the teacher interview transcripts. Based on this analysis of the transcripts, I identified the *celebrated subject identities* for physics and modern languages which are presented in the tables in Appendix N.

After coding both the student and teacher transcripts, I compared the most frequent codes from each of the broader categories and highlighted those which appeared across all the categories (shown below). The notion of *celebrated subject positions* and the coding frameworks were used as the foundation for my analysis in Chapter 7.

Table 4-8 Students' and teachers' celebrated subject positions in physics and modern languages

	Physics	**Modern Languages**
Students	a. *Physics is a masculine subject*	a. **Independent learners**
	b. **Clever, high achievers**	b. Fluent speakers
	c. Focused on science only, science-brain	c. **Clever, high achievers**
	d. **Independent learners**	d. French is a feminine subject
	e. *Practical and hands-on*	e. *German is a masculine subject*
Teachers	a. Confident, takes risks	a. **Independent learners**
	b. **Clever, high achievers**	b. **Clever, high achievers**
	c. *Physics is a masculine subject*	c. Native speakers are disadvantaged in modern languages
	d. **Independent learners**	d. *German is a masculine subject*
	e. *Practical and hands-on*	e. Middle-class

4.8 Summary

In this chapter, I have presented a discussed my methodological approach to addressing the research questions. This study employed a social constructionist approach and qualitative research methodology, which enabled an in-depth, multi-level examination of the factors influencing participation in A-level physics and modern languages. To address my research questions, I recruited 4 secondary schools and a sixth form college located in London and the West Midlands to participate as case studies in this research.

At each school, I interviewed several teachers including at least one physics teacher and one modern language teacher. Teachers were asked about the support available to students and other school practices relating to subject choice (e.g. subject entry requirements, timetables). Students, age 16 to 18, were recruited by their teachers and interviewed in 3 groups based on their enrolment in physics, modern languages and students taking 'other' subjects (neither physics nor modern languages). They were asked about previous school experiences, perceptions of physics and science, how they chose their subjects and future plans (e.g. university, career aspirations). School websites and government data were used to provide contextual information about the schools (e.g. attainment, demographics). Drawing data from multiple sources enabled me to gain a more holistic view of the factors and processes shaping students' subject choices and participation in physics and modern languages at post-compulsory levels.

To analyse the data, I began by coding the data through an iterative process drawing both on the literature reviewed in Chapters 1 and 2 and allowing codes to emerge from the transcripts themselves in order not to dismiss any instances that did not fit with these theories. Based on this initial 'exploratory' coding of the data (Phase 2), I considered how students articulated their reasons for studying physics and modern languages at A-level and how they interpreted and negotiated success within these subjects. Next, I examined the data using a more deductive, theoretically-informed approach based on Bourdieu's theory of social reproduction, specifically the concepts of *institutional habitus*, *pedagogic work* and *symbolic violence*. Although the initial focus of my thesis was on students' identities and experiences, the role of schools and subject-level practices became more apparent during the analysis of the students' accounts. I had not fully appreciated this until I began to analyse and draw comparisons between the school settings. The concept of *institutional habitus* became an important organising concept for my analysis in Chapter 5 and the concept of *pedagogic work* is used to understand subject-specific selective practices in Chapter 6. Finally, I drew on the concept of *celebrated subject identities* developed by (Carlone, et al., 2014) which is central to the analysis presented in Chapter 7. In the following chapters, the analysis and findings of this study are presented in discussed, moving from a focus on schools to subject-specific practices in physics and modern languages and then to students.

Chapter 5: Schools, institutional habitus and subject choice

5.1 Introduction

In this chapter, I discuss the various school practices which influenced students' subject choices at each of the schools. The analysis in this chapter is focused at the school level, drawing predominately on the interview data with students and teachers as well as the information about each of schools which is published on their websites and in the Department for Education (DfE) database. To analyse the data, I have applied one of the theoretical lenses outlined in Chapter 3, Bourdieu's theory of social reproduction. In particular, I have used the concept of *institutional habitus* which describes the impact of a cultural group on an individual's behaviour as it is mediated through an organisation such as a school (McDonough, 1997). Reay et al. (2010) conceptualise institutional habitus as constituted of several interrelated elements including curricular offers, support and guidance, organisational practices (e.g. subject entry requirements) as well as cultural and expressive characteristics (e.g. how the school presents itself and the attitudes of the teachers and students) (Reay, et al., 2010, p.109). Students' subject choices can be influenced by several different 'spheres of influence' (individual, family, peers, and institutions) and the relative weight of these can change over time. These different elements were used to disentangle the effects of institutional habitus from individual and family habitus (Reay, et al., 2005, p.59). This formulation of institutional habitus and its 'interrelated elements' have been especially helpful to guide my analysis of school practices. The coding framework for *institutional habitus* which was applied to student focus group transcripts, teacher interview transcripts, field notes, school websites and recruitment materials can be found in Appendix L. The coding framework shows the frequency of each of these codes within the data.

This chapter, and the next one, extend the literature on the role of schools in students' subject choices by exploring the relationship between institutional habitus and subject-specific school practices. Both chapters challenge the notion of 'free choice' in terms of students' post-16 subjects and explore the role that schools play in shaping these choices. Each of the school practices I will discuss had the potential to restrict or support student participation in more 'academic' or prestigious subjects generally as well as physics and modern languages specifically. The institutional habitus lens draws attention to students' perceptions, expectations and choices which relate to and play their part in reproducing social structures. Bourdieu's concept of institutional habitus can help to illustrate how various school practices make students' choices unthinkable, possible or probable (Bourdieu 1984).

This chapter begins with a discussion of the 'cultural and expressive characteristics' of each school, the different ways that the schools present themselves through their websites, recruitment materials and mission statements. These materials, along with the attitudes of the teachers and students, are one expression of the internalised values, 'tastes and dispositions' which are woven throughout many of the organisational practices at the schools. The rest of the chapter will address how each school's institutional habitus was woven throughout their curricular offers and guidance for post-16 options, drawing more extensively on interview and focus group data. Subject-specific selective practices in physics and modern languages will be explored in greater depth in the following chapter (Chapter 6).

5.2 Cultural and expressive characteristics

In their elaboration of the concept of institutional habitus, Reay et al. describe the cultural and expressive characteristics of a school as "embodied cultural capital" which is expressed through the ways the school presents itself and the attitudes of the teachers and students (2005, p.37). Through institutional habitus, schools convey particular views of higher education to students, including 'tastes' for specific institutions, qualifications and pathways (Smyth & Banks, 2012). By drawing on information from school recruitment materials as well as comments from teachers, I examine how the schools present themselves, their views of higher education and expectations of their students. These tastes and dispositions influenced other school practices, curricular offers and guidance which are discussed later in the chapter.

5.2.1 Elmwood Independent Boys' School

Elmwood Independent Boys' School is a single-sex, selective, independent school in London with a diverse multi-ethnic student population and a sixth form of roughly 300 boys. Elmwood's website describes their location in London as one of their "greatest strengths" which connects them with prominent and influential cultural, political, educational, business and professional institutions. These connections provide the school with extensive social capital and brings in a variety of high-profile speakers including politicians, lawyers, scientists and published authors. There is also a thriving alumni network which hosts regular social and networking events at the school.

Elmwood's website describes the school as "unashamedly academic" and advertises that 90 percent of their pupils attend Russell Group Universities and 24 percent take up places at Oxbridge. Most of the students that I interviewed not only plan to attend university but specifically, Russell Group universities after sixth form. It was not a question of whether they would attend university but which university and what course. All the teachers' academic qualifications and universities are

listed on the school's website next to their names and a high proportion of the school's staff attended Oxford and Cambridge as well as other Russell Group universities. It was apparent from the focus groups and interviews that most students at Elmwood would not be the first generation in their family to attend university and, as a result, students could draw on their parents, siblings and other social contacts for advice about specific university courses and career pathways. As other researchers have argued, this knowledge of higher education institutions, university courses and the application process as well as social connections represent forms of cultural and social capital commonly held by more privileged families (Lamont & Lareau, 1988; Smyth & Banks, 2012).

Elmwood's vision statement describes their approach as "outward-looking and forward-thinking" and most of the school's numerous enrichment activities incorporate an element of community engagement. The school is particularly proud of their annual charity appeal, organised by students, which raises money for organisations voted on by the students and teachers. Elmwood also participates in international essay-writing, debating competitions, drama and theatre programmes which aim to develop "confidence, independent thinking, resilience". The drama department stages three theatrical productions every year in the school's dedicated auditorium fitted to high specifications. In addition, Elmwood regularly competes at regional and national competitions in football, basketball, cricket and water-polo and offers a wide variety of 'more specialised minor sports' including sailing, fencing, squash and a dozen others.

5.2.2 Birch High School

Birch High School is a co-educational (mixed), 13-18 Catholic High School located in a mid-sized town in the West Midlands. The school sits on a small hill in a modern building located in a leafy suburban area and surrounded by detached and semi-detached houses. The student population is predominately White and middle-class. The Assistant Principal (Ms. BL) describes the student population as coming from predominately "semi-skilled backgrounds" with a small minority in the "professions" such as medicine and law. The proportion of students eligible for free school meals and statements of special educational needs at Birch were both well below the national average.

Birch is proud of their academic attainment which is well above both the national average in both the school and sixth form. Banners and an awards case in the school's lobby showcase their students' achievements in STEM subjects and alumni who have gone on to study at prestigious universities. Birch has a relatively large sixth form with roughly 250 students. Over 25 percent of their students go on to top universities including Russell Group institutions, and an increasing number of students are pursuing higher level apprenticeships. The school maintains close

connections with local universities around the West Midlands, specifically Russell Group institutions, and offers school trips to visit universities throughout the year.

Upon entry at the school in Year 9, students at Birch are placed into three separate guided pathways to follow either an academic, vocational or combined curriculum. Students with high prior attainment from Key Stage 3 are placed on the academic pathway, which is called the 'Russell Pathway' in printed recruitment materials. During our interview, teachers often referred to the students on this pathway as the 'Russell Group' when discussing the different kinds of support available to students. Students on the academic 'Russell Pathway' referred to themselves by this name as well. Birch's guided pathways are discussed in greater depth later in this chapter in the section on advice and guidance.

5.2.3 Ashford Academy

Ashford Academy is an average-sized co-educational secondary school in the West Midlands region of England. The sixth form is relatively small with roughly 150 students. On its website, the school describes itself as an "inclusive school where we work together so that all aim high and achieve their very best". Although Birch High School and Ashford Academy are in the same town in the West Midlands (roughly 5 kilometres apart), Ashford has a much higher proportion of students eligible for pupil premium and free school meals, both indicators of economic disadvantage. The school sits between two large council estates where many of the students live. Both teachers interviewed described the area as 'quite deprived' and mentioned that many of the students come from families with a single-earner or where neither parent is working.

According to the Office for Students (OfS), the postcode where Ashford is located is in the lowest quintile for adult higher education qualifications and in the second lowest quintile for young people's participation in higher education using the POLAR3 classification. Nonetheless, university pathways were heavily promoted through the school's guidance and the sixth form reception area has one wall devoted to alumni from the previous year group who are currently studying at university. The display features a school portrait of each former student and lists their degree course and A-level subjects. The students I interviewed held a wide range of different plans and aspirations for after sixth form and most students were taking a combination of A-level and BTEC qualifications. In the sixth form, student attainment in A-levels and academic qualifications is just below the national average. Conversely, attainment broad vocational qualifications and occupational qualifications ('Tech Levels') are both several points above the national average and compared to other state-funded schools in the local area.

While the school has generally performed very well on vocational qualifications, pressure from government policies has meant that Ashford has had to shift their focus towards a more traditional academic curriculum. Students are strongly encouraged to complete an EBacc combination of subjects including English, mathematics, science, a modern language and a humanity subject. The EBacc was mentioned in every single interview and focus group that I conducted at Ashford, mostly without prompting. I would argue that the combination of these internal and external pressures on the school has created a 'conflicted habitus' where the school is trying to adapt to shifts in policy while also responding the different and diverse preferences and 'tastes' of their students.

5.2.4 Daffodil Girls' School

Daffodil Girls' School is a state-funded girls' school located in an urban area of North London, well connected to Central London by public transportation. The school is split onto two sites, a lower school for Years 7 to 11 (ages 11 to 16) and the sixth form centre for Years 12 and 13 (ages 16 to 18). Although Daffodil has had a sixth form for a long time, new buildings were constructed in the past five years to accommodate the growing sixth form which had around 150 students at the time of this study. Teachers described the area as being 'quite deprived' and the proportion of students who have been eligible for free school meals in the past six years is well above the national average. Students come from a broad spectrum of social and ethnic backgrounds. The proportion of students from minority ethnic groups and students who speak English as an additional language are both well above the national average. School performance measures show that pupils who speak English as an additional language make more rapid progress compared to other pupils nationally and the teachers were very proud of their literacy programmes.

The school's location near Central London gave Daffodil access to a wide range of resources for enrichment and professional development opportunities for the teachers. The teachers that I interviewed were active in discipline-specific teacher networks and regularly attended events at the Institute of Physics (IOP), SOAS and other London-based institutions. In addition, Daffodil offered numerous extra-curricular activities for careers guidance, particularly in STEM careers, including a weekly assembly where scientists from nearby London universities and research centres gave presentations about their work. The school also participated in mentorship schemes which were a vital source of information for students about careers and degree programmes as well as contacts for finding work placements.

Daffodil's website describes their mission is to "provide opportunity for academic success in a warm and friendly environment… through high teaching standards and exceptional pastoral care". Daffodil's latest Ofsted report also stated that, "leaders at all levels have created a school where

pupils are happy, confident and safe, at the same time as being academically successful". All the students that I interviewed commented on how comfortable they felt at Daffodil. Some of the girls had tried other sixth forms but decided to stay because they felt more supported at Daffodil.

> "I actually went to [Other Sixth Form College] for about a week... But it's just, I think, there were so many people, I just couldn't take it. I think I preferred the personal touch that [Daffodil] gives you, you know? I think because it's a smaller school, the teachers get to know you better and you know like what you're actually capable of so, I think I preferred this environment." (Teresa, Physics Focus Group, Daffodil Girls' School)

Daffodil has a good record for progression into higher education and employment. The proportion of students at Daffodil who go on to higher education is well above the national average (75 percent in 2017) and even higher for students from disadvantaged backgrounds (82 percent in 2017). Government data from the most recent years shows that a high proportion of Daffodil's students have been successful in gaining places at high tariff universities, including Oxbridge and Russell Group universities. A smaller proportion of students at Daffodil (5 percent in 2017) have also been successful in obtaining competitive degree apprenticeships and employment.

5.2.5 Cedar Sixth Form College

Cedar Sixth Form College, located in London, was established as a 16-19 sixth form college in the 1970s on the site of a former grammar school. This history is described on the college's website in detail and displayed on the walls of the reception area. The college has always had a close relationship with two single-sex secondary schools, one girls' and one boys', which formerly contributed the majority of students. Today, in addition to those two schools, Cedar's roughly 1,200 students come from a mixture of single-sex and co-educational as well as state-funded and independent schools from eleven local authorities. Consequently, the students that I interviewed had a wide range of different experiences from their primary and secondary education prior to beginning their studies at Cedar Sixth Form College. The college is well connected to Central London by public transportation and several students that I interviewed mentioned travelling over an hour to the College every day.

Unlike lower secondary where academic selection is prohibited, there are no restrictions on selection for state-funded sixth forms. Commonly, five GCSE passes is the minimum requirement. Cedar requires 7 GCSE passes to enter the 'A-level programme' consisting of 3 A-levels and 5 GCSE passes to enter the 'Applied General Qualifications' including a combination of A-levels and BTECs. Academic attainment at Cedar is above the national average and most students achieve better

grades than those predicted from their prior GCSE attainment, though the student attainment at entry is also well above the national average. Over ninety percent of the students at Cedar go on to higher education every year with the rest entering higher level apprenticeships or employment. The college has an extensive alumni network who are often invited as guest speakers to talk about university and career pathways.

Out-of-school enrichment is required for the first-year students in Year 12 with a heavy emphasis on developing leadership skills and supporting university applications. The Medical/Dental/Vet society was especially popular as well as the Fair-Trade Society, Duke of Edinburgh Award and recreational sports. Students could join the active Student Council to represent their peers and the student ambassador scheme to support teachers during induction and open evenings. Cedar's highest attaining students are placed in the college's 'Oxbridge Programme' which provides those students with additional reading lists as well as workshops on writing personal statements and preparing university applications. The enrichment activities and alumni connections were considered a significant benefit by many of the students that I interviewed.

5.2.6 Summary

This section has explored the different ways that schools present themselves through their websites, recruitment materials and mission statements. Each of the schools promoted academic achievement and university progression in different ways, conveying 'tastes' for specific institutions, qualifications and pathways (Smyth & Banks, 2012). As an independent school, Elmwood attracted a high-attaining, affluent student intake and emphasised elite Oxbridge and Russell Group universities in their published school materials and extracurricular offers. In contrast, the state-funded schools with less affluent and lower attaining student intakes, Ashford and Daffodil, placed greater emphasis on inclusion and career progression. Birch and Cedar both had student intakes with higher average attainment and provided differentiated support for students within the school with special attention given to the highest attaining students within the school. In terms of geographic location, the London schools (Elmwood, Daffodil, Cedar) tended to have access to a wider range of resources including continuing professional development for staff and enrichment activities for students. In contrast, teachers and students at the two Midlands schools (Ashford and Birch) reported less interaction with external organisations. The schools and college in this study represent contrasting examples of institutional habitus reflected by their educational status, student intake and geographic location. The following sections will analyse how the schools' internalised 'tastes and dispositions' were enacted through their curricular offers and advice.

5.3 Curricular offers: limiting the field of possibilities

In this section, I examine how schools made decisions about their curricular offers. Reay et al. (2005) describe curriculum offer as an integral part of institutional habitus which underpins the educational status of institutions. As discussed in Chapter 1, all state-funded secondary schools in the UK are required to teach to the National Curriculum until the end of Key Stage 4 (DfE, 2014b). After age 16, students have more flexibility and can study a wider array of academic and vocational qualifications. The subjects and qualifications that students complete at secondary school can have implications for their future academic and career pathways. Academic A-levels are the most common route into university but some subjects, referred to as 'facilitating subjects', are perceived to provide better preparation for further academic study at university including mathematics, English Literature, physics, biology, chemistry, geography, history and modern or classical languages. The Russell Group advises students to study at least two facilitating subjects if they are unsure which degree they want to study (Russell Group, 2016, p.29). Student attainment in facilitating subjects at both GCSE and A-level are also used by the Department for Education (DfE) as performance indicators for schools and colleges (DfE, 2014c). The most recently introduced of these performance indicators is the proportion of students obtaining the grades AAB in at least two facilitating subjects (DfE, 2014c) (see Section 1.4). Based on a review of guidance published by individual Russell Group universities, research by Dilnot (2015) identified an additional list of 'less useful subjects', mainly technical and vocational subjects, which are considered less suitable preparation by some universities. In more recent quantitative study, Dilnot (2018) found that students who studied these 'less useful' subjects were more likely to be from the most disadvantaged groups and less likely to attend university. In other words, not all subjects and qualifications hold the same weight and policy shifts have played a role in determining what forms of knowledge are considered valuable and legitimate.

The schools and college in this study offered a range of different subjects at Key Stage 5, up to 30 different post-16 qualifications were offered at Birch High School and Cedar Sixth Form College while the other three schools offered around 20 different qualifications (see Appendix K). All the schools offered the facilitating subjects; however, the greatest variation was between the number of modern languages and additional options available. These differences highlighted the potential for schools to reproduce existing inequalities. As the research literature has revealed, independent and selective schools in the UK tend favour traditional academic subjects, including physics and modern languages, while state-funded schools are more likely to offer newer subjects, such as media studies and business studies, as well as vocational qualifications (Abrahams, 2018; Jin, et al., 2011; Gill, 2018a). In addition, state-funded schools with more advantaged intakes are more likely to offer

academically selective subjects and less likely to offer technical or vocational subjects (Anders, et al., 2018; Dilnot, 2016; Iannelli, 2013). The analysis in this section provides some insights into how the schools' institutional habitus influenced their curricular offers.

5.3.1 Independent schools: 'Anticipating the choice of traditional subjects at traditional universities'

In this study, schools with the highest attaining and more advantaged student populations offered the highest number of 'traditional' academic subjects and the most options for modern language A-levels. Elmwood Independent Boys' School offered the most traditional curriculum which emphasised academic subjects. The most popular subjects in the sixth form are mathematics, economics, chemistry and physics. About half of the subjects offered in the sixth form were "Pre-U" qualifications, an alternative post-16 qualification intended to offer better preparation for university through greater depth into course material and more challenging exams. These qualifications, along with other aspects of the school's institutional habitus, promoted a culture of 'eliteness' with a focus on 'challenging' academic subjects and elite universities (e.g. Oxbridge and Russell Group).

> "I mean, it is exactly what it says, Pre-U, it's a pre-university qualification… It was designed by the Russell Group… along with some of the elite schools who put it together because the courses at those universities do demand a lot more wider reading and this kind of thing." (Mr EM, French Teacher, Elmwood Independent Boys' School)

Elmwood had a strong language programme throughout the school. There are 13 language teachers on staff at Elmwood as well as 4 language assistants and many had been working at the school for over a decade. The school also had a dedicated computer lab for languages where students could access audio and video resources. All students learn French and Latin from Years 6/7 (ages 10-11) and are required to study a language up to Year 11 (age 16). Languages held a high status at the school and French was the only subject to be set by ability at GCSE. Language study was further embedded into the school culture through Elmwood Independent Boys' School's extracurricular offers. Over half of the students that I interviewed at Elmwood had participated in language study trips both organised through the school and independently. For example, one modern language student (Jay) had done two language-related work experiences, one at a translation centre in London and another at a hospital in Germany. In the sixth form, there were five modern languages on offer including French, German, Russian, Mandarin (Chinese) and Spanish as well as two classical languages (Latin and Greek). Unsurprisingly, the high status that languages held at Elmwood had a positive impact on post-16 participation; French was among the top ten most popular subjects in the sixth form after maths, economics and science subjects.

Besides the facilitating subjects, Elmwood offered 8 additional options in the sixth form. The rationale for choosing to include some subjects and not others in the curriculum represents an "integral part of institutional habitus" and "underpins the educational status of institutions" (Reay, et al., 2005, p.44). One subject which distinguished Elmwood from the other schools in this study was classical civilizations, in addition to classical languages. At GCSE, classical civilizations was one of the available options for fulfilling the humanities requirement (see Appendix K). However, classical civilizations has consistently been one of the least popular A-levels over the past few years. Classical civilizations is traditionally associated with both private education and the rationale of accessing 'high culture' (Mitchell, 2003) but has steadily been declining in popularity. Recent figures show that the classical civilizations A-level is studied by only 1.3 percent of students in England, mostly at independent and selective schools (Gill, 2018b).

On the other hand, one subject that Elmwood did not offer was A-level psychology which has been growing in popularity in recent years and is currently the second most popular A-level subject in England after mathematics (Gill, 2018b). When I asked Elmwood's Deputy Head of Sixth Form (Mr. EL) whether the school had considered offering psychology, he explained:

> "We don't offer psychology A-level, I mean, I think we try to keep our A-level offer not too broad because, for one, it keeps subjects that have decent numbers in there and stuff. And also, if you start running psychology then you need a psychology teacher and what else do they teach? I think from a staffing point of view the numbers are about right. But um, I think more boys should do psychology, I think a lot of them would enjoy it. I think if they realised that a lot of it is to do with neuroscience these days, I think they'd probably jump on that a bit more." (Mr EL, Deputy Head of Sixth Form, Elmwood Independent Boys' School)

As Mr. EL explains, the decision not to offer psychology A-level was due to a perceived lack of student interest and concerns about staffing a subject with such small numbers, which does not appear to be a concern for classical civilizations A-level. Although it is not a 'facilitating subject', psychology is one of the subjects which is not included on any of the non-preferred lists but may be classified by some Russell Group universities as an appropriately academic subject for university entry (Dilnot, 2015). However, Mr. EL's comments imply that Elmwood's leadership does not consider psychology as academically rigorous as 'natural science' disciplines, such as neuroscience, which Mr. EL considered to be a more suitable option for Elmwood's students. The examples of classical civilisations and psychology A-levels illustrate how Elmwood's curriculum offers appear to "anticipate the choice of traditional subjects at traditional universities" (Reay, et al., 2005, p.44).

5.3.2 State-funded schools: 'We need to have a good range of facilitating subjects'

Meanwhile, the state-funded schools offered a wider range of options which included a combination of 'facilitating subjects' as well as 'newer' subjects, including psychology, and vocational qualifications such as BTECs. All three state-funded schools offered a combination of academic and vocational qualifications, though Birch High School and Daffodil Girls' School placed greater emphasis on facilitating subjects and academic A-levels compared to Ashford Academy. These differences broadly reflected the socioeconomic background of the student intake at each of the schools. Although Birch High School and Ashford Academy are located in the same town in the West Midlands, Ashford Academy has a much higher proportion of students eligible for pupil premium and free school meals, both indicators of economic disadvantage. Daffodil Girls' School is located in London and has a high proportion of students from lower socioeconomic backgrounds, though not as high as Ashford Academy.

Birch High School offered 28 distinct post-16 qualifications which, according to their sixth form prospectus, are intended to "provide an even balance of academic and vocationally oriented options". Though when I asked the Head of Sixth Form (Ms. BL) about the school's curricular offers, she explained that the school has "a mainly academic curriculum" and commented that the school prioritises facilitating subjects, including mathematics and science, to provide better preparation for university.

> "I guess, from a sixth form point of view, one of our biggest determiners are the facilitating subjects because we need to have a good range of facilitating subjects because the vast majority of our cohort will go on to higher education." (Ms. BL, Head of Sixth Form, Birch High School)

Daffodil Girls' School also prioritised facilitating subjects and academic A-levels in their curricular offers in the 22 different qualifications offered in the sixth form. A recent study by Anders et al. (2018) found that students at single-sex schools are more likely to study academically selective subjects. Daffodil offered fewer vocational and applied subjects at both Key Stages 4 and 5 compared to Ashford and Birch (see Appendix K). In contrast to Elmwood, psychology was the most popular subject at Daffodil and one of the few to be taught in two classes to accommodate all the students. Politics and economics A-levels were discontinued recently due to recent budget cuts, as were many BTECs and applied A-level subjects including business, music and drama.

By comparison, Ashford Academy offered 22 distinct qualifications in their sixth form, over half of which were applied and vocational qualifications. Most students that I interviewed at Ashford

Academy were taking a combination of A-levels and BTECs. BTEC qualifications in business studies, catering and health and social care were especially popular at Ashford. Business studies was so popular it was the only subject in the sixth form with two classes to accommodate all the students.

Mathematics and science A-levels were reasonably popular (compared to other subjects) at the state-funded secondary schools in this study, especially at Birch and Daffodil. Mathematics, chemistry and biology A-levels consistently had between 20 to 30 students, between 20-25 percent of the cohorts, starting each subject in Year 12 at all three schools. While most of these students continued through Year 13 at Birch and Daffodil, the numbers appeared to drop significantly between Years 12 and 13 at Ashford, down to 10 in biology and as low as 5 students in chemistry and mathematics. By comparison, A-level physics had much lower numbers at each of the schools with around 9 students (10 percent of the cohorts) each at Birch and Daffodil and as few as 2 students (4 percent of the cohort) at Ashford. However, unlike the other subjects, most students who started physics at Year 12 continued the course through Year 13. Despite low numbers, A-level physics was offered every year at all three state-funded schools.

While mathematics and science subjects were offered every year, the provision of modern languages varied widely between the schools. At Birch High School, teachers explained that modern languages were considered relatively high-status subjects at the school. At GCSE, a modern language was compulsory for the highest attaining students on the school's academic 'Russell Pathway'. One point which made Birch High School distinctive from the other state-funded schools was offering German rather than Spanish as a second language besides French. This was also linked to their commitment to offering an 'academic' curriculum, as the modern languages teacher (Ms. BM) explained in our interview:

> "I think that other schools that aren't perceived as so academic, as in the grammar school system, I think they go for the French and the Spanish option. Umm… we have the German and French option, but we don't do Spanish." (Ms. BM, Modern Languages Subject Leader, Birch High School)

Birch High School's preference for 'academic' facilitating subjects extended to their decision to offer A-level modern languages despite having low numbers. However, comments from two Birch teachers about cost and viability suggest that modern languages may be in a vulnerable position and at risk of being cut in the future.

> "I'm fortunate in this school they do value languages so we're very fortunate. Um… other schools I've worked at don't value languages so therefore, for example, with the A-level

> numbers, if we have two or three students some schools will say, no, we're not running the course at all." (Ms. BM, Modern Languages Subject Leader, Birch High School)
>
> "As I've said, we've traditionally always made sure that we had a good range of facilitating subjects, we offer virtually all of the facilitating subjects. As a sixth form, we have decided to continue with modern foreign languages. But we get very small numbers for those groups… and we've had to merge a group in, so the AS and the A2 is getting taught at the same time which I think must be very difficult for the MFL staff… It's about whether it's viable and whether cost-wise we can make that happen." (Ms. BL, Assistant Principal, Birch High School)

In stark contrast, Ashford Academy and Daffodil Girls' School did not have any students studying modern language A-levels the year this study was conducted, though the course had been offered in previous years. At Ashford, the modern language teacher (Ms. AM) explained that this was due to a lack of interest, no students had expressed an interest that academic year. Whereas at Daffodil, a few students had expressed an interest, but the school did not run courses with fewer than three students due their recent budget cuts according to Daffodil's modern language teacher (Ms. DM). Both Ashford and Daffodil taught French and Spanish at GCSE but modern languages were not compulsory for any students.

A lack of options for modern languages at GCSE and A-level was a common complaint among the students that I interviewed and several (10 out of 67) students at Ashford and Cedar said that they had been 'forced' to study a language that was not their desired one. At secondary school, French is the main language taught at over 90 percent of state-funded schools in England followed by Spanish (around 70 percent) and German (around 40 percent) (Tinsley & Dolezal, 2018, p.10). This means that most students have only a very narrow range of options for studying modern languages and rarely get a 'choice' of which language to study. The narrow range of modern language options in schools has been highlighted in a recent study by Parrish (2019) who surveyed over 650 students (age 14-15) and around 190 teachers in secondary schools throughout England. Parrish found that student respondents showed interest in a more diverse range of languages than is currently on offer in schools and their reasons for wanting to study these languages commonly related to travel or something inherent in the language itself. Despite this apparent student interest, the staff surveys suggest that there are substantial barriers to changing the range of languages on offer including limited staff expertise, timetabling and curriculum planning (Parrish, 2019, p.16).

Staffing for modern languages was a particular challenge at the state-funded schools, mainly Ashford Academy. Birch High School had 2 full-time modern language teachers, one who specialised in

German (Ms. BM) and another who teaches French. Neither of the modern language teachers at Birch had responsibilities for any other areas of the curriculum beyond their subject. Meanwhile, Daffodil Girls' School had 5 languages teachers on staff but all of them had other responsibilities in the school, one was the Deputy Head of Sixth Form and another was responsible for careers advice. In contrast, Ashford Academy only had one modern language teacher (Ms. AM) who was responsible for both Spanish and French at GCSE and A-level as well as leading the PSHE[2] curriculum. As the only modern language teacher at Ashford, Ms. AM described how she struggled with a heavy workload and limited resources.

> "So, our timetables are absolutely rammed… I think that if you had fewer lessons on your timetable, and more time to prepare, because when you've got six lessons a day back-to-back, I don't think you give your best to the kids." (Ms. AM, Head of Modern Languages, Ashford Academy)

Ms. AM's comments highlight the challenges that many modern languages teachers face at state-funded schools, particularly schools with a limited budget for enrichment and staff development. These frustrations seemed to impact on students' learning and motivation as well.

Staffing and resources not only dictate a schools' capacity to offer courses but also enrichment activities that can support learning. For example, Birch's Head of Languages (Ms. BM) organised numerous language enrichment activities including optional afternoon practice sessions, language exchange trips and work abroad placements for modern language students. One of Birch's A-level French students, Christine, had done a work placement in France the previous summer working as a server in a café. At the other extreme, Ashford's Head of Languages (Ms. AM) had not been able to offer a language exchange trip for the last two years and, throughout our interview, listed several enrichment activities that had been discontinued for various reasons. Language exchanges had been stopped due to the increasing restrictions on hosting exchange students and language ambassador schemes had been discontinued due to cost.

Teachers at Ashford and Daffodil expressed frustration over the lack of support but felt the lack of interest in modern languages was mainly linked to the socioeconomic background of the students at the schools. The socioeconomic background of the schools' intake also influenced the languages that the schools offered, both Ashford and Daffodil offered Spanish as a second language (besides

[2] Personal, social, health and economic (PSHE) education is a school subject required by the national curriculum that focuses on supporting students' health and well-being.

French) because they felt it would be more relevant to their students who are more likely to go on holiday to Spain.

> "Especially in our school as well, a lot of our students don't have lots of money, you know, and that is an issue… Like I said, we're not a middle-class school, and languages, in my opinion, I know when I went to university everyone else was from a middle-class background." (Ms. DM, Head of Languages, Daffodil Girls' School)

> "Because there isn't the money to travel overseas sometimes our kids, they struggle to see the relevance for that. And I think in a more… in a wealthy area where kids get on a plane and go places. You know, if you've got a middle-class family that goes skiing in the Alps every year, they're going to see the point of French, you know? Whereas our kids are never going to go there, can't afford to go there." (Ms. AM, Head of Modern Languages, Ashford Academy)

These examples illustrate some of the ways that state-funded schools were more constrained than independent schools by funding and staffing concerns. Although the attention and resources dedicated to the different qualifications did vary, the three state-funded schools in this study are discussed together to show how their curricular offers differed from Elmwood Independent Boys' School and Cedar Sixth Form College. One recent survey of modern languages education estimates that around a third of state-funded schools and a quarter of independent schools have difficulties recruiting staff for modern languages (Tinsley, 2019, p.14). This means that state-funded schools must be more strategic about their curricular offers than independent schools which then limited the options available to students. Modern language A-levels were particularly vulnerable, unlike physics and other science subjects which were offered every year at all three state-funded schools.

5.3.3 Cedar Sixth Form College

Cedar Sixth Form College offered 30 different post-16 qualifications including A-levels, BTECs and other vocational qualifications. As a sixth form college, Cedar had much larger year groups and offered most subjects in multiple timeslots. At the time of this study, the most popular subjects at Cedar were mathematics and science, with around half of the cohort (~300 students) taking mathematics A-level and around a third (~200 students) in each cohort taking biology and chemistry A-levels. A-level physics was considerably less popular at the college with only around 13 percent of the cohort (~80 students) entered for the exam in the year this study was conducted.

The college also offered vocational qualifications, including BTECs, though the Assistant Principal (Ms. CL) explained that their curriculum emphasised academic A-levels, both facilitating subjects and

'newer' subjects like psychology and sociology. Psychology was especially popular at the college and the Assistant Principal (Ms. CL) commented that it was 'massively oversubscribed' and the subject had a little 16 percent (~100 students) entered for the A-level subject in recent years. Compared to the state-funded schools in this study, Cedar Sixth Form College offered relatively few of the 'less useful' subjects identified by Dilnot (2015).

> "…BTEC is very small and we really are more of an A-level kind of college." (Ms. CL, Assistant Principal, Cedar Sixth Form College)

Cedar offered several languages including 4 modern languages (French, Spanish, German and Italian) and one classical language (Latin). Out of these, A-level French had the largest cohort with around 20 students in each year (3 percent of the cohort). The German and Italian A-level courses had relatively small cohorts with two students in each. Funding for Italian was provided by the Italian embassy which made the course financially viable for the college despite low numbers.

> "Languages can have small classes so German is traditionally had uh, smaller classes. Um but uh, I think the others, Spanish and French are quite healthy. We do Italian, and the teacher who teaches that comes from the Italian embassy so in fact… they have small numbers but we're not paying for them so that's okay, isn't it?" (Ms. CL, Assistant Principal, Cedar Sixth Form College)

Since Cedar attracts students from 75 different secondary schools, the students had a range of different experiences from their primary and secondary education prior to beginning studies at the college. However, one theme which emerged across the different groups that I interviewed was that an overwhelming number recalled a high turnover in modern language teachers during their GCSEs, even though they had attended different secondary schools. The following comments by Jennifer and Claire illustrate how this 'constant swapping of teachers' negatively impacted their motivation to learn languages:

> "We had a string of teachers that, like kept leaving or got pregnant and it was just really heart-breaking, and it never really felt like a subject that I knew like really well. There was always like, oh well is the teacher going to leave? Like in my final GCSE year, my teacher retired halfway through and left us with this other teacher who, by this point, no one really respected her because we'd gone so long with one teacher and even then we still sort of felt like we got away with a lot of things. Then it was just hard to actually take it seriously and really appreciate it." (Claire, Other Mixed Focus Group, Cedar Sixth Form College)

> "I chose like Spanish but literally from Year 7 to Year 11 it was just like a constant swapping of teachers and one was in, one wasn't in, you'd get a new one… I feel like, the whole department knew that the kids don't really like or take it seriously so they gave up before they could even start to get us motivated… Like they didn't bother so none of us bothered either and if we did get a new teacher then there was like zero respect for any of them." (Jennifer, Other Mixed Focus Group, Cedar Sixth Form College)

Despite attending different secondary schools, it is striking how similar Claire's and Jennifer's accounts of studying modern languages are so similar. The words they use to describe their experiences evoke a sense of sadness ('heart-breaking') and illustrate how these students interpreted the constant staff turnover as a reflection of the relative importance of modern languages compared to other subjects. Moreover, when considering sixth form options, 2 (out of 6) A-level French students at Cedar Sixth Form College said that they had moved to another school when their previous schools announced that they were not going to offer the subject.

> "Yeah, I left my school, they promised us, I think they were kind of like, just stringing us along because they would be like, oh don't worry, we'll definitely run it." (Alice, French Focus Group, Cedar Sixth Form College)

> "I actually uh, left my old sixth form because they weren't going to offer French because no one wants to do it… That's why I came here actually." (Samantha, French Focus Group, Cedar Sixth Form College)

Of course, moving changing schools is not possible for all students. There are some regions where there are more options for sixth form than others and higher attaining students are more likely to change schools for A-levels.

5.3.4 Summary

In their study of school examinations in the French educational system, Bourdieu and Passeron (1990) discuss how inequalities related to socioeconomic status (social class) are manifested through the 'organization and functioning of the school system' since it establishes an arbitrary hierarchy of disciplines, with more 'abstract' subjects have become legitimated as superior forms of knowledge while concrete or 'technical' subjects are devalued. Bourdieu and Passeron (1990) argue that this hierarchy is 'retranslated' through the educational status of institutions since higher status academic subjects, which provide their students with a better chance of entering higher education, are more common at independent and selective schools. In this way, a school's curricular offers represent an integral part of its institutional habitus.

Providing a curriculum which prepared students for university appeared to be a priority for the schools in this study, as illustrated by the resources each school devoted to facilitating subjects. I have highlighted how Elmwood Independent Boy's School promoted traditional academic subjects through offering Pre-U qualifications, classical and modern languages as well as their decision not to offer psychology. Meanwhile, the state-funded schools, which catered to more diverse student intakes, were often limited by resources and the level of interest in specific subjects. All of the state-funded schools offered most 'facilitating subjects' at A-level, though modern languages provision was inconsistent. Modern language A-levels were particularly vulnerable at the state-funded schools, unlike physics and other science subjects which held a higher status in the curriculum as 'core' subjects in compulsory education. Therefore, I have given very little attention to physics in this chapter because the A-level was offered every year at all the schools, even with low numbers. Moreover, the introduction of a recent school performance measure of 'AAB in at least two facilitating subjects' has likely placed school sixth forms under increasing pressure to restrict their subject offer to traditional subjects with a lower priority given to providing 'newer' and vocational qualifications, which are taken disproportionately by students from lower socioeconomic backgrounds and inversely correlated to university progression (Dilnot, 2018; Vidal Rodeiro, 2007; Iannelli, 2013).

5.4 Support and guidance for post-16 choices

In this section, I analyse the guidance and support provided at each of the schools for post-16 choices. Previous research using an institutional habitus lens has highlighted the significance of the guidance facilities for students' educational choices (Smyth & Banks, 2012; Reay, et al., 2005; McDonough, 1997). Reay et al. (2005) argue that the different institutional habituses can transform into widely differing advice practices within institutions (p. 39). Based on their study of four USA high schools, McDonough (1997) argued that the *amount* of guidance available to students is the key factor for university progression since schools attended by middle-class students tend to provide more guidance counselling and support through the university application process. These schools often draw on their extensive cultural capital and understanding of the 'rules of the game' to help their students 'stand out from the crowd' on university applications. In contrast, the schools in McDonough's study in low-income areas provided less structured guidance and focused on providing students with 'realistic' options. Other studies in the UK have demonstrated that class-based institutional habitus is not necessarily uniform within and between schools. For example, Reay (1998) found that schools in disadvantaged areas provided little guidance for most pupils but offered more detailed advice and support for a small number of high attaining students within the school.

While Reay and McDonough focus mainly on the potential for schools to reproduce existing patterns of inequality related to socioeconomic status, others have pointed out how schools can also disrupt those patterns of inequality. Guidance can play an important role in challenging classed expectations as guidance counsellors are a vital source of information for students and families with less experience at higher education (Smyth & Banks, 2012; Kolluri, 2019). Therefore, while institutional habitus can reproduce patterns of inequality, it is not deterministic. The analysis in this section provides some insights into the ways that the schools' institutional habitus influenced their advice and guidance, focusing on the ways that advice and guidance was differentiated for the various groups of students within the school.

5.4.1 Elmwood Independent Boys' School

Careers guidance begins early at Elmwood when the students enter the school in Year 7 (age 11) and is woven throughout the curriculum. From the time they enter the school, students are evaluated by their teachers on 'effort' and 'engagement' and these teacher evaluations are used to advise students on their sixth form subject choices. Every student has an interview with a dedicated careers advisor once a year with drop-in appointments after that. In Year 11, the appointments usually discuss sixth form options, and in Year 12, appointments tend to focus on university applications. In addition, Elmwood hosts a series of formal events, a higher education evening and parent breakfasts, where students and their parents can ask questions about universities. The school also draws on their extensive social capital and location near Central London to attract speakers to give presentations about job opportunities in different sectors, however, most guidance is focused on university progression. The Head and Deputy Heads of Sixth Form have an 'open door' policy for parents to discuss students' subject choices and post-school aspirations. Elmwood's thriving alumni network also host events to share information, advice and guidance for applying specifically to Oxbridge universities.

Sixth form subject choices are submitted in the middle of Year 11 after students take their mock GCSE exams. Around this time, students are provided with a curriculum booklet which has information about the available options. The school hosts a parents evening where students and parents can sample lessons and talk to the subject leaders. The sixth form booklet, which is published on the school's website, states that students can either study 4 A-level or Pre-U subjects or, alternatively, 3 subjects with an additional qualification such as, Information and Communication Technology (ICT) or Extended Project Qualifications (EPQs). When I spoke to the Deputy Head of Sixth Form (Mr. EL), he explained that Elmwood's guidance aims to provide students with the best

chance at getting into university. Elmwood also maintains relationships with universities to ensure that their advice is current.

> "The advice tends to be if you can achieve highly in your four subjects, that's impressive and that's a good signal to universities. If doing four subjects is going to cost you any grades, you need to think quite carefully about it… I spoke to someone from Cambridge last year and she did say that she'd rather see a student that does three A-level subjects well and just reads more around their subjects…" (Mr EL, Deputy Head of Sixth Form, Elmwood Independent Boys' School)

Later, I asked whether the school provided any guidance for students who may not want to go to university, and the Deputy Head of Sixth Form (Mr. EL) responded that the main reason why students would not apply for university are 'pastoral reasons' related to finance or not achieving their desired grades.

> "I'd say that ninety-five, ninety-six percent are university bound. We think it could become a little bit less, as apprenticeships become better known to the students, things like degree apprenticeships might become more of a route. But I'd say out of a hundred students in a year group, one or two might not go to university… and even within that, it's often for more sort of pastoral reasons than a deliberate choice. It might be an issue around finance at home or because of pastoral reasons, in sixth form they've just not achieved the grades but there will still be an aspiration to do that." (Mr EL, Deputy Head of Sixth Form, Elmwood Independent Boys' School)

These comments reinforce the notion that progression to top universities is the expected norm, at Elmwood and much of the pedagogic work at Elmwood focuses on progression to elite, high-ranking universities. The school provides a rigorous academic curriculum, extra-curricular activities and a comprehensive guidance programme which help students to 'stand out from the crowd' on university applications.

5.4.2 Birch High School

At Birch High School, students are advised to follow one of three guided pathways (academic, vocational or combined) based on "their preferred way of working, interests, ability and future aspirations". Students with high prior attainment from Key Stage 3 are placed on the academic pathway, which is called the 'Russell Pathway'. At GCSE, students on all three pathways follow a core curriculum which includes English, mathematics, science (separate or dual awards), physical education and religious education. Students on the Russell Pathway were required to study a

modern language and humanity subject in addition to the core subjects to complete an EBacc combination of subjects. Modern languages were not compulsory for students in the vocational or combined pathways. The full list of options for the different pathways is provided in the appendix (Appendix K).

The pathways continue through the sixth form where students on the academic pathway are advised to study at least two 'facilitating subjects' and receive individualised support in guidance from a member of staff who facilitates travel to attend university open days, summer school applications and support for applications particularly for Russell Group universities. According to the Deputy Head of Sixth Form (Ms. BL), increased support for students who might apply to Oxford or Cambridge (Oxbridge) is an area that the school intends to develop further.

Meanwhile, students on the vocational and combined pathways could attend university and careers days organised by the school but did not receive individualised support. These students were guided towards more 'applied' and vocational qualifications, however, at least some parents and students were resistant to this guidance since these qualifications are perceived to be less valuable.

> "BTECs tend to be more like looked down on sometimes. They're not seen as proper qualifications." (David, Other Focus Group, Birch High School)

> "But actually the parents still really struggle with the idea of the Level 3 BTEC being the equivalent to A-level and you know, we've had quite sort of, umm… detailed conversations where they have totally refused that their child could go on a BTEC course." (Ms BL, Deputy Head of Sixth Form, Birch High School)

In the sixth form, all students start with 4 subjects or qualifications and drop down to 3 subjects for the second year. A few students mentioned that timetabling and option blocks played a role in their subject choices. However, this was mainly discussed in relation to their "fourth subject", seen as less important because most universities only require three A-levels for admission.

> "I just had to take history as my fourth because we had to start off taking four A-levels, so I just knew that I was going to drop history… At this school we had to start off with taking four A-levels to start because that's how the pathways worked so, I just picked that was fit in the option blocks, we only had a certain number of options that we could choose from that didn't clash with the time tables." (Elizabeth, Other Focus Group, Birch High School)

Birch has a careers advisor who works at the school two days a week who organises the extensive careers programme which includes workshops on CV writing, mock job interviews as well as support for writing personal statements for university applications. The school also organises careers fairs

and invited external speakers to give presentations on careers in different sectors. Students at Birch High School are encouraged to complete work placements at the end of Year 12. Two students that I interviewed (Kevin and Christine) shared about their work placements during the focus groups. Kevin, one of the A-level physics students, did his work experience at a local engineering firm and Christine, an A-level French student, did a work and language exchange at a café in France which was organised by the Head of Languages (Ms. BM). In sum, Birch High School provides extensive careers support and guidance throughout the school. However, much of this support was focused on high attaining students on the top pathways while students on other pathways were guided towards more 'applied' options.

5.4.3 Ashford Academy

At Ashford Academy, students are divided into two equal bands which are set based on their prior attainment in English, maths and science. The bands are explained on the school's websites but did not come up in any of the interviews or focus groups. There did not appear to be as much differentiation between the bands as there had been at Birch High School, teachers and students did not refer to the bands by name. At GCSE, all students at Ashford are strongly encouraged to complete an EBacc combination of subjects including English, mathematics, science, a modern language and a humanity subject. The school's prospectus explains that completing an EBacc combination of subjects will "provide a foundation for further study… and enable students to keep their options open for a wide range of degree subjects and career opportunities". The EBacc was mentioned in every single interview and focus group at Ashford when I asked about students' experiences at GCSE. During the student focus groups, almost every student that I spoke with said they were told that studying EBacc subjects would help them 'stand out' on university applications, as on student Jessica explained:

> "When they gave us the option blocks they were like, universities see it more if you have a humanity and a language. Yeah, we were urged to pick a humanity and a language, that's why I have French and Geography. It was like, oh if universities want them, I'll do them." (Jessica, Other Focus Group, Ashford Academy)

Compared to the other schools in this study, guidance for sixth form choices was less formalised at Ashford. The school organises a university day where speakers from local universities give presentations about UCAS and the application process. Careers advice and support for university applications was provided primarily by the form tutors. There was a careers advisor who visited the school one day per week and students in all year groups could book appointments, though none of the students that I interviewed had. A few students reported having an interview with the sixth form

staff to help decide their post-16 options, but most students said they made their subject choices 'independently' or by asking their teachers and form tutors about specific subjects.

> "No, when it comes to choosing my A levels and stuff my parents are like, just choose what you want. So, I just sort of do it quite independently. I don't really…for my A levels if I'm struggling at all I just look to my peers, I don't really talk to the staff. I don't know why. I just look to my peers and we normally get through it." (Michael, Physics Focus Group, Pilot Study, Ashford Academy)

> "Yeah, I just do it really independently… You know, I chose mine from what I thought I'd enjoy the most." (Logan, Other Focus Group, Pilot Study, Ashford Academy)

In the sixth form, students typically choose between three and four subjects and are told they can choose between an 'academic pathway' (A-level), a 'vocational pathway' (equivalents) or a combination of the two. Most of the students that I interviewed at Ashford were taking a combination of A-levels and vocational qualifications. BTEC qualifications in business studies and catering were especially popular within the school.

Timetables and option blocks were a major consideration for over a third of the students that I interviewed (6 out of 17), and some students had to choose between subjects if their desired options were offered in the same block. This was potentially problematic for students as it restricts which subjects they can study and, consequently, have implications for the future university and career pathways available (Abrahams, 2018).

> "I mean there is the limits to the option blocks in school. Like, they give you some blocks and you can't have two of those subjects in the same block so, you kind of like, what do I do when two subjects that I want to do are like, you have to just leave one of them behind." (Jessica, Other Focus Group, Ashford Academy)

> "You can't pick Media and Geography. Yeah, it's about what was more important to you and what you'd enjoy more." (Fiona, Other Focus Group, Pilot Study, Ashford Academy)

Students were advised to choose subjects that they enjoyed and that they had the best chance of doing well (achieving high grades). While I spoke with students who were told that they could not take certain subjects because they had not achieved the minimum grade requirements, a few students had also been allowed to take subjects with higher entry requirements, like physics, despite having been in the lower set at GCSE which is explored further in the next chapter (Section 6.2.1). This suggests that teachers played an important role in deciding whether students would be allowed to study certain A-level subjects.

5.4.4 Daffodil Girls' School

At Daffodil Girls' School, careers advice and guidance start in Year 8 and continues to the end of Year 13. The school invites a range of external speakers and organises school trips to learn about university and apprenticeship routes to help students make informed decisions about their next steps. Daffodil actively encourages participation in university open days and taster courses and provides information about how to apply for these programmes.

Two of students that I interviewed at Daffodil had taken part in summer schools for Medicine and Dentistry organised by nearby London universities. One of these girls also participated in mentorship schemes organised by external STEM outreach organisations, meeting weekly with professional women working in science or engineering to discuss potential educational and career pathways. For example, one of the physics students (Teresa) participated in a mentorship scheme which matched her with a professional Civil Engineer as well as a separate scheme that provides tailored support to students from underrepresented backgrounds for finding work placements and writing university applications. Another student (Erin) participated in a pre-dentistry summer school organised by a London university which she learned about from the school's careers advisor. These enrichment activities were particularly influential in students' A-level choices and provided a valuable source of practical information about post-school pathways, including university, apprenticeships and employment.

> "I didn't really know what I wanted to do at first, I thought I wanted to do a physics degree, but I couldn't see how I could use that beyond university. So I decided to look into engineering and… I found out more through a programme called [Programme Name] where they uh, give you a mentor for three months… I think she works in Civil Engineering so I kind of just asked her how did she decide what specialisation to go into because I know that's a tough decision for most engineers. Yeah, so she was the one that I really went to decide what um, type of engineering would suit my interests." (Teresa, Physics Focus Group, Daffodil Girls' School)

> "So, in Year 11 [Careers Advisor] asked that everyone make an appointment with her and speak to her and then when I went to her, she told me about [Pre-Dentistry Summer School]. So, when the time came, I applied… I feel so lucky that I live in London and have the opportunity to do this because I feel like I've learned so much… I don't really know anyone who's applied to like Medicine or Dentistry and it's completely different to the way that you'd apply for a normal university degree and so it's also so nice to be going to these like

> sessions with these other pupils who are in a similar boat to me." (Erin, Other Focus Group, Daffodil Girls' School)

The school has a parents evening in February for Year 11 students and their parents to ask teachers and current students questions as well as sample A-level classes. The 'option blocks' for the upcoming year are introduced at the parents evening and students can choose one subject in each of the four blocks, though the option blocks did not appear to be a major factor for any of the students that I interviewed. A few of the more popular subjects are offered in multiple blocks including psychology and English literature A-levels. In contrast to the other schools in this study, I could not find any evidence of attainment-based selection for either science or modern languages at the GCSE level at Daffodil. Daffodil was the only school in this study which did not offer multiple GCSE science routes and, although modern languages were not compulsory for any students, all students were strongly encouraged to study a modern language at GCSE. Over 75 percent of Daffodil's students studied modern languages GCSE in 2018, according to recent DfE data, much higher than any of the other state-funded schools in this study. These subject-specific practices will be discussed in greater detail in the next chapter.

In July, after students have completed their GCSE exams, Daffodil also offers 'master classes' in most A-level subjects so that students can sample a few courses before selecting their options. Around this time, students also meet with a member of senior leadership in the sixth form to discuss their subject choices. During this discussion, students can ask to join a course even if they have not met the entry criteria as long as the Head of Sixth Form agrees. In previous years, students had been able to choose up to 4 subjects or qualifications, but the year this study was conducted was the first time that Year 12 students could choose only 3 subjects. A few higher attaining students had been allowed to take 4 subjects as long as it would not impact their grades, but this was rare. When students express an interest in a course, they are assigned 'transition work' over the summer with a few tasks and recommended reading on and around the subject. In the sixth form, all students also take part in a 'Life Skills' course which provides advice on time management, higher and further education courses, the university application process, interview techniques and employment opportunities. All Year 12 students participate in mock interviews with sixth form staff and receive practical, personalised advice. Daffodil also promotes mentorship within the school and the school website explains that sixth form students are encouraged to mentor and organise activities for younger students.

Daffodil's advice and guidance programmes appeared to have a transformative influence for their students. Government data from the most recent years shows that a high proportion of Daffodil's

students have been successful in gaining places at high tariff universities, including Oxbridge and Russell Group universities. The proportion of students at Daffodil who go on to higher education is well above the national average (75 percent in 2017) and even higher for students from disadvantaged backgrounds (82 percent in 2017). A smaller proportion of students at Daffodil (5 percent in 2017) have also been successful in obtaining competitive degree apprenticeships and employment.

5.4.5 Cedar Sixth Form College

Students had to apply to study at Cedar Sixth Form College and, as a result, much of the advice and guidance for subject choices took place during the application process. Applications for Cedar Sixth Form College are due in December when students are in Year 11. Offer holders are invited to induction days, usually in early July, where they can discuss their options with teachers and 'student ambassadors', current students elected by their peers to represent the different subjects at the school. To qualify for the 'A-level programme' consisting of 3 A-levels, students must have 7 GCSE passes including English and mathematics as well as meet the minimum criteria for their desired subjects. Cedar also offers an 'Applied General Qualifications' (BTECs) pathway required a minimum of 5 GCSE passes including English and mathematics.

> "…we take great care during enrolment and induction to ensure that students are on appropriate programmes given their prior performance in order to ensure the greatest chance of success." (Cedar Sixth Form College Curriculum Booklet)

The highest attaining students are placed in the school's 'Oxbridge Programme' in October of their first year (Year 12). Students in this programme receive extra support and guidance from the Assistant Principal who leads the programme. Students in the Oxbridge programme are given reading lists and encouraged to take on an additional Extended Project (EPQ) and attend lectures at nearby Russell Group universities in London (e.g. Imperial, UCL and King's)

Like Birch, students at Cedar are advised to start with 4 subjects in Year 12 and drop down to 3 subjects in Year 13. Unlike the school sixth forms, Cedar was able to offer most subjects in multiple timeslots and students are generally able to take their desired subjects as long as they meet the entry requirements. Timetables and option blocks were not an issue at Cedar.

> "Luckily, because we're a sixth form, there's a massive choice on the timetable. It's very rare that a student would find that they've chosen two subjects that clash all the way across the timetable." (Ms. CL, Assistant Principal, Cedar Sixth Form College)

In January, all students are required to attend two workshops led by the dedicated Careers Advisor (Ms. CC). The first workshop focuses on university applications including an introduction to the UCAS and writing personal statements. The second workshop focuses on alternatives to university, CV writing and employability skills. Afterwards, the college hosts a 'Higher Education and Careers Day' where students can circulate around to booths hosted by different universities and employers. Students are encouraged to ask the questions they wrote during the two workshops. Individualised careers advice is done by appointment and referrals, as the careers advisor (Ms. CC) explains:

> "We can't see every single student one-to-one but then the personal tutors see the students one to one as well. Sometimes students will be referred to us, or they'll self-refer, by booking an appointment slot allocate - there's slots during the week that they know to be able to refer to and book in at the library desk… or a teacher, or the senior management quite often will – yeah, there's quite a lot of referrals, because sometimes students don't necessarily think that they, perhaps, need that. Really, sometimes, it's just a little bit of an understanding as to where they're going and - or where they could get to with working a bit harder, or perseverance. Or just they're not really sure about their career paths at all and, so, they would be referred to me." (Ms. CC, Careers Advisor, Cedar Sixth Form College)

Overall, Cedar Sixth Form College provides extensive careers support and guidance for university applications. Cedar also provides more targeted support for the highest attaining students to apply for Oxbridge universities, similar to Birch High School's 'Russell Pathway'. Several points which made Cedar distinctive from the schools was the application process and entry requirements to enter the College and the facilities to offer courses during multiple time slots.

5.4.6 Summary

This section has examined the support and guidance available to students for post-16 choices at the sixth forms in this study. Several authors have argued that institutional habitus is reflected through the amount and structure of the guidance available to students (McDonough, 1997; Smyth & Banks, 2012; Reay, et al., 2005). At Elmwood Independent Boys' School there was an in-built assumption that students will attend university and much of the pedagogic work at Elmwood focuses on progression to elite, high-ranking universities. Students are provided with practical and individualised support throughout their schooling including one-on-one appointments with the dedicated careers advisor and a range of events to support students' university applications. Since Elmwood serves a student population that is already advantaged in socioeconomic terms, these practices may reinforce individual and familial habitus in such a way that the decision is not about whether to go to university but about which university to attend and what to study there (Smyth &

Banks, 2012). In stark contrast, state-funded Ashford Academy served students from less advantaged backgrounds. Students at Ashford reported receiving very little support for their subject choices and post-18 choices, instead relying on 'independent research' or family members for advice.

Other state-funded sixth forms in this study provided support and guidance that was differentiated based on prior attainment. The most extreme example was at Birch High School where students were placed on guided pathways throughout secondary school. This was limiting for some students on the 'vocational' and 'combined' pathways who were often guided towards 'practical' and 'applied' BTEC qualifications perceived to hold less exchange value in education. Meanwhile, students on the academic 'Russell Pathway' were given extra support and guidance for university applications and preferential treatment within the school. Cedar Sixth Form College had a similar 'Oxbridge Programme' for students who had been recognised for their academic potential. Reay et al. (2005) argued that sponsorship by schools through these 'Oxbridge Pathways' can be a valuable asset for students which can greatly increase their chances of getting into these institutions through careful cultivation of academic and cultural capital (p. 48). However, recent doctoral research by Burgess (2018) argues that these types of selective practices can have a particularly negative impact on 'moderate' attaining students who reported receiving much less guidance for their post-16 choices than both their high and low attaining peers.

While these examples demonstrate how schools can reproduce existing inequalities through their guidance provisions, this was not the case for all the schools in this study. Previous research using an institutional habitus lens has tended to focus on the tendency for schools to reproduce social class inequalities, and this is one of the major criticisms levied at the institutional habitus concept (Atkinson, 2011; Burke, et al., 2013). However, as more recent work by Kolluri (2019) has argued, schools serving disadvantaged student populations also have the capacity to cultivate institutional habituses that interrupt patterns of inequality. Daffodil Girls' School's apparent lack of attainment-based selective practices, extensive careers programme and pastoral care appeared to have a transformative influence for their students. Daffodil's focused enrichment on careers and opportunities, particularly in STEM, and close links to organisations that provide mentorship programmes as well as university summer schools were especially influential in students' subject choices and career aspirations. In short, the school served as a vital source of information for students about their post-16 options. Although Daffodil has a high proportion of students from disadvantaged backgrounds, progression to higher education and higher-level apprenticeships is well above the national average compared to schools with a similar student intake. However, I could not

find any evidence of attainment-based practices or differentiated support for students and this apparent lack of attainment-based selective practices highlight another aspect of Daffodil's institutional habitus which made it distinctive from the other state-funded secondary schools in this study.

5.5 Conclusion

Numerous studies have highlighted persisting inequalities within the UK education system, in particular, the under-representation of students from more disadvantaged socioeconomic backgrounds in higher education (Reay, et al., 2005; Bathmaker, et al., 2016; e.g. Archer, et al., 2003). In this chapter, I have sought to contribute to this literature through an account of how the reproduction of social class inequality in the structures and practices of five contrasting sixth form institutions in England. I have highlighted how Elmwood Independent Boys' School, which served an already advantaged student population, was able to utilise their resources to offer pupils 'traditional' A-level options alongside extensive support for developing a valuable 'package' of qualifications for university and career progression. Meanwhile, the state-funded schools in this study (Ashford, Birch and Daffodil) offered a wider range of post-16 subject choices but often provided differentiated support for high, middle and low attainers. Birch High School and Cedar Sixth Form College, which had high-attaining student intakes, provided a broad curriculum which emphasise subjects which promote university progression, but targeted advice and guidance was reserved for a small number of high attaining students. In contrast, Ashford Academy's and Daffodil Girls' School's intakes had a lower average attainment and a higher proportion of students from disadvantaged backgrounds. However, while Ashford differentiated support by prior attainment, Daffodil's more radical approach to academic support and pastoral care appeared to have a transformative influence for their students.

The examples in this chapter illustrate how Bourdieu's theory of social reproduction and institutional habitus might be applied to analyse school practices at the 'median-level' by examining the practices at individual schools while remaining sensitive to wider structural conditions. Schools must adapt to the wider context of educational policy including the introduction of school performance measures and the 'fair access' policies which focus particularly on access to elite universities. These policies filter into schools through their curricular offers and guidance provisions. This chapter examines this link between school practices and students' subject choices and demonstrates how different institutional habituses can produce different opportunities, barriers and outcomes for students.

Chapter 6: Subject-specific pedagogic practices in physics and modern languages

6.1 Introduction

Most of the research on institutional habitus and educational choices has focused specifically on post-school pathways, or the influence of schools over whether students progress to university and which higher education institutions they choose. The previous chapter explored how institutional habitus influenced students' educational choices more generally, including their subject choices. This chapter will focus on the discipline-specific practices within physics and modern languages which create and perpetuate social inequalities, producing different patterns of student identity, aspiration and attainment.

In this chapter, I have used Bourdieu's concepts of *pedagogic work* and *symbolic violence* to understand the ways in which schools can influence student participation and engagement in the two subjects compared in this thesis, physics and modern languages. Bourdieu proposed that *pedagogic action* is the imposition the 'cultural arbitrary' or taken for granted assumptions and power relations within a field. *Pedagogic work* refers to the mechanisms and practices undertaken by institutions (schools) through which the goal of pedagogic action might be achieved through producing long-lasting and durable dispositions in the habitus. Pedagogic work involves a process of socialising young people to 'know their place' in the social order and reproducing dominant group values by 'inculcating' students to accept these values and unequal social order as legitimate, 'natural' and 'the way things are' (Bourdieu & Passeron, 1990). An important way that pedagogic work is achieved is through *symbolic violence* which refers to a process through which individuals, through their lived experiences, come to develop taken-for-granted ways of thinking and behaving which reflect the unequal power structures which created them. The coding framework for *pedagogic work,* which was applied to student focus group transcripts, teacher interview transcripts, field notes, school websites and recruitment materials, can be found in Appendix M. The coding framework shows the frequency of each of these codes within the data.

This chapter is split into two halves, the first focuses on physics and the second on modern languages. Each section explores 'taken-for-granted' assumptions, dispositions and constructions specific to each of the school subjects. These included reasons that students gave for continuing physics and/or modern languages, or not. Within these sub-themes for each of the subject areas, I used the four criteria proposed by Archer et al. (2020) to assess the prevalence, or not, of school selective practices (pedagogic work) which differentiate and/or exclude students based on

attainment, post-school plans, gender and/or ethnicity. This chapter will examine the prominent forms of pedagogic work which occurred in physics and modern languages and how these forms of pedagogic work are understood by key actors (e.g. teachers and students). At the end of the chapter, I attempt to draw comparisons between physics and modern languages and discuss the implications of the various forms of pedagogic work identified in each.

6.2 Pedagogic work in physics

This section explores the pedagogic work undertaken within school physics at both GCSE and A-level. There is an extensive body of literature on science identity which has drawn attention to the role of schools and the culture of science classrooms can influence students' constructions of and identification with school science. Many of the findings in this section resonate with recent work by Archer et al. (2016) which explored how selective practices around the triple science GCSE route create and perpetuate social inequalities through the construction of triple science as an 'elite' route for 'clever' students. The culture of physics in particular is similarly associated with masculinity and 'cleverness' which has implications for the types of students who participate in physics at post-compulsory levels (e.g. Francis, et al., 2017; Gonsalves, et al., 2016). In my own analysis, I have identified two main forms of pedagogic work which reinforced notions of physics as an 'elite' subject reserved for 'clever' (mostly male) students. These included attainment-based gatekeeping practices and the promotion of a 'competitive' (masculine) classroom culture which are discussed below.

6.2.1 'Clever' students do physics: Attainment-based gatekeeping practices

Since science is a 'core' subject throughout compulsory schooling, all students at state-funded schools must receive at least some form of science education through age 16. However, there are several different ways that students can fulfil this science requirement ranging from traditional academic routes, such as GCSEs, to more applied and vocational options. As discussed in Chapter 1 (Section 1.2), the most common is the 'double science' or 'core and additional science' route which incorporate aspects of biology, chemistry and physics and results in two GCSE qualifications. In contrast, the 'triple science' or 'separate sciences' route results in three separate GCSE qualifications and grades in each of the three 'traditional' sciences (biology, chemistry and physics). The availability of different routes makes science distinctive from most other GCSE subjects in terms of structure.

Following curriculum reforms in 2006, triple science was introduced as an entitlement for higher attaining students to enable them to study science in greater depth and breadth. Government, industry and science education policy organisations have strongly advocated for increasing the number of entries in triple science since students who take triple science are more likely to continue

studying science subjects post-16 and to do well in those subjects (Ofsted, 2013). While triple science is an 'entitlement' for high-attaining students, the availability of the triple science route varies widely between schools. State-funded schools in areas of high socioeconomic deprivation are less likely to offer triple science (RSA, 2015)

For the students that I interviewed, triple science was constructed as the more prestigious route since it was recommended for high-attaining students and resulted in a greater number of GCSE qualifications. According to recent DfE data, around 20 percent of the students at Ashford Academy and Birch High School completed the triple science pathway in 2018. At Birch High School, triple science was compulsory for students on Birch's academic 'Russell Pathway' and at Ashford Academy, the top set was strongly encouraged to complete the EBacc pathway including either double or triple science. This practice was also reported by students at Cedar Sixth Form College who completed their GCSEs at various secondary schools. Higher-attaining students were often implicitly and explicitly steered towards the triple science route by their schools. In this way, the triple science route was constructed as more appropriate for the most 'clever' and 'able' students.

> "If you were in the top set you were pushed towards Triple Science." (Eric, French Male Focus Group, Cedar Sixth Form College)
>
> "I did Triple Science because I really liked science, I was like well add some more GCSEs to my thing, I'll get one for each of them. I was like, it's like one of my options they've given me because they only offer it to certain people if they feel you're capable of doing it." (Jessica, Other Focus Group, Ashford Academy)
>
> "I did double science solely because I didn't really like science and I wanted to spend the extra GCSE on another subject I liked, um, but if you did well in science at Key Stage 3, I did quite okay in it, the Head of Science put a lot of pressure on you. There was only about ten of us who refused. We just said, no we don't want to do it, and that whole year they were kind of on our backs." (Daniel, Other Male Focus Group, Cedar Sixth Form College)

As these comments illustrate, schools engaged in considerable work to convince students that triple science was the 'better' choice because it was only offered to 'capable' students. High-attaining students like Eric and Daniel said they felt 'pressured' to do triple science by their teachers.

The notion that triple science is an 'elite' route reserved for the more able or 'clever' students was further reinforced by the heavier workload and faster pace reported by students on the triple science route. Many students reported considerable stress and anxiety over the workload of triple science. Around a third (8 out of 26) students who did not continue with science post-16 reported

that the heavier workload had discouraged them from continuing science studies beyond GCSEs. For example, Isabel described her experience with triple science rather vividly as a 'wild ride' and 'traumatic' experience while others talked about trying to cope or 'keep up' to cover all the material.

> "The thing is, mine was very much like a wild ride, you know how it's like, if you go up a hill, it's really good and then suddenly you're like crashing down and you go back again and like recovering. See, that sounds like, just remember it now is kind of like, giving me some like traumatic memories." (Isabel, Other Mixed Focus Group, Cedar Sixth Form College)

> "I used to stress about it all the time… because it was Triple Science as well so it's like an extra lot of things you had to remember as well. I used to just stress about it. I had the choice to move down as well but, in the end, I was like, I've done the majority of the work for it so I might as well just continue going with it." (Claire, Other Mixed Focus Group, Cedar Sixth Form College)

These comments evoke very strong images which reflect students' anxieties and concerns about being able to keep up with triple science and these forms of pedagogic work undertaken by schools conceal power relations through a notion of meritocracy. Jessica's comments illustrate how the faster pace and increased workload of triple science had convinced her not to continue with science beyond GCSEs. In addition, the practice of sorting/selecting students onto different GCSE science routes exacerbate students' anxieties, producing symbolic violence as they blame themselves for struggling with the course and finding it difficult.

Another theme that emerged from the focus groups was a possibility of being 'moved down' to double science if students were unable to keep up. At Elmwood Independent Boys' School, triple science was standard, and most students completed the triple science route. The only exception would be if the student does not perform well on their mock exams in Year 11 at which stage teachers may recommend that they take double science instead.

> "All boys embark on the Triple Award Science and the vast majority will take Triple. After the Mocks in January of the Fifth Form, the Head of Science recommends that some boys take the Double Award and parents are consulted then about this decision." (GCSE Curriculum Booklet, Elmwood Independent Boys' School)

> "So the school makes you do Triple Science until your mock GCSEs in Year 11 and then, if you underperformed in your mock GCSEs then they'll say, okay you should drop to Double… Triple is definitely standard." (Jay, Other Focus Group, Elmwood Independent Boys' School)

The possibility of being 'moved down' to double science at some schools further illustrates how students had to defend and maintain their status in order to stay on the elite triple science route. Recent work by Archer et al. (2016) on students' views and experiences of triple science argued that this threat of being 'moved down' creates a culture of insecurity which serves to exemplify and reinforce the pedagogic authority of the school since the school has the power to decide who can and cannot take triple science (p. 14). Furthermore, the language of 'going down' or 'dropping' to double science implies an arbitrary hierarchy between the different science routes which is reinforced through the formal selective practices in the schools. Students with lower prior attainment were usually placed on double science from the beginning of GCSEs and, while this was often framed as a benefit to students who might 'struggle' with the triple science coursework, student comments highlight how double science students were constructed negatively as less able or 'bad at science'.

> "I think it was mainly um, we didn't get a choice as much as, if you were less good at sciences you would do double or a less intensive course which would mean you'd be able to get a better grade." (Marco, Physics Male Focus Group, Cedar Sixth Form College)

Moreover, students reported that double science classes often had fewer resources, less time dedicated to practical work and were more likely to be taught by non-specialist physics teachers. This was best summarised up by the experiences of Leah (Cedar Sixth Form College) who had done double science at a mixed state-funded school for GCSEs:

> "Yeah, it was kind of neglected as well because a lot of the teachers that were better, so to speak, went to the classes that were taking Triple and that also meant for a lot of us who wanted to get good grades, we couldn't because we weren't provided the resources or the teacher who could help us develop that further because there was a couple of times where I wanted to walk upstairs and just join their lesson because they were doing the same thing." (Leah, Female Other Focus Group, Cedar Sixth Form College)

At the same time, the teachers that I interviewed did not universally agree that offering multiple GCSE science routes was a good thing, suggesting that is a mismatch between teacher beliefs and school policies. The physics teachers at both Ashford Academy and Birch High School actively encouraged students from both the double and triple science classes to study A-level physics. Ashford's physics teacher (Ms. AP) told me that she had advocated on for two of her students, Tom and Albert, to be allowed to take A-level physics despite being placed on the double science route. Ms. AP went on to say that both students were now two of her top students (see Section 7.3).

Similarly, the physics teacher at Birch (Ms. BP) commented that she did not feel that triple science offered students any advantages.

> "I mean, we know that, actually, in terms of their future opportunities there isn't really any advantage to doing the separate [triple] sciences and getting the extra GCSE umm… there aren't any universities that would require that. We certainly wouldn't require it for our A-levels at all, and…we would never assume any knowledge from the separate science so, umm… it doesn't offer an advantage and it's extra work for the students... I have seen a lot of A-level students thrive having done double science" (Ms. BP, Physics Teacher, Birch High School)

The only school in this study which did not offer multiple GCSE science routes was Daffodil Girls' School, where all students are entered for double science, confusingly called 'Combined Science: Trilogy' (AQA) which results in only 2 GCSEs. In their curriculum booklet, the school explains the rationale for their curriculum as aiming to provide "a very good all-round education" so that every student has the opportunity to progress into A-level science courses. Despite these statements about providing equal opportunities, instruction was still (somewhat) differentiated by attainment since only the 'top set' is taught by a physics specialist teacher so that the teacher can 'push them a bit more' and students can 'get used' to her teaching.

> "The preference is for a subject-specialist to teach the students at GCSE and A-level. So I will get the top sets, I'm a subject specialist so I will teach physics... so I can push them a bit more… When I teach the top sets, they get used to my teaching." (Ms. DP, Head of Physics, Daffodil Girls' School)

In the sixth forms, entry requirements for A-level physics were much stricter than any other subjects across all the schools. While most subjects require a grade 5 (B) or above in the subject at GCSE, physics often required at least a 6 or 7 (high B or A) in science and maths GCSE and two of the schools had additional requirements such as co-requisite maths A-level (Birch High School) and maths exams (Daffodil Girls' School).

Out of the three non-selective, state-funded schools, Birch High School had most restrictive entry requirements for physics A-level. Students needed a 6 (high B) each in GCSE science and English as well as a 7 (A) in GCSE maths to take A-level physics. Students are also required to take A-level maths, making physics distinctive in that it is the only subject at Birch with a compulsory corequisite course. This corequisite course did appear to deter some students and two non-physics students interviewed commented that the only reason they did not study physics was because they did not

like maths. One student, Brian, bragged that he got three A*s in triple science but found physics the least interesting out of the three sciences.

> "I did well in maths but I just didn't enjoy it… and also if you take physics you have to take maths as well, I think...and I'd never had it in my mind taking maths at A-level. Never, never thought about it, I don't enjoy it and I had to sit through two years of it." (Brian, Other Focus Group, Birch High School)

At Ashford Academy and Daffodil Girls' School, the requirements appeared to be more flexible and teachers had more discretion over who was able to take physics A-level. As mentioned earlier, Ashford's physics teacher (MS. AP) shared with me how she had advocated for two of the students, Albert and Tom, to be allowed to take physics A-level even though their grades were slightly below the grade cut-off of a 6 (or high B). By comparison, Daffodil's physics teacher (Ms. DP) did not feel that the entry requirements were high enough and required students to take a maths exam on the first day of A-level physics.

> "We have intake students in chemistry and biology and probably even physics which are not necessarily the right candidates to do it, but we didn't have any choice, the Head teacher set the boundary… So after two years of complaining, the Head Teacher said she will consider more teachers voice about the intake now… No one here is lazy, it's a good school, they all work hard but the amount of knowledge that you didn't have in GCSE, how are you going to fill in this gap? They will never do it if they have a low B. It's hard to catch up." (Ms. DP, Head of Physics, Daffodil Girls' School)

At Elmwood, physics was one of the more popular subjects after mathematics, chemistry and economics. Around a quarter of the cohort completed A-level physics in 2018. Almost all the A-level physics students at Elmwood take maths and about half take further maths as well. While there were no formal entry requirements for A-level physics, Elmwood's Head of Physics (Mr. EP) explained that students are strongly advised to study maths during the parent's evening hosted by the school during the period when students are selecting their sixth form options.

> "So I'm normally pointing at Maths results and saying well, if you don't like Maths, you're not going to like Physics, and strongly advise them not do to Physics unless they do the Maths…We push quite hard what we want them to do. We show them graphs of GCSE results versus what you're likely to get at A-level and how they link." (Mr. EP, Physics Subject Lead, Elmwood Independent Boys' School)

While the schools varied in their specific practices, each of the schools engaged in various

attainment-based gatekeeping that reproduced and maintained the 'elite' status of triple science and A-level physics. As a result, most students appeared to accept that only 'clever' or high-attaining students take triple science and that triple science was the more prestigious GCSE route. This was reinforced by the pedagogic work at each of the schools to 'push' students towards making the 'right' choice. Similarly, higher grade entry requirements and compulsory corequisite courses which distinguished A-level physics from other subjects further reinforced the school's pedagogic authority and discouraged many students from pursuing A-level physics.

6.2.2 Physics is 'competitive': Sexist and masculine classroom culture

As discussed in Chapter 2 (Section 2.3), the gender divide in science, particularly physics, is well-documented and there has been much research and policy attention focused on issues of access, participation and engagement in school science. In England, participation in A-level physics continues to be predominately male despite numerous efforts to improve the gender balance over the past three decades. The research literature on science engagement documents a long-standing association of science with men and masculinity which is perhaps most apparent within the physical sciences.

During the focus groups, I asked students if they were aware of a gender imbalance in subject choices and whether they had ever personally felt like they had been treated differently due to their gender. For many students (19 out of 67), physics was constructed as particularly 'masculine' or something that a boy was more likely to do, and this perception was shared even by many of the girls who are studying physics (see section 7.3). The stereotypical image of the 'middle-aged man' and 'men with crazy hair and lab coats' was used to describe their image of a typical physicist or engineer by 14 (out of 67) students interviewed, including both students taking A-level physics and those who were not. However, when talking about their own experiences in the classroom, most of the male students replied that they had never really noticed a gender imbalance or felt they had been treated differently because of their gender. On the other hand, female students were more likely to report feeling excluded or marginalised by the masculine culture in the physics classrooms. Several (5 out of 30) girls who were interviewed described the boys in their GCSE physics classes as 'rude' and 'boisterous' and some gave this as one of the reasons they decided not to continue with physics or any science subjects beyond GCSE, as illustrated by the following comments:

> "I remember in my old science class in high school, there were like four girls and this was a class of thirty and there were like twenty-six boys. And loads of boys, literally when I used to say something all the boys would laugh if you got it wrong. It was kind of like, oh well let me just keep quiet and I literally have nothing to say. That's why I don't really like sciences as

well because I feel like, I feel like if you're a woman and you try and go into science, I feel like you're disregarded." (Alice, Female French Focus Group, Cedar Sixth Form College)

"If I had stayed in my other school then I definitely would not have done physics at all, because uh, it was just boys who signed up… I don't know, they were just rude, very rude people. I didn't like the dynamic so I thought that if it was just me and them in that classroom I wouldn't have enjoyed it." (Lily, Other Focus Group, Daffodil Girls' School)

"It was just like in the Physics lesson, boys would just were just like more, I don't know. I'm not sure how to describe it, well just being more boisterous or like, oh yeah I know everything. Or just, say if I was trying to explain something, it always used to get on my nerves… and they would just try correcting me while I'm explaining like (..) I know, that I'm right but it's okay whatever... They just made the assumption that I don't even know what I'm talking about." (Harriet, Cedar Sixth Form College)

The girls who did continue studying physics at A-level, namely the girls at Cedar Sixth Form College (Felicity, Lucy and Harriet), also commented that they felt classroom discussions in physics were dominated by a few students, particularly boys. Below, Lucy and Felicity describe how the relative lack of girls in placed a greater pressure on those few girls to participate in class. "The thing is, in most of our lessons, because there's so many guys (..) like, say there's fifteen guys, six guys would answer one question each but because there's so few girls, one girl could answer like three questions in that lesson." (Lucy, Female Physics Focus Group, Cedar Sixth Form College)

"It's also like the same boys that always answer the questions and it's often the same girls that get picked on to answer the questions. Because the teacher might not think like, oh they might not really know what they're doing. So they pick on that person specifically so they will try and like engage them in the lesson." (Felicity, Female Physics Focus Group, Cedar Sixth Form College)

Physics teachers also commented on this dynamic in their classrooms, which they framed as a 'natural' or inherent difference between the genders. Boys were described as more 'boisterous', 'physical' and 'hands-on' while girls were described as more 'calm', 'reluctant' and lacking confidence.

"Oh it's very different teaching boys and girls you see. It's the obvious thing, um, boys are more boisterous, they want more hands-on things. They want to try things whereas with the girls you have to sort of use a different approach, at least for me, it was a different

> approach, they can be reluctant to try out different things. Um, and it's a general lack of confidence… which I found was more predominant in girls compared to the boys who were just getting on with things. Obviously in terms of behaviour management as well, it's very different. Girls are very calm even though some can be a handful. But in general, it's sort of, boys are more physical, girls can be more verbal." (Mr. CP, Physics Subject Leader, Cedar Sixth Form College)

Daffodil's physics teacher (Ms. DP) shared an experience where she had been asked to include boys in the A-level physics classes after a nearby comprehensive school had closed its sixth form. Ms DP describes how the class became more competitive, which was framed positively, as girls were pushed to prove their 'cleverness' after the boys joined the class.

> "So for three years in a row, I had boys in my classroom… and it was very, very interesting to teach. The boys get so much attention when they come, of course, because it's an all girls' school. But it really pushed our girls as well because they're not, our girls are not shy at all… our girls were very competitive, so when the boys were actually better than them all of a sudden. Because they were always the ones in the top set, they chose physics, they think they're very clever and that's why they chose physics and they do very well and then they've got somebody that's come in, boys, and that's doing a bit better than them and it really pushed them and it was quite nice to see." (Ms. DP, Head of Physics, Daffodil Girls' School)

These comments illustrate some examples the pedagogic work in physics classrooms reinforced the masculine culture of physics through fostering a 'competitive' environment that was alienating for many of the female physics students. Particularly concerning were comments about how some girls, like Alice, learned to silence themselves after being repeatedly interrupted, teased or corrected by their classmates. A recent study by Archer et al. (2019) characterises such displays of dominance in urban secondary science classrooms ('talking science through muscular intellect') by students controlling classroom science talk, competitive performances of talking science and policing what counts as 'proper' science talk. Generally recognised as 'authentic' and 'legitimate' displays of science by teachers and other students, 'talking science through muscular intellect' was predominately enacted by a small group of working-class boys from a range of ethnic backgrounds while experienced negatively by 'other' students, notably girls and 'quiet' boys who were often silenced through these displays (Archer, et al., 2019). Both the examples in this study and the work by Archer et al. illustrate how a competitive (and masculine) culture is normalised secondary science classrooms.

6.2.3 Summary

In sum, the examples of pedagogic work have illustrated how students and teachers construct A-level physics and the triple science route as 'elite' pathways reserved for 'clever' students. The construction of physics as a difficult or hard subject is longstanding (e.g. Duckworth & Entwistle, 1974) and perceived difficulty is a primary reason given by students for decisions not to pursue the subject at A-level (e.g. Tripney, et al., 2010). The analysis in this section has tried to explore the different ways that schools and teachers have reinforced these notions through various forms of pedagogic work including attainment-based gatekeeping practices and the predominantly masculine and competitive classroom cultures. The implication of these selective practices is that students from disadvantaged and underrepresented backgrounds are either excluded from pursuing A-level physics or choose to opt-out when the classroom culture conflicts with their identities. This is reflected in the profile of students who are entered for triple science. Girls are less likely than boys to study all three sciences separately, even controlling for prior attainment (Jin, et al., 2011) though this gender imbalance has become less prominent over time (Homer, et al., 2013). In addition, students who are eligible for free school meals are under-represented on triple science, compared to double science where they are proportionally represented and applied science routes where they are over-represented (Homer, et al., 2013).

Furthermore, the different GCSE science routes have implications for progression into science subjects post-16 and beyond. Evidence suggests that students are more likely to progress to A-level science subjects when they have studied triple science at GCSE and to achieve higher grades on those courses (National Audit Office, 2010; Ofsted, 2013; IOP, 2018b). For physics specifically, studies by the Institute of Physics (2018b) and Gill and Bell (2013) both found that students who took physics as part of the triple science route were more likely to continue physics at A-level compared to other science subjects biology and chemistry. Analyses by the Institute of Physics (2018b) found students are between six to seven times more likely to study physics A-level having done triple science. By comparison, students are six times more likely to take chemistry A-level and five times more likely to take biology A-level after taking the triple science route (IOP, 2018b, p.16). In other words, these forms of pedagogic work can have a significant impact on which students continue studying science at post-compulsory levels.

6.3 Pedagogic work in modern languages

This section explores the pedagogic work at both GCSE and A-level which can influence modern language participation. I have identified three main forms of pedagogic work performed by modern languages including attainment-based gatekeeping practices, differential support for a narrow range

of (predominately European) languages and harsher grading schemes on A-levels compared to other subjects. In my analysis, I found that schools, particularly in the state-funded sector, were constrained by external factors such as the availability of qualified staff, timetable limitations and government school performance measures. These external factors were much more prominent in modern languages than in science and this is reflected in the following analysis.

6.3.1 Compulsory or optional? Attainment-based gatekeeping practices

In the previous chapter, I discussed the vulnerable position of modern languages, particularly at state-funded schools. Unlike science subjects, modern languages are not compulsory at Key Stage 4 and some students do not study any modern languages at GCSE. As discussed in Chapter 1 (section 1.2), modern languages were removed as a compulsory subject from the secondary curriculum in 2004 and then made compulsory from primary school starting in 2014 (Tinsley & Dolezal, 2018). Currently, modern languages are not compulsory beyond age 14 and individual schools are free to set their own policies. Some have argued that these policy changes have led to disparities in access to and participation in modern languages between different schools, or a 'social divide in language learning' (Lanvers, 2018). For example, independent and selective schools are more likely than state-funded comprehensive schools to offer multiple languages and to make them compulsory for all students (Tinsley, 2019; Lanvers, 2017b). There are also considerable differences within the state sector. Previous studies on modern languages participation have indicated that not all students are able to study a language at Key Stage 4 since schools may limit the numbers taking modern languages through academic pathways and timetabling restrictions (Board & Tinsley, 2016; Abrahams, 2018). In addition, there is a growing trend in both the state and independent sectors, but particularly in state-funded secondary schools, to exclude or excuse pupils from studying languages for a variety of reasons and the practice of restricting access to language study in Key Stage 4 is also associated with socio-economic disadvantage. In the most economically deprived category of schools, 44 percent of schools reported excluding some pupils from language study at Key Stage 4 (Board & Tinsley, 2015).

Participation in languages varied widely at each of the different schools in this study. At Elmwood Independent Boys' School, all students learn French and Latin from Years 6/7 (ages 10-11) and are required to study a language up to Year 11 (age 16). Languages were so embedded in the curriculum that studying languages was normalised. During focus groups, almost every student at Elmwood described languages as 'useful' and 'invaluable', helpful for reasoning and problem solving. The most popular language at GCSE is French with around 80 percent of the cohort studying the subject, followed by Latin (48 percent), Greek (42 percent), Spanish (21 percent) and German (20 percent).

Most of the students that I interviewed had studied multiple languages at GCSE and two students, Jay and Caleb, studied five languages within the school: French, German, Russian, Latin and Classical Greek. Consequently, French was among the top ten most popular subjects in the sixth form, after maths, economics and science subjects. This was best summed in the comments by one of Elmwood's French teachers (Mr. EM):

> "For a French teacher or for a language teacher, this school is a real find because um, first of all, you have a lot of people taking the language at GCSE because that's basically compulsory here… and a lot of them do enjoy it and take it on at A-level. We've got huge numbers compared to other schools, um, certainly from what I've seen. Um, and so it's quite a high-status subject here, it's quite popular as well." (Mr. EM, French Teacher, Elmwood Independent Boys' School)

At the state-funded schools in this study, modern language policies varied from school to school, though most used some form of attainment-based selection. At Birch High School, modern language GCSEs were only compulsory for the students on the school's academic 'Russell Pathway' while students on the other pathways were required to make a special request to the Head of Languages (Ms. BM) in order to study them. The curriculum booklet states that the Head of Languages must agree that the student will have a 'very good chance of gaining at least a Grade 4 / L2 Pass or better' (GCSE Curriculum Booklet, Birch High School). The process at Birch of requiring lower-attaining students to request permission from their teacher represents one form of pedagogic work that reinforces the school's pedagogic authority and may discourage some students from studying modern languages.

Meanwhile, Ashford Academy encouraged all students to complete an EBacc combination of subjects, including a modern language, to 'keep their options open' for a wider range of degree subjects and career opportunities. In practice, it was mainly the high-attaining students who were encouraged to study modern languages.

> "So, you know, the more academic universities and the more desirable universities will look for a language amongst their GCSE qualifications. So we're encouraging them, we market a language in such a way that we're encouraging the top end of the year to take it… but I wouldn't say that out of choice they would. I think they are possibly encouraged and pushed to take it because we think it's a good idea." (Ms. AM, Head of Languages, Ashford Academy)

Ms. AM's comments suggest that schools engage in considerable work to encourage students to study modern languages, highlighting the benefits of studying languages for future educational and

career pathways. The high-attaining students at both Ashford and Birch explained that studying modern languages was not really a choice for them and one student (Michael) even expressed regrets about studying modern languages at GCSE:

> "For us… we weren't even like encouraged, it was like, you have to do a language and you have to choose between Geography and History. So there wasn't like an option." (Emmett, Other Focus Group, Ashford Academy)

> "I did French and Spanish. Yeah, that was challenging, very challenging. I wish I didn't but, yeah… they really promoted it as an EBacc thing." (Michael, Physics Focus Group, Pilot Study, Ashford Academy)

> "Yeah, we had to take a language and a humanity." (Elizabeth, Other Focus Group, Birch High School)

At the same time, around half of the students at both schools said they felt that languages were not as 'important' or 'relevant' as other subjects. Since some students at Birch and Ashford were explicitly excluded or excused from studying languages, these subjects were often viewed as less important than 'core' subjects (English, maths and science). Modern languages were not compulsory for any of the academic pathways at Ashford and some students are either excused or choose to 'opt-out' of modern language GCSEs. Ashford's Head of Languages (Ms. AM) reported that students were frequently removed from modern language lessons to revise for maths and English, which she found frustrating. These selective practices at Birch and Ashford appeared to have a significant impact on participation in modern language GCSEs. According to recent DfE data, around half (47 percent) of the students at Birch High School and less than a quarter (24 percent) of Ashford's students studied a modern language GCSE in 2018.

At Daffodil Girls' School, modern languages were not compulsory for any students but two languages, French and Spanish, were offered as additional options that students could study at GCSE. In contrast to the other schools in this study, I could not find any evidence of attainment-based selection for modern languages at the GCSE level either on the school's website or during interviews. All students were strongly encouraged to study a modern language at GCSE and over 75 percent of Daffodil's students studied modern languages GCSE in 2018, according to recent DfE data. The unusually high uptake in modern language GCSEs may have been due in part to the Daffodil's London location and student intake. The school has a very high proportion of students with English as an Additional Language (EAL), including students who speak Spanish or French at home. By comparison, both Ashford and Birch have a much lower proportion of students with English as an Additional Language (EAL). Nonetheless, the apparent lack of attainment-based selective practices

which explicitly excused or excluded students from studying modern languages was perhaps a key factor driving the higher participation in modern language GCSEs at Daffodil.

All three state-funded secondary schools had relatively low uptake of modern language A-levels. Birch High School had 4 students studying modern languages in both year groups (Years 12 and 13) at the time of this study. Modern languages were considered relatively high-status subjects at Birch and the school continued to run the A-level courses despite low numbers. Conversely, neither Ashford Academy nor Daffodil Girls' School offered modern language A-levels the year this study was conducted, although they had been offered in previous years.

In sum, the attainment-based gatekeeping which excused or excluded students from studying modern languages appeared to have a significant impact on take up of these subjects at both GCSE and A-level, by constructing them as 'optional' subjects. Students who attended schools where a high proportion of students studied modern languages (Elmwood, Daffodil and Cedar) were more likely to view these subjects as useful, valuable and important. Whereas students who attended schools which excused or excluded a high proportion of students from studying modern languages (Ashford and Birch) were less convinced of their value. Since languages are more likely to be compulsory at independent and selective schools, I would argue that these forms of pedagogic work have the potential to widen the existing social divide in language learning.

6.3.2 Modern languages are 'difficult': Exams and grading severity

Perceived difficulty was the most common reason that students gave for not continuing modern languages to A-level, even students who had done well in at GCSE. GCSE language courses were perceived to lack 'practical' applications and focus almost entirely on passing exams through memorising vocabulary and sentence structures.

> "I feel like, at GCSE, French was more like kind of learning it by the script like just to prepare for an exam rather than learning it freely." (Amir, Cedar Sixth Form College)

> "You're not learning it to learn it. Like you're learning French to pass the exam. Not in terms of, I'm learning French for more practical kind of use to it." (Hassan, Cedar Sixth Form College)

> "I think we're more learning how to pass the French GCSE than to actually learn French. Like, I think learning the French GCSE and learning French are two completely different things." (Teresa, Daffodil Girls' School)

The 'jump' between GCSE to A-levels in modern languages, referencing the increased workload and shift in the types of tasks required, was referenced by about a quarter of all the students

interviewed (17 out of 67) and was a common reason given for students who did not continue studying modern languages beyond GCSE. Several of these students (11 out of 67) felt that modern languages require a lot more 'work' than their other subjects.

> "I did it for GCSE and I got an A* and I was like, well, if I can do it for GCSE then I'll carry on. But it's a jump from GCSE having to know a few words and recognising those to suddenly reading books and watching films, reading essays. There's a massive jump between what you need to know at GCSE and A-level…" (Jessica, Other Focus Group, Ashford Academy)

> "I think it would be helpful, but I think it would take me so much longer and it would take so much more effort to like, be good at Spanish than it would for like another subject." (Chelsea, Physics Focus Group, Daffodil Girls' School)

In particular, the perceived difficulty of achieving high grades (A or A*) in modern languages compared to other subjects was a concern for students, like Gavin and Erin:

> "Looking back, I wouldn't have taken Spanish. I'd have taken something that would have got me an A grade." (Gavin, Other Focus Group, Ashford Academy)

> "I was going to do Spanish but then, I was speaking to a teacher and… asked her if I should do it, and the language teacher said, no because only the people who are native speakers get the top grades so therefore there's no point taking it, because you can't really get an A or an A*, that put me right off it." (Erin, Other Focus Group, Daffodil Girls' School)

These findings are consistent with numerous studies on modern languages education which have found that perceived difficulty and the likely negative impact on grades is one of the factors with the greatest influence on whether students continue studying modern language subjects (Coffey, 2016; Vidal Rodeiro, 2017; Coleman, et al., 2007; Parrish, 2019; Graham, et al., 2012). Erin's comments also reveal how teachers may reinforce these notions that modern languages are different to other subjects since 'native speakers' are thought to perform better on exams. A recent Ofqual report by Taylor and Zanini (2017) provides some evidence that native-speakers outperform non-native speakers on modern language A-levels, particularly in A-level German, when controlling for prior attainment, gender and school type. The report also found a smaller effect size for French and Spanish A-levels, but the authors suspect this is due to the much smaller proportion of native speakers entering exams in these languages.

The modern language teachers that I interviewed had concerns about the relative difficulty of modern language exams compared to other subjects. The French teacher at Cedar Sixth Form College (Ms. CM) remarked that she had not had any students achieve an A* in six years.

> "I mean I think there's a national uh, awareness that we don't get a lot of A*s in languages… it's definitely more difficult to get an A* in French than it is in other subjects… because I had amazing students and I never managed to get one A* in six years." (Ms. CM, French Teacher, Cedar Sixth Form College)

> "I think also, the fact when they get their exam results on results day for GCSE, nationally, languages are always a grade down so they're getting all A*s in everything else and they've got an A or even a B in a language… I just wish the exam boards would be fairer on the exams." (Ms. BM, Head of Modern Languages, Birch High School)

> "It is harder to get a good grade in a language… I know that came up in a newspaper last year, I don't know if you saw that…. I've never really been aware, I just always knew that I've taught my subject and it's quite hard, I have to teach what's on the curriculum, and I have to teach according to the marking criteria." (Ms. DM, Head of Languages, Daffodil Girls' School)

These comments illustrate how students and teachers' constructions of school subjects are strongly influenced by external factors such as curriculum and assessment. In particular the teachers' comments reflect ongoing national debates about 'inter-subject comparability' or the relative difficulty of different subjects (see Ofqual, 2018, 2015). There is evidence to suggest that science (including physics) and modern language subjects are graded more severely than other subjects at GCSE and A-level, making it more difficult for students to achieve top grades in these subjects (Coe, et al., 2008; Fitz-Gibbon & Vincent, 1994; He & Black, 2019). In the most recent Language Trends survey, exam issues emerged as the biggest concern for secondary school teachers with more than half of the teachers commenting negatively about the new exams, their difficulty, grading, and the new tier structure (Tinsley, 2019, p.17). Other studies have found that while many schools are working hard to increase participation in modern languages at GCSE and A-level, teachers frequently cite concerns about student and league table outcomes as major barrier to increasing numbers (Parrish, 2019; Lanvers, 2018). In addition, the introduction of the new school performance measure of 'AAB in at least two facilitating subjects' has likely placed schools under increasing pressure to ensure that their students are obtaining high marks in facilitating subjects, including modern languages.

6.3.3 Summary

Overall, the examples in this section have illustrated how modern languages have been constructed as 'elite' and 'optional' (compared to 'core' English, maths and science) subjects reserved for the high-attaining students who will go on to university. As I have mentioned elsewhere, much of this

pedagogic work is outside of schools' control such as the availability of qualified staff and harsher grading criteria on exams. Nonetheless, the implication of these various forms of pedagogic work is that students from disadvantaged backgrounds will continue to opt-out or be excluded from participating in modern languages.

The school curriculum can have a profound impact on how these students are positioned. In multiple studies, UK students gave clear importance to the prestigious world languages, such as French and German (Parrish, 2019; Coffey, 2016). For students who speak additional languages at home, one study by Coffey (2016) reported that only students who spoke French, German or Spanish thought that speaking other languages had any bearing on language learning in school, and opted to continue these languages at GCSE. In contrast, community languages, those spoken by minority communities in the UK such as Urdu and Panjabi, were considered less important to learn (Parrish, 2019, p.8) and those who spoke these languages reported that they did not feel there was a connection to school languages (Coffey, 2016, p.4). The analysis in this section also highlighted how the narrow range of (predominately European) languages available in schools can limit which languages are constructed as valuable and important.

6.4 Conclusion

In this chapter, I have sought to contribute to existing work on students' post-16 participation in physics and modern languages by comparing the subject-specific practices in each. Since much of the work on participation in these respective areas has tended to focus on individual students, this chapter attempts to illuminate some of the structural barriers to increasing access, engagement and participation in physics and modern languages. Attainment-based gatekeeping practices were common in both physics and modern languages and, as a result, it was mainly high-attaining students who studied these subjects at both GCSE and A-level. The examples in this chapter illustrate how students were implicitly and explicitly guided towards making the 'right' choices but could also be disbarred or excluded if they failed to 'keep up'. In science, students could be 'moved down' from triple science to double science and, in modern languages, teachers reported how students were sometimes removed from classes to revise for other subjects. At A-level, the higher entry requirements for physics and the harsher grading in both subjects discouraged many students from even attempting these courses. These practices reinforced the notion that students had to be 'clever' to study these subjects.

Issues of gender and sexism in science education emerged very strongly in my interviews with students and teachers. For many students (19 out of 67), physics was constructed as particularly 'masculine' or something that a boy was more likely to do, and this perception was shared even by

many of the girls who are studying physics. But while the majority of the students that I interviewed were at least aware of an association of science and masculinity, only a small minority (3 out of 67) said they believed that modern languages are as overtly gendered as science and most students said they were not aware that there were any gendered patterns participation in modern language education. These issues are discussed at greater length in the following chapter (Chapter 7) which discusses the ways that students negotiated identity in physics and modern languages through a social practice lens.

One issue which was distinctive to modern languages was the varying levels of support for different languages. Students and teachers perceived French and German to have greater exchange value within the context of school and higher education, as these were the main languages taught in schools. Spanish has been growing in popularity in recent years, however, the students that I interviewed were more likely to associate Spanish with travel and tourism. As I have highlighted in the previous chapter, schools often face substantial barriers to increasing the range of languages on offer including the availability of qualified staff and timetable limitations.

From a Bourdieusian perspective, the purpose of pedagogic work is to reproduce of dominant relations of privilege and inequality. The findings and analysis in this chapter have highlighted the subject-specific practices within physics and modern languages have reproduced these dominant structures through the over-representation of more socially advantaged students at independent and selective schools. I would argue that the examples of pedagogic work in this chapter exemplify symbolic violence as these practices are normalised, concealing power relations through notions of meritocracy and 'free choice'.

Chapter 7: Students' constructions of celebrated identities in physics and modern languages

7.1 Introduction

In this chapter, I explore the different ways that students' identities influenced their subject choices, drawing primarily on the student focus group data. While the previous chapters focused on the school and pedagogic practices using a Bourdieusian lens, the current chapter focuses on the different ways that students exercised agency to negotiate subject identities in relation to physics and modern languages. This chapter explores students' identity work by drawing on the concept of 'celebrated subject identities' developed by Carlone et al. (2014) which describes the cultural models of who counted as successful and legitimate participants in school subjects (i.e. science). Carlone et al. developed their concept of *celebrated subject identities*, drawing on the notion of *figured worlds* developed by Holland et al. (1998). From these perspectives, identity is understood as an ongoing process which is interpreted and negotiated within and across social spaces or *figured worlds* (Holland, et al., 1998). Students develop understandings of different school subjects over time across these *figured worlds* as they position themselves and are positioned by others in relation to these school subjects (Rubin, 2007; Boaler & Greeno, 2000). Using this framework, such identity work is "ongoing, cumulative and contentious" because it takes place under the power dynamics sanctioned by cultural and historical narratives (Calabrese Barton, et al., 2013; Kang, et al., 2019).

In Chapter 2, I argued that the norms and values within physics and modern languages has tended to privilege certain groups and identities in relation to gender, social class and ethnicity. For example, the alignment of physics with 'objectivity' and 'certainty' has tended construct physics as a more masculine subject and privileges students from predominately White and middle-class backgrounds. This chapter will use the concept of celebrated subject positions to focus on the ways that students positioned themselves (deliberately or not) and/or were positioned as successful learners within physics and modern language classrooms. The chapter begins by examining how students and teachers constructed notions of 'natural ability' in physics and modern language classrooms and which students were able to perform and be recognised as 'good students' in these subjects. The rest of the chapter explores how these constructions of 'natural ability' intersected with other aspects of students' identities, specifically in relation to gender and ethnicity.

7.2 Constructing 'natural ability' in physics and modern languages

As discussed in the previous chapter, physics and modern languages were constructed as 'difficult' subjects that only 'clever' students study. These constructions were shaped and reinforced by various attainment-based selective practices which excused, excluded and disbarred students from taking these subjects. For many of the students that I interviewed, notions of 'natural ability' were prominent in both physics and modern languages. Around half of the A-level French students (7 out of 15) that I interviewed said they chose the subject because they found it easy and 'came naturally' to them.

> "Um, with French in particular I guess it was just that it was one of my strong subjects at GCSE and um, I found it came quite naturally…" (Samantha, French Focus Group, Cedar Sixth Form College)

As Samantha's comments suggest, it was not simply enough to receive high marks in these subjects, but high attainment had to be 'easy' or effortless. Conversely, perceived difficulty was the most common reason that students gave for not continuing physics and modern languages to A-level, even for students who had done well in those subjects at GCSE. The previous chapter detailed examples of students who reported that high levels of stress and anxiety over the workload in GCSE science had discouraged them from studying A-level physics. Similarly, students often felt that modern languages required a lot more 'work' than other subjects.

> "I did Triple Science because I really liked science… But it was really hard… and then I got my results and I was like, that's it, I'm not touching science again… this is too hard, I'm not carrying on, that's it, I'll do my GCSEs, that's it. Bye science!" (Jessica, Other Focus Group, Ashford Academy)

> "I've never really been confident with French, you know, I got a good grade in it because I put in a lot of work… and I suppose this is why I was put off the A-level…" (Daniel, Male Other Focus Group, Cedar Sixth Form College)

My analysis in this chapter was influenced by research in secondary schools in the USA, England and Sweden that has found that the 'effortless achiever' identity in education is often equated with 'authentic intelligence' (or natural ability) but has been particularly associated with middle-class masculinity (Jackson & Nyström, 2015; Carlone, 2004; Francis, et al., 2012). For example, research by Carlone (2004) in the USA illustrated how a teachers' gendered expectations of the students in high school physics classes reproduced gender stereotypes by positioning the male students in the class as having 'raw talent' for the subject, whereas the female students were seen as having succeeded

in the subject through hard work. In relation to social class, previous studies have described how working-class pupils presenting as 'effortless' run the risk of being positioned as lazy and lacking aspirations (Jackson & Nyström, 2015). Moreover, the 'effortless achiever identity' is established more easily in some subjects than others; it is more difficult to hide effort in subjects that require extended writing, more common in 'feminine humanities' than in 'masculine sciences' (Nyström, et al., 2019; Jackson & Nyström, 2015). The rest of this section will focus on main ways that the students positioned themselves or negotiated identity in the focus group discussions in relation to notions of 'natural ability'. As I will discuss, these notions of 'effortless achievement' were often gendered in both physics and modern languages whereas, in modern languages specifically, students' conceptualised success in terms of conversational 'fluency'.

7.3 Physics as a 'masculine' subject

During the focus groups, students commonly described themselves as either a 'science person' or an 'essay person' and suggested that talents for these subjects were somewhat rigid or fixed, particularly for science subjects. Many of the A-level physics students had never considered studying anything besides science subjects. For these students, studying science was obvious, practically a non-choice, because science came 'naturally' to them.

> "I really like sciences and stuff so… and there wasn't really anything else that I wanted to do, so I just kind of went with what I liked." (Ben, Physics Focus Group, Ashford Academy)

> "I chose Physics and Maths because I've always been like, the content in it has naturally come to me, like I understand it a lot more than other subjects." (Leslie, Physics Focus Group, Birch High School)

It is interesting to note that most of the A-level physics students were taking similar subject combinations; all but one of the physics students was also taking A-level mathematics and 16 (out of 25) students were taking at least one other science A-level (biology or chemistry) (see Appendix H). In contrast, there was no comparable 'companion' subject for modern language students as mathematics appeared to be for physics (see Appendix H). Instead, the A-level modern language students appeared to be evenly split between those who were taking a combination of languages and science subjects (7 out of 17) and those who combined languages with humanities subjects (7 out of 17). Only 3 (out of 17) modern language students were taking multiple language A-levels, though this was only possible at some the schools. These patterns suggest that some combinations of subjects were more compatible than others; physics was especially incompatible with non-science subjects while modern language students had more diverse combinations of subjects.

These patterns were also exemplified through students' expressed career aspirations. The majority of physics A-level students (18 out of 25) aspired to careers in engineering or physics itself with the rest aspiring to STEM-related careers in medicine, teaching (physics), video games development, finance and aeronautics (professional pilot) (see Appendix I). In contrast, modern language students aspired to a wider range of careers and languages were seen to offer greater opportunities for travel and mobility. Only 4 (out of 17) A-level modern language students felt that languages would be directly useful for their careers or future plans. Students who did continue modern languages did not always have a specific career pathway in mind. Instead, modern languages were constructed as a tool to allow them to travel and learn about other cultures.

In relation to gender, there have been decades of research which demonstrate that students, teachers and the wider community have a clear sense of gendered curriculum divisions and gender-specific stereotypes about the careers available to different students (Mendick, 2005; Thomas, 1988). More recent studies have shown positive shifts in these views, with girls less likely to exclude traditionally male subjects such as mathematics and science (Francis, 2000; Mujtaba & Reiss, 2013a). Nonetheless, there is a widespread finding that many young people still come to see science, particularly physics, as being for boys (e.g. Archer, Moote, et al., 2017; Carlone, 2003; Francis, 2000; Mendick, 2005). This construction of physics as a masculine subject is something that young people must negotiate in order to choose the subject (Archer, Moote, et al., 2017).

Many of the students in this study (19 out of 67), said they believed that physics is a particularly 'masculine' or a subject that boys were more likely to study, and this perception was shared even by many of the girls taking A-level physics. Girls who studying A-level physics were viewed as exceptional since there were so few of them taking the subject, as indicated by the following two comments:

> "I feel like girls who are interested in physics are like really interested in physics, but guys just choose to take physics because most of the guys take physics. Their friends take physics too." (Felicity, Female Physics Focus Group, Cedar Sixth Form College)

> "I feel like on a conventional level more boys are attracted to physics than girls are…" (Leslie, Physics Focus Group, Birch High School)

Science subjects were often constructed in opposition to 'creative' 'essay-based' subjects like English literature which were constructed as more feminine, as illustrated in these quotes from Claire, Amir and Allen.

> "I think English has a reputation of, because it's a more of a like creative, I always feel like people see creative subjects as more of a like female or feminine sort of territory. And I feel like, factual like scientific sort of things maybe as more male territory." (Claire, Mixed Other Focus Group, Cedar Sixth Form College)

> "I think that also maybe, French is like, it's a language which means that there's just as many women speaking it as males do. Whereas physics is something that you learn so an Engineer would be like, I don't know, you can't really relate the two. French is a lot more broad and I think that's why like maybe girls would be more interested in doing that." (Amir, Male French Focus Group, Cedar Sixth Form College)

> "I think, like, because it seems like there's a lot more males in science because a lot of them feel like they get pushed out of things like English and stuff... I really felt like I got pushed out by English Literature… some of the stuff I just felt was very female sort of orientated… I felt like the sort of stuff we were reading, didn't feel like there was really anything in there for men in any sort of sense…" (Allen, Mixed Other Focus Group, Cedar Sixth Form College)

These comments demonstrate that it was not only that girls who felt excluded from physics through these gendered constructions of school subjects. Some boys, like Allen, reported feeling excluded by his perception of the 'female oriented' or feminised English curriculum. Students' perceptions of their own subject identities followed similar trends, especially the boys. Boys were more likely to describe themselves as a 'science person' (19 out of 37) compared to those who said they are better at 'languages' or 'essay subjects' (9 out of 37). A smaller number of boys felt they were equally good at both science and languages (5 out of 37) and a few were unsure (4 out of 37). On the other hand, girls were more evenly split, 12 (out of 30) said they were better at science, 14 said they were better at languages or 'essay subjects' and only 4 felt they felt equally skilled at both.

In relation to their subject choices, students positioned themselves in relation to such gendered notions of school subjects and curricula in several ways. The girls who were studying physics were often described as 'tomboys' by their peers or positioned themselves as 'tomboys' by drawing on stereotypically masculine traits and interests. For example, Phoebe (below) describes herself as 'like a boy' by drawing on her interest in engineering and transportation, reinforcing the 'masculine' image of physics and engineering.

> "I think people who take engineering anyway, girls who take it, they're seen as a tomboy even if they're really, really feminine just because they're… taking like, a male-dominated subject and then they're labelled a tomboy because they're like the only girl doing it." (Sophie, Female Other Focus Group, Cedar Sixth Form College)

> "I think it was just since a young age, I've always liked trains, cars, like I was always like maybe, like a boy." (Phoebe, Physics Focus Group, Daffodil Girls' School)
>
> "For example from, our school, because most of the girls take English and History… The thing is, that's the case with most of the girls who went to our school but then I'm like the complete opposite. I don't like essays." (Lucy, Female Physics Focus Group, Cedar Sixth Form College)

Since physics was also constructed as a 'difficult' subject, students who were not in the top sets at GCSE had to perform significant identity work to be recognised as authentic physics students and to be allowed to take A-level physics. Besides the mainly high-attaining students who were taking physics, there were also two physics students at Ashford Academy who had been placed in lower sets at GCSE, Tom and Albert. While both boys had had narrowly missed the grade cut-off, Ashford's physics teacher (Ms. AP) advocated for them to be allowed to take A-level physics. Both Tom and Albert described their interest in physics in relation to their personal interests and activities. Albert said he 'always' had an interest in space and airplanes while Tom repeatedly brought the conversation about his decision to study physics back to his interests in weightlifting and his part-time job in the kitchen of a restaurant. Tom does not describe himself as very academic and reading more about the science behind weightlifting and this was "probably the most science-y thing that I look into outside of school" (Physics Focus Group, Pilot Study, Ashford Academy).

Tom's and Albert's responses were typical of the (all male) physics students at Ashford Academy, a comprehensive secondary school in a traditionally working-class area. All the physics students at Ashford Academy described their interest in science and engineering as obvious, almost a non-decision. When I asked these students about their subject choices, none of these students had ever considered studying anything but science. Relating physics to their part-time jobs and personal interests were an important aspect of these boys' identity work which allowed them to be recognised as 'good physics students'. These students were able to create a continuity between their experiences outside of school and their current studies. This connection to 'hands-on' practical activities was an important part of these students' narratives but also, I would argue, related to their notion of (working-class) masculinity. These findings are similar to previous research on physics and masculinities which found that boys from working-class backgrounds drew on discourses of 'popular masculinity' through an interest in sports and video games at secondary school (Archer, et al., 2014) or 'technicist masculinity' through an interest in mechanics at university (Danielsson, et al., 2019) to negotiate their science identities.

These examples illustrate how some students, both girls and boys, positioned themselves as good or successful physics students by emphasising their stereotypically masculine interests (e.g. engineering, sports, 'hands-on' activities). In the previous chapter, I discuss pedagogic practices which reinforced a masculine culture in physics through fostered a 'competitive' environment which was alienating for many students, particularly the girls. I would argue that these practices have a significant impact on which students continue studying science at post-compulsory levels.

7.4 Gendered notions of French and German

While the majority of participants believed or were at least aware of the association of science and masculinity, they were less likely to feel that all modern languages are as overtly gendered. When I asked about national gender disparities in modern languages at secondary (A-level) and university levels, most students said they were unaware that there were any gendered patterns of uptake at these levels. However, as the discussions progressed it appeared that although modern languages were not generally seen as gendered, specific languages may be more strongly associated with femininity or masculinity. Some participants felt that French was more 'feminine', and German was viewed as more 'masculine' due to its associations with science, engineering and business. While this was not a widespread assumption, three of the students commented that they felt that French, in particular, was more feminised and therefore less interesting or appealing to boys. For example, Amy (Cedar Sixth Form College) described French as a 'dainty' language and Alice (Cedar Sixth Form College) refers to French, Spanish and Italian as 'languages of love' which are less appealing to boys who are more interested in business and maths.

> "I think it's just because French is kind of like a dainty language and it's just like, I don't know. That's just the impression I get so, like no boys would be like 'Oh yeah, I really want to do well in French.' They'd just be like, they really want to do Maths or Business or something." (Amy, Female French Focus Group, Cedar Sixth Form College)

> "I feel like French... Spanish, Italian. I feel like because they call them the languages of love, I feel like…those languages are more like female dominated whereas, more like German, boys are likely to do German because of business and stuff and like how many businesses are in Germany." (Alice, Female French Focus Group, Cedar Sixth Form College)

These comments echo previous research with young people, which has also found that students perceived French as a particularly unsuitable choice for boys due to its associations with feminine interests such as travel, old buildings and history (Williams, et al., 2002; Carr & Pauwels, 2006; Bartram, 2006, 2010). In Bartram's (2006) interviews with modern language learners (age 15 to 16)

at mixed comprehensive schools in England, Germany and the Netherlands, French was perceived as 'girly' by students in all three countries. Some of the Dutch pupils in Bartram's study felt this was due to the aesthetics of French as an "elegant and chic" language which appealed more to girls (2006, p.51), similar to Amy's description of French as a 'dainty language'. A few of the English boys in Bartram's (2006) study also expressed embarrassment at trying to speak with a French accent in front of other boys, suggesting that learning French might be seen as compromising male identity.

For some students and teachers, German was more closely associated with science and perceived to be more 'useful' for business applications. For example, Sara (Birch High School) explained that she wanted to study German because it would make her 'more employable' and provide access to scientific journal articles before they are translated into English.

> "I'm aware that universities uh, really like languages and I wanted to be, you know, be able to get into competitive universities and also I know that Germany is becoming a sort of world power and I know they have very good technology and science and they're very relevant in the uh, politically… It's just a good job skill, it makes you more employable… there are lots of German companies especially with technology… and uh, lots of German scientists, research papers things that need to be translated but you can get in there first." (Sara, Modern Language Focus Group, Birch High School)

Three teachers, including Ms. BM (below) also noted that students tend to associate German with science and engineering which are constructed as more 'masculine' subjects.

> "I think the boys go for German over the girls because of the engineering route and they see science and engineering and German together." (Ms. BM, Head of Languages & German Teacher, Birch High School)

Interestingly, none of the boys in the focus groups articulated a link between German and careers in science or engineering in the focus groups. However, a small number of the boys who studied GCSE German said that it was easier than French due to its similarity to English and more interesting curriculum.

> "I took German and I enjoyed it in Year 9 quite a lot… it felt a lot easier to me compared to French." (David, Other Focus Group, Birch High School)

> "I just found uh, I found German easier. I guess it's always just down to personal preference but out of the two, I found German easier to understand than French. I don't know why but, I think English is like a Germanic language or something like that and I just found, just found

> it easier to understand. I mean like, "and" in English is "und" in German." (Brian, Other Focus Group, Birch High School)

The examples in this section are included to illustrate how the students' comments relate to the existing literature on gender and students' subject choices, particularly in modern languages, and to show how this contrasts with the much more common perceptions of physics as a 'masculine' subject. None of the boys in this study reported feeling excluded or marginalised in modern language classrooms in the same way that some of the girls reported feeling marginalised in physics classrooms. However, in the literature on modern language education, boys in particular, have been found to negotiate gendered perceptions of different languages was by emphasising the potential for languages to provide transferable skills and access to high-paying careers. In a study by Bartram (2010), many students who acknowledged the usefulness of German appear to locate its utility *beyond* their present (Bartram, 2010, p.95). Similarly, previous research by Carr and Pauwels' in Australia has also highlighted how boys were more likely to perceive Asian languages, Chinese and Japanese, as more 'useful' for future careers in more 'masculine' fields such as building/construction and technology (Carr & Pauwels, 2006, p.171).

7.5 Negotiating 'success' in modern languages: conversational fluency and exams

As has been mentioned elsewhere in this thesis (see Section 6.3.2), perceived difficulty was the most common reason that students gave for choosing not to continue studying modern languages at A-level. Besides the concerns about grading severity and workload, speaking and listening were a major concern for students and spoken fluency was a common measure of success in modern languages against which they compared their own abilities. Both Jessica (Ashford) and Leah (Cedar) had considered studying modern language A-levels but reconsidered after the first day.

> "I know I've got an A* in GCSE and I had to drop A-level, I can't do it… a lad that was in my French when I was in AS, I was like watching him because he would just fluently have conversations with Miss and I was like, I could never do that…" (Jessica, Other Focus Group, Ashford Academy)

> "I found it so difficult, but that was because… everyone else, to me, just seemed like they were way more educated in Spanish than I was… because she spoke fully in Spanish in the first lesson, and I barely understood any of it." (Leah, Female Other Focus Group, Cedar Sixth Form College)

In the examples above, both Jessica (Ashford Academy) and Leah (Cedar Sixth Form College) explain how they had initially wanted to study a language at A-level but chose not to because they found it difficult to keep up with speaking and listening tasks used in the classroom, despite achieving high grades in modern languages at GCSE. These comments highlight a point which is distinctive for modern languages is the greater emphasis of speaking and listening, compared to English and other 'essay subjects' which have a greater emphasis on reading and writing. Being able to speak a language 'fluently', either as a 'valuable skill' or for a specific career pathway, was an important motivator for most (12 out of 17) of the A-level modern language students. All the modern language students described languages as a tool that would offer greater opportunities and the 'freedom' to travel and work in other countries as well as learn about other cultures, as illustrated by these comments from Eric, Amir and Alice:

> "I think languages open up options because most businesses need overseas, like they will need someone to speak French overseas. So I think that if you have a language it's sort of easier to get a job. There's no set path." (Eric, Male French Focus Group, Cedar Sixth Form College)

> "I think it could maybe allow you to work abroad a lot easier as well. Because obviously it's not just France that speaks French like a country like Belgium as well. So I think it (..) gives you an edge maybe, over other people who might be fighting you for the same places in a job, knowing that you can speak another language (..) It's just something useful I think for anyone." (Amir, Male French Focus Group, Cedar Sixth Form College)

> "I want to do International Relations and French at university and I hope to become a diplomatic service officer in the foreign office… But it's a case of, I don't really want to stay in France if I'm truly honest. I'd want to go to like Francophone countries, mainly in like Africa or the Caribbean or Asia, it wouldn't just be a thing where I'd want to stay in France. Like I actually want to be able to travel with the job…" (Alice, Female French Focus Group, Cedar Sixth Form College)

These comments illustrate how students' investment in second language and literacy practices were often linked to hoped-for *future* identities as well as their *current* sense of their own identities. For these students, there was a general sense that languages would provide a greater appreciation of other cultures so that they could become 'global citizens' through learning another language. From a social practice lens, learning a language provided a way for students to positioning oneself in society (Coffey & Street, 2008). Similar to the participants in a study by Coffey and Street (2008), the language learning project represented a site for increasing symbolic power, often through increased

opportunity to integrate new areas of experience into their lives as they participate in new figured worlds (p. 457). Coffey and Street (2008) concluded that "the act of becoming bilingual allows conscious commitment to certain ways of being and doing that constitute construction of new identities" within and across real and imagined figured worlds (p. 453).

At the same time, many students (17 out of 67) felt a disconnect between their grades and perceptions of their ability to speak their target language. For these students, high attainment in modern languages at GCSE did not mean that students saw themselves as 'successful' modern language learners, as Daniel, Chelsea and Allen describe:

> "I got an A* in French um, when I went to France though on holiday, I probably embarrassed myself with how bad my French was." (Daniel, Male Other Focus Group, Cedar Sixth Form College)
>
> "I don't think the GCSE really, like the grades you get actually show that you know any of the language… I wish I knew how to speak Spanish but I don't really know anything and I go there most years and I still don't know anything." (Chelsea, Physics Focus Group, Daffodil Girls' School)
>
> "I got a B in the exam but I can't actually speak it because I basically just cheated on my coursework… I can't actually speak any Spanish at all but I passed the GCSE and so I felt like it was a complete waste of five years." (Allen, Mixed Other Focus Group, Cedar Sixth Form

In her model of *investment* (in language learning), Norton (1995) explains that learners exercise agency to *invest* in practices which can transform their lives, such as learning a new language (Darvin & Norton, 2015, p.46). Building on Norton's concept of investment in their ethnographic study of middle school students in the USA, McKay and Wong (1996) observed that students' 'investment' practices could be highly selective in any one or a combination of the four language skills: listening, speaking, reading and writing. McKay and Wong argue that, "contrary to common belief, the four skills do not develop sequentially, nor is proficiency in one necessarily an indicator of proficiency in another" (McKay & Wong, 1996, p.604). Moreover, speaking a language is a skill that may be regarded as 'highly performative' which can cause anxiety for learners and lead to negative attitudes towards language learning (Bartram, 2006; Graham, et al., 2012). For the students in this study who were highly invested in fluency and spoken proficiency, I would argue that it was difficult for them to value success in other aspects of language learning such as reading and writing.

Through the lens of social practice theory, social positions play an important role in shaping how individuals perceive possibilities and limitations. Higher social positions represent an "entitlement to

social and material resources" which are accorded to those "genders, races, ethnic groups, castes and sexualities privileged by society" (Holland, et al., 1998, p.271). I argue that within the figured world of modern languages, 'native speakers' were perceived to have an advantage and have access to greater resources (e.g. trips abroad, family members who speak the language, etc). The previous chapter discussed how concerns about grade severity influenced the advice given to students since 'native speakers' are thought to perform better on exams (see Section 6.3.2).

There also appeared to be a common assumption that languages are learned 'from birth' or inherited, either through genetic endowment or by socialisation. Students who did not speak any additional languages could be discouraged by what appeared to be a divide between native and non-native speakers.

> "I think a lot of people who are bilingual it's because their parents speak… That's how the majority of people learn when they're younger. And I think that's why when people are bilingual, it's because of that early learning." (Sophie, Female Other Focus Group, Cedar Sixth Form College)

> "Like for me, language is something that you always learn at birth, uh so people might be put off learning languages because it's not something that they've always known." (David, Other Focus Group, Birch High School)

For the students who self-identified as bilingual/native-speakers or who had a personal connection to another language, spoken fluency was perceived to be an advantage. For example, Amir viewed his decision to study A-level French as a 'safe option' because he had completed part of his education in France and spoke French with his parents. Another student, Nick, drew on his family connection to Russian as an advantage in studying the language at Elmwood Independent Boys' School, the only school in this study which offered the subject.

> "I enjoyed it at GCSE and I could speak it at home so I thought it would be a safe option to take and like, I'd enjoy it because I'd be good at it…" (Amir, Male French Focus Group, Cedar Sixth Form College)

However, the 'native speaker' identity was sometimes in conflict with 'good student' identities in modern languages. Three of the five modern language teachers (Ms. BM, Ms. CM and Ms. DM) described how being a 'native speaker' could be a hindrance rather than as an asset for students and one of the language teachers described their 'native speaker' students as 'lazy' since they did not appear to work as hard as the non-native speakers. Another teacher (Ms. DM) brought up the difficulties for students who do not speak the 'standard' varieties of languages taught in schools.

> "Sometimes having a language is a benefit and sometimes it's a bit of a hindrance because you've got to unpick the bad grammar rules, as well…" (Ms BM, Head of Languages, Birch High School)
>
> "My students, my native speakers in French are not as strong, we have, I believe, stronger students who are not native speakers in French… I have, um, the two native speakers are a bit lazy, more lazy than the two other boys that are not…. One student, he's a native speaker, I keep telling him, you know, he's not working hard enough but is still getting good grades because they can get away with it and understand." (Ms. CM, French Teacher, Cedar Sixth Form College)
>
> "We've got more Columbian girls that do Spanish and we have lots of girls who are of um, French-speaking African countries. So we have, some of them have taken Spanish or French to A-level… because they feel that they can speak it, obviously when they did get on to do the A-level, they find the difficulty is that they are colloquial... what they could have got away with at GCSE they can't get away with in A-level." (Ms. DM, Head of Languages, Daffodil Girls' School)

These comments are particularly strange if compared with perceptions around 'natural ability' in science subjects. Students with scientist parents and who participate in out-of-school science activities are unlikely to be described as 'lazy' if they decide to study science at post-compulsory levels. Furthermore, languages are not static and there are often multiple groups that can claim 'ownership' of languages across national boundaries (e.g. European versus African varieties of French, European versus Latin American varieties of Spanish). As Rampton (1990) argues, "if native-speaker competence is used to set targets and define proficiency, the learner is left playing a game in which the goal-posts are perpetually being moved by the people they cannot often challenge" (p. 98). These examples highlight a feature which is unique to modern languages.

7.6 Conclusion

The examples in this chapter have explored some of the ways that students negotiated identities in relation to the celebrated subject identities in physics and modern languages. In physics, many students were able to demonstrate natural ability in physics by emphasising stereotypically masculine interests (e.g. engineering, sports, 'hands-on' activities). This was particularly common for students from groups that are underrepresented in physics, namely girls and students from working-class backgrounds. In the previous chapter, I discussed how some girls felt alienated by the masculine and competitive culture of physics classrooms. However, I could not find any instances

where boys felt they had been teased or marginalised in modern language classrooms because of their gender. In modern languages, natural ability was more closely associated with spoken fluency in other languages, something that came more easily for bilingual and 'native speaker' students. However, the 'native speaker' identity did sometimes conflict with 'good student' identities in modern languages since these students were not seen to work as hard as non-native speakers. In the following chapter I will discuss the wider implications of my findings for policy and practice.

Chapter 8: Discussion and Conclusion

8.1 Introduction

In this chapter, I draw together the key findings and contributions of this study. As discussed in Chapters 1 and 2, physics and modern languages are identified as school subjects which have been experiencing a 'skills gap' or shortage of qualified graduates to meet the economic demands (HEFCE, 2008, 2011) and studied disproportionately by students from more advantaged backgrounds (Davies, et al., 2008; Henderson, et al., 2017; Vidal Rodeiro, 2007; Dilnot, 2016). While there has been considerable research and policy interest in understanding the factors which influence participation in these subjects separately, there is almost no research into how the factors influencing participation in science compares with those for non-science subjects. This thesis aims to address that gap in the literature and makes an empirical contribution to knowledge by improving the understanding of the factors which influence post-16 participation in physics and modern language (A-levels). This thesis also makes a conceptual contribution to the literature on subject choice using multiple theoretical tools to explore across a range of social, cultural and structural factors influencing students' choices.

Specifically, I addressed the following research questions:

1) What are the main factors impacting students' post-16 subject choices in physics and modern languages?
2) To what extent are the factors shaping students' subject choices similar or different for physics and modern languages?
    a) How are these factors influenced by structural inequalities related to gender, ethnicity and socioeconomic background?

For this study, I adopted a qualitative research methodology and collected data through student focus groups and teacher interviews at 5 sixth forms as discussed in Chapter 4. I began my analysis of the data by mapping out students' reasons for choosing to study physics and/or modern language A-levels, or not. Then, I subjected the data to a more theoretically informed analysis using Bourdieu's (1984, 1990, 1986) theory of social reproduction and the concept of *celebrated subject positions* developed by Carlone et al. (2014) which are outlined in Chapter 3. The analysis in Chapters 5 and 6 used Bourdieu's concepts of institutional habitus, symbolic violence and pedagogic work to examine the role of school and subject-specific practices on participation in physics and modern languages. In Chapter 7, I used the concept of *celebrated subject positions* developed by Carlone et al. (2014) to explore the ways that physics and modern language students exercised

agency in their subject choices. In this final chapter, I draw together and discuss the key findings and contributions of this study and reflect on the theoretical approaches I adopted. The chapter concludes with a discussion of the limitations and implications of this study, including thoughts for further research.

8.2 Discussion of findings

This section pulls together the findings from the three analytic chapters and the literature review to discuss the key findings and contributions of this study to understanding the factors that influence post-16 participation in physics and modern languages. This thesis contributes a greater understanding of subject choice in post-16 education in England and draws comparisons between two contrasting subjects, both of which are studied by a limited number of students in English secondary education and are disproportionately studied by students from White and middle-class backgrounds. In this section, I will outline the key empirical findings and conceptual contributions by first addressing my research questions. Next, I will discuss the key findings of this study in greater detail and grouped at each of these broader 'levels' and then reflect on the usefulness of the theoretical perspectives applied in this study for understanding students' choices.

The first research question focuses on understanding the main factors influencing students' subject choices in physics and modern language A-levels. Based on an initial mapping of the student focus group data, I grouped the reasons that students gave for their subject choices into three broader categories related to school practices, subjects (physics and modern languages) and students. These categories helped to drive a more conceptually driven analysis using the theoretical tools adopted in this thesis. Initially, my intention was to prioritise students' voices and choice narratives however, as the study evolved, it became clear that schools and institutions played a key role in students' subject choices. This meant that the role of schools and institutions became more central in my analysis and teachers and students are understood as located within those institutions. At the beginning of this thesis, I presented a diagram (Figure 1) which illustrates my conceptual mapping of the factors influencing students' subject choices represented by spheres of society, school practices, subject-specific practices and individual students. Some factors operate at multiple levels, for example, the school curriculum and assessments are shaped by education policy, enacted at schools and within subject classrooms which then influence students' educational experiences and perceptions of different school subjects.

The second research question addresses the extent to which the factors shaping students' post-16 subject choices are similar or different for physics and modern languages. Overall, I argue that physics and modern languages share some similarities, notably in terms of their relatively high status

at independent and selective schools and the prevalence of attainment-based gate-keeping practices at state-funded schools. However, there were significant differences in terms of the provision of these subjects between state-funded schools. In addition, gendered notions of the curriculum and the influence of students' out-of-school experiences were significant in shaping post-16 participation in physics and modern languages, though in different ways. Below, I revisit this diagram and map the key factors identified in this study onto the different spheres. Each of the spheres or levels will be discussed in greater detail in the following sub-sections.

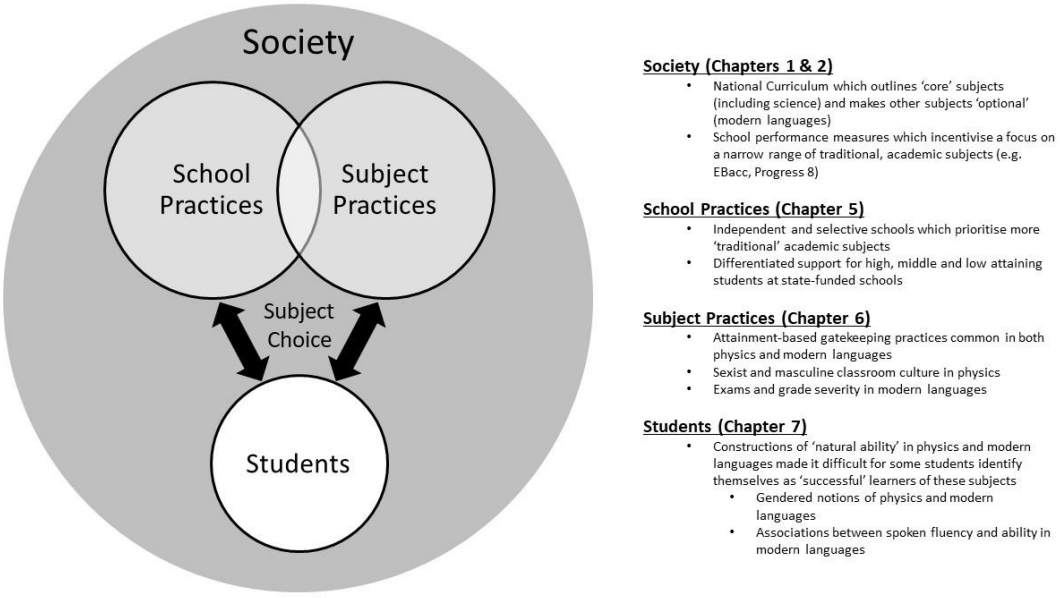

Figure 3 Conceptual mapping of factors influencing students' subject choices with key findings

8.2.1 Society and policy level factors (Chapters 1 & 2)

At a policy level, physics and modern languages differ widely in terms of provision, particularly at state-funded schools. The national curriculum outlines 'core' and 'foundation' subjects which are compulsory during primary and secondary education. Science is a 'core' subject throughout compulsory schooling and all students at state-funded schools must receive at least some form of science education through age 16, though structure and provision of science options varies from school to school. However, unlike science subjects, modern languages are not compulsory beyond age 14 and individual schools are free to set their own policies. Some have argued that these policies have led to disparities in access to and participation in modern languages between schools, since independent and selective schools are more likely than state-funded comprehensive schools to offer multiple languages and make them compulsory for all students (Tinsley, 2013; Lanvers, 2017a). **The more varied provision of modern languages between schools at GCSE and A-level was a major difference between physics and modern languages.**

Moreover, education policies such as school performance measures have also been shown to influence participation in these subjects, particularly modern languages. As discussed in Chapter 1 (Section 1.3), some have argued that school performance measures such as EBacc and Progress 8 incentivise schools to focus on a narrow range of traditional, academic subjects but disadvantage schools with fewer resources in less affluent areas (Allen & Thomson, 2016; Neumann, et al., 2016). There is evidence that some schools actively discourage students with low prior attainment from studying subjects which may jeopardise the school's performance on league tables, particularly science and modern languages (Parameshwaran & Thomson, 2015; Greevy, et al., 2013; Davies, et al., 2008). In addition, examples from this thesis illustrate how some state-funded schools ration support and guidance to high-attaining students who have a better chance of performing well on assessments. This will be discussed in the later section on subject-specific practices and attainment-based gatekeeping.

8.2.2 School practices (Chapter 5)

At the school and institutional level, students' choices are shaped through various institutional practices including curricular offers, support and guidance, organisational practices (e.g. subject entry requirements) as well as cultural and expressive characteristics (e.g. how the school presents itself and the attitudes of the teachers and students) (Reay, et al., 2010, p.109). The analysis in Chapter 5 illustrates how Bourdieu's theory of social reproduction and institutional habitus might be applied to analyse school practices at the 'median-level' by examining the practices at individual schools while remaining sensitive to wider structural conditions, such as the differences between more and less affluent schools (Reay, et al., 2001; Burke, et al., 2013). Using this theoretical lens, **I argue that physics and modern languages share some similarities, notably in terms of their relatively higher status at schools serving more affluent student populations. Modern languages were particularly vulnerable at state-funded schools and two of the schools in this study chose not to run the course with low numbers.**

In this study, Elmwood Independent Boys' School, which served an already advantaged student population, was able to utilise their resources to offer pupils 'traditional' A-level options alongside extensive support for developing a valuable 'package' of qualifications for university and career progression. Classical and modern languages were considered highly valued forms of cultural capital in this schools. This supports findings from previous work which shows how independent schools and schools which served more affluent student populations tend to offer a more 'traditional' academic curriculum including physics and modern languages, and to make these subjects

compulsory to age 16 (McDonough, 1997; Reay, et al., 2005). These practices anticipate the choice of traditional subjects at traditional universities (e.g. Oxbridge, Russell Group) (see Section 5.3.1).

In contrast, state-funded schools were more varied in their practices but, in general, did offer a wider combination of traditional and newer subjects (e.g. psychology, sociology, vocational courses) (see Section 5.3.2). These schools were more constrained by budgeting, staffing and timetable restrictions compared to independent schools. For example, the year this study was conducted, Ashford and Daffodil did not offer modern language A-levels though they had been offered in the past. Similarly, several of the modern language A-level students at Cedar Sixth Form College said they left their state-funded secondary schools because modern languages were not going to be offered. Previous studies have found that students attending independent schools are significantly more likely to study modern languages at A-level (Vidal Rodeiro, 2017; Board & Tinsley, 2014) and, according to a recent survey, 20 percent of state-funded secondary schools in England offer no language provision beyond the compulsory levels (Cambridge Public Policy, 2016). Another recent survey reported that in 28 percent of state-funded schools, most students are not given the opportunity to study a language beyond the age of 14 (Lanvers, 2017a). These reports highlight the vulnerable position of modern languages at state-funded secondary schools.

Moreover, support and guidance at the state-funded schools was often differentiated for high, middle and low attainers. Birch High School and Ashford Academy restricted access to triple science pathways and modern languages to the higher attaining students through formal selective practices, such as guided pathways, as well as more informal support and guidance strategies. These selective practices at Birch and Ashford appeared to have a significant impact on participation in science and modern languages at GCSE. At Birch High School in 2018, around 20 percent of students completed the triple science route and around half (47 percent) studied a modern language. At Ashford Academy, around 20 percent completed the triple science pathway and less than a quarter (24 percent) studied a modern language. However, Daffodil Girls' School's more radical approach to academic support and pastoral care appeared to have a transformative influence for their students. Daffodil was the only school in this study which did not offer multiple GCSE science routes, all students are entered for double science, and I could not find any evidence of attainment-based selection for modern languages at the GCSE level either on the school's website or during interviews. Over 75 percent of Daffodil's students studied modern languages GCSE in 2018, according to recent DfE data, much higher than any of the other state-funded schools in this study.

8.2.3 Subject-specific practices (Chapter 6)

At the subject level, students' experiences and perceptions of school subjects are shaped through curriculum, classroom materials, pedagogy and assessment. The analysis in Chapter 6 explored these subject-specific school practices which can influence student participation in physics and modern languages using Bourdieu's concepts of pedagogic work and symbolic violence (Bourdieu & Passeron, 1990). Throughout the student focus group data there were examples of pedagogic work which reproduced 'taken-for-granted' assumptions, dispositions and constructions specific to physics and modern languages.

In relation to pedagogy and assessment, **attainment-based gatekeeping practices had a significant impact on participation in both physics and modern languages, particularly at state-funded schools. At Key Stage 4, triple science and modern language GCSEs were restricted to high-attaining students through academic pathways, timetabling and informal guidance.** The examples in Chapter 6 illustrate how students were implicitly and explicitly guided towards making the 'right' choices but could also be disbarred or excluded if they failed to 'keep up'. In science, students could be 'moved down' from triple science to double science and, in modern languages, teachers reported how students were sometimes removed from classes to revise for other subjects. At each of the different schools, these selective practices were often linked to the schools' perceptions of the students' backgrounds and interests, intersecting with gender, ethnicity and socioeconomic background. The findings in this study reinforced and extended previous work by Archer et al. (2016) which argued that selective practices in triple science at GCSE create and perpetuate social inequalities, as well as research by Abrahams (2018) which highlighted the potential for timetable blocking systems to restrict students' subject choices. This thesis has provided numerous examples of school selective practices at Key Stage 4 which excluded or excused students from studying physics (or triple science) and modern languages and supports previous work on this topic. **At Key Stage 5, I found that higher grade entry requirements and compulsory corequisite courses made A-level physics distinctive from other subjects.** While most subjects require a grade 5 (B) or above in the subject at GCSE, physics often required at least a 6 or 7 (high B or A) in science and maths GCSE. Several schools had also additional requirements such as co-requisite maths A-level (Birch High School) and maths exams (Daffodil Girls' School). However, I would argue that the issue of higher entry requirements has received less attention in the literature on subject choice and should be investigated further.

In both physics and modern languages, perceived difficulty was the most common reason that students gave for not continuing physics and modern languages to A-level, even for students who

had done well in those subjects at GCSE. Both teachers and students expressed concern about harsher marking in these subjects compared to other subjects. The findings of this study are consistent with numerous studies on modern languages education which have found that perceived difficulty and the likely negative impact on grades is one of the factors with the greatest influence on whether students continue studying modern language subjects (Coffey, 2016; Coleman, et al., 2007; Parrish, 2019; Vidal Rodeiro, 2017). There is evidence to suggest that science (including physics) and modern language subjects are graded more severely than other subjects at GCSE and A-level, making it more difficult for students to achieve top grades in these subjects (Coe, et al., 2008; Fitz-Gibbon & Vincent, 1994; He & Black, 2019). The modern language teachers that I interviewed commented on the marking criteria for modern language GCSEs and A-levels, which they felt were marked more harshly than other subjects. For example, the French teacher at Cedar Sixth Form College (Ms. CM) remarked that she had not had any students achieve an A* in six years (see Section 6.3.3). The teachers' comments reflect ongoing national debates about 'inter-subject comparability' or the relative difficulty of different subjects (see Ofqual, 2018, 2015). In addition, several students in this study reported being discouraged from studying modern language A-levels because native speakers are thought to perform better on exams. A recent report by Ofqual did find evidence that native-speakers outperform non-native speakers on modern language A-levels, particularly in A-level German, when controlling for prior attainment, gender and school type (Taylor & Zanini, 2017). This study provides further evidence to support call to adjust the grade boundaries in science and modern language exams.

8.2.4 Individual students (Chapter 7)

In terms of individual students, there are many sociocultural factors which can influence individual students' subject choices and these have been discussed extensively in the research literature on participation in physics and modern languages separately (Chapter 2). One of the main contributions of this study is to draw attention to the broader structural factors influencing participation in both physics and modern languages. Another unique contribution is the comparative approach applied in Chapters 6 and 7 to explore both how subjects constructed learners as well as how students negotiated identity in relation to these subjects. Since much of the previous research on subject choice in physics and modern languages has been focused in these respective areas, this thesis attempted to shed some light on the similarities and differences in the factors affecting participation in these areas.

As discussed in Chapter 2 (Section 2.3), there have been decades of research which demonstrate that students, teachers and the wider community have a clear sense of gendered curriculum

divisions and gender-specific stereotypes about the careers available to different students (Mendick, 2005; Thomas, 1988). **In this study, students and teachers constructed physics (and science) as particularly 'masculine' or something that a boy was more likely to study, a perception that was shared even by many of the girls that were studying physics**. For example, some physics students, both girls and boys, positioned themselves as 'good' or 'successful' physics students by emphasising their stereotypically masculine interests (e.g. engineering, sports, 'hands-on' activities). In addition, the female students that I interviewed were more likely to report feeling excluded or marginalised by what they felt was a competitive and masculine classroom culture where 'talking science through muscular intellect' was generally recognised as an authentic and legitimate performance of science competence (Archer, et al., 2019). Several girls described the boys in their GCSE physics classes as 'rude' and 'boisterous' and some even gave this as one of the reasons they decided not to continue with physics or any science subjects beyond GCSE.

In contrast to science subjects, students were less likely to feel that all modern languages are overtly gendered, and most students said they were unaware of any gendered patterns participation in modern language education. However, for a small number of students, specific languages had stronger associations with femininity or masculinity. Some students viewed French was as more 'feminine' and German was viewed as more 'masculine' due to its associations with science, engineering and business. One student described French as more feminised or 'dainty' and several students explained that these feminised associations made French A-levels less appealing to boys. One of the boys (Allen) reported feeling excluded by his perception of the 'female oriented' or feminised English curriculum. These comments echo previous research with young people, which has also found that students perceived French as a particularly unsuitable choice for boys due to its associations with feminine interests such as travel, old buildings and history (Williams, et al., 2002; Carr and Pauwels, 2006; Bartram, 2006, 2010). One way that many of the modern language students, particularly the boys, were able to negotiate these gendered perceptions of different languages was by emphasising the potential for languages to provide transferable skills and access to high-paying careers. While these examples represent only a small number of students in this study, they are included to illustrate how students' and teachers' notions of gendered subject choices differed between physics and modern languages. None of the boys in this study reported feeling excluded or marginalised in modern language classrooms in the same way that some of the girls reported feeling marginalised in physics classrooms.

One thing that make modern languages distinctive as school subjects is the way that students and teachers assign a special status or identity to those who can speak other languages. I argue that

there is no equivalent status or identity in physics and other school subjects. While the 'native/non-native' binary is controversial and widely debated in sociolinguistics and language education (e.g. Cook, 1999; Davies, 2003; Medgyes, 1992; Rampton, 1990; Coffey & Wingate, 2018), for the participants in this study, native speaker and bilingual students were perceived to have an advantage and to have access to greater resources (e.g. trips abroad, family members who speak the language, etc) compared to non-native speakers. Moreover, 'native-speaker proficiency' was a common benchmark for success against which students compared their own abilities. In Chapter 7 (Section 7.5), I described how even high-attaining modern language students articulated a disconnect between their grades and their 'abilities' as evaluated against an idealised notion of 'native-speaker proficiency'. However, the 'native speaker' identity sometimes conflicted with 'good student' identities in modern languages. Several of the modern language teachers that I interviewed described how being a 'native speaker' could be a hindrance rather an asset for students and one of the language teachers described their 'native speaker' students as 'lazy' since they did not appear to work as hard as the non-native speakers. Another teacher brought up the difficulties for students who do not speak the 'standard' varieties of languages taught in schools.

In sum, I argue that physics and modern languages share some similarities, notably in terms of their relatively high status at independent and selective schools and the prevalence of attainment-based gate-keeping practices at state-funded schools. These similarities have the potential to reinforce existing inequalities, particularly related to gender and social class, by restricting participation in these subjects at secondary school to mainly high-attaining students at more affluent (middle-class) schools. On the other hand, there were significant differences in terms of the provision of these subjects between state-funded schools as well as the role of gendered notions of the curriculum and the influence of out-of-school experiences. First, science and physics were more strongly associated with masculinity while specific languages were associated with different genders. The gendered notions of school subjects influenced students' choices through interactions with students' identities, notably through pedagogical practices in physics and a perceived bias towards more feminine interests in the French curriculum. Second, this research has highlighted the importance of out-of-school experiences in shaping students' subject choices in modern languages and this has received relatively little attention in the research literature. These similarities and differences provide starting points for understanding and addressing the inequalities in participation not only in physics and modern languages but also in students' subject choices more generally.

8.2.5 Reflecting on the theoretical approaches (Chapter 3)

In this section, I reflect on the theoretical approaches that I used to examine and understand students' subject choices from a sociological perspective. As outlined in Chapter 3, I have adopted an approach which is underpinned by Bourdieu's theory of social reproduction and influenced by sociological and sociocultural theorisations of identity, particularly the concepts of *celebrated subject identities* developed by Carlone et al. (2014) and *figured worlds* developed by Holland et al. (1998). Bourdieu's theory of social reproduction focuses on the way in which different economic, cultural and social capitals are possessed by different social classes which result in the formation of internalised dispositions towards learning that inform students' educational choices (Bourdieu, 1984, 1990, 1986). Holland et al.'s (1998) theorisations of *figured worlds* incorporates influences from Bourdieu regarding the power of social structures such as gender, ethnicity and social class to position individuals within particular social practices. Individuals engage in *identity work* within educational settings as they develop understandings of school subjects, position themselves and are positioned by others in relation to these subjects, including through their subject choices (Holland, et al., 1998). Drawing on the notion of *figured worlds*, Carlone et al.'s concept of *celebrated subject* identities describes the cultural models of who counts as successful and legitimate participants in school subjects to shift focus to individual agency and the ways that individuals are actively constructing identities.

I considered Bourdieu's (1984, 1986) concepts of habitus, capital and field useful for understanding the reproduction of inequalities in education, particularly in relation to social class. Bourdieu's theory of social reproduction is usually applied on a larger scale at the level of societies, but I have applied these concepts to investigate how social structures are reproduced at a 'median level' within schools and departments. Building on work by Reay et al. (2010) and others (e.g. McDonough, 1997; Smyth & Banks, 2012; Kolluri, 2019), the concept of *institutional habitus* provided a framework to examine the role of schools in shaping students' identities, aspirations and subject choices. While institutional habitus has mainly been used to explore university access and aspirations, not applied to subject choice, this approach was helpful to 'zoom out' from individual students to contextualise and situate students' choices. Through this lens I was able to compare between schools and between subjects/departments (i.e. physics and modern languages). In Chapters 5 and 6, I argued that schools' institutional habitus play an important role in shaping students' subject choices which is often overlooked in research which focuses on individual students' attitudes and motivations. In addition, I considered how institutional habitus is enacted within physics and modern languages using Bourdieu's (1990) concepts of *pedagogic work* and *symbolic violence* and building on recent

work in physics education by Archer et al. (2020). These concepts provided a framework to draw comparisons between physics and modern languages by focusing analysis on the mechanisms and practices within disciplines that can influence student participation and engagement. This thesis makes a novel contribution to this literature by extending the concept of institutional habitus in relation to subject choice.

Carlone et al.'s (2014) concept of *celebrated subject identities*, provided a theoretical lens to focus on the different ways that students positioned themselves (deliberately or not) and/or were positioned as successful learners within physics and modern languages education. This conceptual lens highlighted how some identity performances were privileged and more easily recognised while others were marginalised. The difficulties accessing the practices privileged within celebrated subject positions illuminate the sometimes problematic recognition work related to the raced, classed, and/or gendered nature of celebrated subject positions (Carlone, et al., 2014, p.839). This study offers some reflections and empirical examples to illustrate the different ways that students' gender, ethnicity and/or social class influenced their subject choices. For example, the analysis in Chapter 7 (Section 7.5) discussed how students and teachers perceived 'native-speaker' and multilingual students to have an advantage ('natural' abilities) compared to non-native speakers. 'Native-speaker proficiency' was a common benchmark for success against which students compared their own abilities. However, the 'native speaker' identity did sometimes conflict with the celebrated subject positions in modern languages, often intersecting with gender, ethnicity and social class in complex ways. Several teachers described how being a 'native speaker' could be a hindrance since some students did not speak 'standard' varieties of the languages taught in schools and because native speaker students may not appear to work as hard as non-native speakers. Moreover, more affluent students, particularly at Elmwood Independent Boys' School and Birch High School, had greater access to resources and opportunities to participate in language exchanges and work placements abroad. Thus, this thesis extends Carlone et al.'s concept of celebrated subject positions beyond science education and shows how it might be applied in other school subjects.

In sum, I argue that each of these theoretical perspectives allowed me to interrogate the data at different levels or magnifications and, thus, helping to provide a more holistic understanding of students' subject choices than in previous studies which focus on either micro or macro level factors. The use of these different theoretical perspectives is reflected in the structure of this thesis. In examining school institutional habitus, the thesis highlights how students' subject choices are shaped at the institutional level in both physics and modern languages through, for example, curricular offers and academic pathways. The social practice lens provided an additional and

complementary perspective to examine how these practices shaped students' educational experiences and choices. Previous studies on subject choice using a Bourdieusian lens have tended to focus on broader structural inequalities, particularly in relation to social class (e.g. Bowers-Brown, 2016; Smyth & Banks, 2012; Reay, et al., 2010). In contrast, studies employing a social practice lens have tended to focus on the importance of students' identities and experiences in shaping educational choices (Carlone, et al., 2014; Coffey & Street, 2008; Gonsalves, et al., 2019). This study builds on and extends the literature on subject choice and participation in physics and modern languages by providing a median or meso level analysis which attends to both the structural as well as individual factors and experiences which influence students' subject choices.

8.3 Limitations

In this section, I reflect on the methodological and conceptual limitations of this study. On a practical level, it was very difficult to recruit schools with consistent language uptake due to the national decline in post-16 modern languages participation. Most of the schools included in this study had very low numbers taking languages post-16, except for Elmwood Independent Boys' School and Cedar Sixth Form College which did have consistent modern language offers from year to year. By comparison, two of the state-funded schools (Ashford Academy & Daffodil Girls' School) did not have any Year 12 students taking languages at the time this study was conducted although languages were advertised and there were full-time language teachers on the permanent staff at the schools. After this study was conducted, the other state-funded secondary school (Birch High School) lost a member of staff in the language department due to low uptake of A-level languages. While the schools that were included in this study are not necessarily representative of the national landscape of schools, I would argue that these challenges do reflect common concerns within modern languages education nationally.

Following the initial challenges in recruiting schools, I was not able to spend as much time at each school site as I would have preferred. Some of the student focus groups were as short as 30 minutes while others lasted over an hour. As a result, I was not able to gather the detailed information on students' socioeconomic and ethnic backgrounds that would have supported analyses on the ways that students' experiences varied between different groups. There were some anecdotal differences between the various ethnic groups represented in this study. However, it would be difficult to draw any conclusive findings from these examples because there were such small numbers in each of the ethnic groups. Of course, these issues are very complex, and it would have been difficult to recruit enough students from different ethnic groups since the overall numbers taking each of these subjects were so low.

Conceptually, the analytical approach used in this study meant that some issues were foregrounded more than others, namely the role of schools and subject-specific pedagogical practices. The use of different analytical approaches may have led to different interpretations and/or brought additional issues to the surface. For example, the focus on school practices meant that less attention was paid to the influence of families and out-of-school experiences. Although many students participated in out-of-school science and language learning activities, less attention was given to these activities in the focus groups and analysis due to the focus on schools and school subjects. Another limitation was that the selected theoretical perspectives did not provide explanations for all empirical occurrences. As discussed in Chapter 3 (Section 3.2.5), Bourdieu's theoretical tools are often criticised for their limited scope for agency and transformation and, for instance, was less helpful for explaining the transformative influence that Daffodil Girls' School appeared to have for their students.

8.4 Recommendations for policy and practice

An important contribution of this study is an in-depth and systematic review of the school, classroom and individual level conditions influencing students' subject choices. This thesis has provided a more nuanced understanding of the interplay of broader sociocultural factors operating at societal, policy, school, classroom and individual levels. Chapter 5 highlighted the differences in provision and support for students' subject choices between independent and state-funded schools. State-funded schools were often constrained by budgets and the availability of qualified staff. As a result, many state-funded schools tended to ration support and guidance to mainly high-attaining students and restrict access to high-status subjects like physics and modern languages. Moreover, Chapters 6 and 7 underscored the importance of pedagogic practices within physics and modern languages which can lessen or reinforce the impact of wider school practices on students' experiences of these subjects. Therefore, I argue that greater research attention be given to the impact of school and subject-specific pedagogic practices in the literature on subject choice. Alongside the literature on rational choice, students' choices need to be understood within the context of the opportunities available at their schools. In this section, I focus on the main recommendations for policy and practice arising from this study. The three main messages concern the following: (i) providing more careers advice for all students about the implications of their subject choices; (ii) selective practices and attainment-based gate-keeping in physics and modern languages; and (iii) explicitly addressing gender inequalities in education.

My first recommendation is for schools to provide more guidance to all students about the implications of their subject choices and the transferability of skills in science and modern

languages for a broad range of careers. As discussed in Chapter 5 (Section 5.4), support and guidance at state-funded schools was mainly provided for high-attaining students, often focusing on progression to elite universities. A recent study by Moote and Archer (2017) indicates that the provision of careers education in England is currently patterned in ways that reproduce inequalities in relation to gender, ethnicity and social class through, for example, self-referral systems which arguably disadvantages those who might benefit the most. Improved careers advice would provide students with more information about the career possibilities and emphasise the transferability of skills from these subjects for a broader range of careers. Calls for improvements in careers education have come from both science education (Reiss & Mujtaba, 2017) and in modern languages education (Mills & Tinsley, 2020). Careers advice might include embedding careers education into subject lessons as well as having dedicated staff in schools to arrange subject-specific careers support such as hosting regular guest speakers, mentorship schemes and work placements in partnership with local employers, universities and/or educational charities. One of the schools in this study demonstrated how schools serving disadvantaged student populations also have the capacity to cultivate institutional habituses that interrupt patterns of inequality. Daffodil Girls' School's extensive careers programme and pastoral care appeared to have a transformative influence for their students. Daffodil's focused enrichment on careers and opportunities, particularly in STEM, and close links to organisations that provide mentorship programmes as well as university summer schools were especially influential in students' subject choices and career aspirations.

My second recommendation is for more equitable provision of science and modern languages in primary and secondary schools to enable students to keep their options open by not forcing them into routes that can restrict later choices. This thesis has provided numerous examples of formal and informal selective practices at Key Stage 4 which excluded or excused students from studying physics (or triple science) and modern languages. Previous studies have highlighted inequalities in access to the triple science route (RSA, 2015; Archer, et al., 2016) and modern languages (Lanvers, 2017b; Tinsley, 2019) for students from socioeconomically disadvantaged backgrounds. Moreover, research by Abrahams (2018) highlighted the potential for timetable blocking systems to restrict students' subject choices. While the policy interventions would necessarily be different between physics and modern languages, I would argue that the principles of social justice and equity apply for both. In science, I support calls to promote a common GCSE pathway for science that includes instruction in all three sciences to foster wider science participation post-16 and beyond (Claussen & Osborne, 2012; Archer, et al., 2016). In modern languages, I support calls to allocate more time in the timetable for modern languages and ensuring that languages are available in all or almost all option blocks at Key Stage 4 (Mills & Tinsley, 2020; British Council, 2019; Cambridge Public Policy,

2016). Teacher recruitment and retention in modern languages will also be important to reach the government target of 90 percent of the cohort studying a modern language GCSE by 2025. In addition, perhaps students could have the option to study GCSE languages on a pass/fail basis rather than for a grade and/or modern languages could be removed from school performance measures such as Progress 8 so that schools will not be penalised for low attainment in languages. This recommendation has its limitations since implementing a pass/fail system and/or removing modern languages from school performance measures could potentially signal to schools that these subjects are not as important as 'core' subjects (English, maths and science) which are measured in school performance tables. However, reducing this pressure on students and schools may be useful in the short-term given the documented issues with grade severity in modern language exams and the concerns of the teachers interviewed for this study.

My final recommendation is to acknowledge and explicitly address gender inequalities in education and students' subject choices, particularly in science and physics. As discussed in Chapter 7, physics (and science) was constructed as particularly 'masculine' or something that boys was more likely to study. In addition, girls were more likely to report feeling excluded or marginalised by what they felt was a competitive and masculine classroom culture. Meanwhile, students were less likely to feel that all modern languages are overtly gendered, however, specific languages had stronger associations with femininity or masculinity. French was viewed feminised or 'dainty' and therefore less appealing to boys while German was viewed as more 'masculine' due to its associations with science, engineering and business. While gender inequalities were more visible in physics classrooms, I would argue that the less overt gender stereotypes in the modern language curriculum are also contributing to the gender imbalance in these subjects. Addressing these issues might include a whole school approach advocated by various organisations involving students, teachers and senior leadership to challenge gender stereotypes (IOP, 2015; National Education Union & UK Feminista, 2017). Some of the suggested strategies include monitoring and addressing sexist behaviour in classrooms (see Gender Action awards programme[3]). Teacher training programmes and continuing professional development should include resources and support for addressing gender biased and sexist behaviour in classrooms alongside resources on addressing racism and homophobia. Organisations including the National Education Union[4], UK Feminista[5] and the Institute of Physics (IOP)[6] have created resources for schools and teachers to address sexism and

[3] Gender Action Awards Programme: https://www.genderaction.co.uk/
[4] National Education Union's Breaking the Mould Resources for Teachers: https://neu.org.uk/breaking-mould
[5] UK Feminista School Resources Hub: https://ukfeminista.org.uk/
[6] IOP School Resources: https://www.iop.org/school-resources-address-gender-imbalance

promote gender equity in classrooms, however, more could be done to promote inclusive practices across all school subjects.

8.5 Concluding thoughts

This study was aimed at providing a better understanding of how the factors influencing student participation in science compares with non-science disciplines. Since my own background is in science education, I had not considered many of the issues influencing participation in other school subjects before beginning this PhD and I found very few studies which compared the factors influencing participation across multiple subjects. Through this study I hope to inspire future research, particularly in subjects that have not received the same resources and policy attention as science. This research highlights the need for future research and policy initiatives which encourages collaboration across subject disciplines such as whole-school initiatives to tackle gender inequalities.

I will conclude by reflecting on the notion of 'subject choice' in education. As this study has shown, schools have a significant influence over students' subject choices through their institutional habitus and practices which reproduce existing inequalities related to gender and social class. While there were some anecdotal differences between the various ethnic groups represented in this study, it would be difficult to draw any conclusive findings from these examples because there were such small numbers in each of the ethnic groups represented in the participants. The examples in this study illustrate how students' choices were limited by school curricular offers and attainment-based gate-keeping practices in physics and modern languages. Through this study I hope to provide a more nuanced view of students' subject choices that considers both individual- and structural-level factors. If policy makers and educators want to encourage more students to study physics and modern languages, then greater attention should be given to the policy and school level factors which can influence students' choices.

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Appendices

Appendix A: Ethical approval letter

25 April 2017

Dear Sandra

LRS-16/17-4601 - Subject Choice in Secondary Schooling: A comparative study of physics and modern foreign languages at A level

Thank you for submitting your application for the above project. I am pleased to inform you that your application has now be approved with the provisos indicated at the end of this letter. All changes must be made before data collection commences. The Committee does not need to see evidence of these changes, however supervisors are responsible for ensuring that students implement any requested changes before data collection commences.

Ethical approval has been granted for a period of **three years** from 25 April 2017 . You will not be sent a reminder when your approval has lapsed and if you require an extension you should complete a modification request, details of which can be found here:
http://www.kcl.ac.uk/innovation/research/support/ethics/applications/modifications.aspx

Please ensure that you follow the guidelines for good research practice as laid out in UKRIO's Code of Practice for research: http://www.kcl.ac.uk/innovation/research/support/conduct/cop/index.aspx

Any unforeseen ethical problems arising during the course of the project should be reported to the panel Chair, via the Research Ethics Office.

Please note that we may, for the purposes of audit, contact you to ascertain the status of your research.

We wish you every success with your research.

Yours sincerely,
Miss Annah Whyton
Senior Research Ethics Officer

For and on behalf of:

E&M Research Ethics Panel REP Reviewer

Appendix B: Recruitment letter

XXXX School/College
ATTN: Mr./Ms. XXX XXXXX, Headteacher
Friendship Way
London XX XX

[DATE]

Dear Mr./Ms. XXX XXXX,

My name is Sandra Takei, I am a post-graduate research student in the School of Education, Communication and Society (ECS) at King's College London. I am conducting research on the factors that impact students' choices about A level subjects in secondary schooling, specifically in low uptake subjects such as physics and modern foreign languages. For this project, I am recruiting six schools to participate as case studies. If you agree to participate, I would ask for your support in contacting Year 12 students (and their parents) as well as teachers of physics and modern foreign languages at A level at your school.

Students in Year 12 would be invited to participate in focus groups lasting between 30 to 40 minutes where they would be asked questions about their general experiences of school, A level subjects, career aspirations as well as the sources of advice and information that were influential in making those decisions. I may invite some students to participate in a follow-up interview to elaborate on certain topics that arise during focus groups in greater depth. Due to time constraints, it is not possible to conduct follow-up interviews with every student.

I would also like to invite physics and modern foreign language teachers to take part in one-on-one interviews lasting around 30 minutes where they will be asked to reflect on their experiences teaching these subjects at A level and the reasons students may or may not choose to study them.

I know that there are many demands on students' and teachers' time so the focus groups and interviews would take place at a time and location most convenient for participants. Participants are able to withdraw from the study at any time and for any reason. I hope that students and teachers enjoy participating in this research and I am happy to share the general findings with you once the study is complete. Please do not hesitate to get in touch if you would like more information. I will follow-up by telephone in about one week.

Yours Sincerely,

Sandra Takei
Doctoral Researcher in Science Education
School of Education, Communication and Society
King's College London

Email: Sandra.Takei@kcl.ac.uk

Appendix C: Information Sheets

Teachers

INFORMATION SHEET FOR TEACHERS

REC Reference Number: LRS-16/17-4601

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Subject Choice in Secondary Schooling: A comparative study of the factors impacting A level subject choice in physics and modern foreign languages

I would like to invite you to take part in this research study, which forms part of my PhD research.

Before you decide whether you want to take part, it is important for you to understand why the research is being done and what it will involve for you. Please take time to read the following information carefully and discuss it with other people if you wish. Feel free to contact me if anything is unclear or if you would like to know more about this research.

What is the purpose of the study?

The project aims to find out about the factors that impact students' choices about A level subjects in secondary schooling, specifically in low uptake subjects such as physics and modern foreign languages. I am inviting A level physics and modern foreign language teachers to reflect on their experiences teaching these subjects at A level and the reasons students may or may not choose to study them. You will also be asked to share thoughts and opinions to inform approaches to advising students during secondary schooling.

Do I have to take part?

You do not have to take part. You should read this information sheet and ask me any questions you have. Please take time to decide whether or not you wish to take part.

What will happen to me if I take part?

You will take part in an interview, lasting around 30 minutes, talking about your experiences teaching physics or modern foreign language and students' experience of selecting A level subjects.

I hope that you will enjoy participating in the interview. I do not expect you to experience any negative effects. You may withdraw from the study at any time, without giving a reason. You may also withdraw your data from the project at any time, up to 1 October 2017. Recordings will also be wiped upon transcription.

Only the researcher (me) and the transcriber will hear the recordings. The transcriber will be required to sign a confidentiality agreement as a condition of employment. Written quotes and extracts from focus groups and interviews may be used in reports, but your identity will be kept completely anonymous.

What are the possible risks of taking part?
There are no foreseeable risks in taking part.

Will my taking part be kept confidential?
What is said during interviews is considered confidential and will be held securely until the research is finished. If you change your mind about participating, let me know and I will remove the data. I can do this until 1 October 2017.

The UK Data Protection Act 1988 will apply to all the data we collect. We will hold the information on password-protected computers and in locked file cabinets. Focus groups and interview data will be accessed only by the researchers and a transcriber and we will protect your anonymity by using false names.

How is the project being funded?
My research is supported through a Professor Sir Richard Trainor Studentship at King's College London and a grant from the Institute of Physics (IOP).

What will happen to the results of the study?
I will write reports about the research for conferences, teachers and other researchers. These reports may also be used by policymakers and other organisations to improve science, foreign language and careers education. Your name and details will never be named in the reports.

Who should I contact for further information?
If you have any questions or require more information about this study, please contact me using the following contact details:

Sandra Takei, Doctoral Researcher
School of Education, Communication and Society, King's College London
Email: sandra.takei@kcl.ac.uk

If this study has harmed you in any way or if you wish to make a complaint you can contact King's College London using these details:

Dr Karen Skilling, Lecturer in Mathematics Education
School of Education, Communication and Society, King's College London
Email: karen.skilling@kcl.ac.uk

It is up to you to decide whether or not to participate. If you decide to take part, you are free to withdraw at any time and without giving a reason.

Thank you for reading this information sheet and for considering taking part in this research.

Students and Parents

INFORMATION SHEET FOR STUDENTS AND PARENTS

REC Reference Number: LRS-16/17-4601

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Subject Choice in Secondary Schooling: A comparative study of the factors impacting A level subject choice in physics and modern foreign languages

I would like to invite you to take part in this research study, which forms part of my PhD research.

Before you decide whether you want to take part, it is important for you to understand why the research is being done and what it will involve for you. Please take time to read the following information carefully and discuss it with other people if you wish. Feel free to contact me if anything is unclear or if you would like to know more about this research.

What is the purpose of the study?

The project aims to find out about the factors that impact students' choices about A level subjects in secondary schooling, specifically in low uptake subjects such as physics and modern foreign languages. I am inviting Year 12 students to reflect on their process of selecting A level subjects and to share thoughts and opinions to inform approaches to advising students during secondary schooling.

Do I have to take part?

You do not have to take part. You should read this information sheet and ask me any questions you have. Please take time to decide whether or not you wish to take part.

What will happen to me if I take part?

You will take part in a focus group with other students from your school or college. These focus groups will last between 30 to 45 minutes, talking about students' experience of A level subjects, what students might want to do in the future, the kinds of choices students are making about their education and the kinds of things students interested in. I may invite some students to participate in a follow-up interview to elaborate on certain topics that arise during focus groups in greater depth. Due to time constraints, it is not possible to conduct follow-up interviews with every student.

I hope that you will enjoy participating in the focus groups and potential follow-up interview. I do not expect you to experience any negative effects. You may withdraw from the study at any time, without giving a reason. You may also withdraw your data from the project at any time, up to 1 October 2017. Recordings will also be wiped upon transcription.

Only the researcher (me) and the transcriber will hear the recordings. The transcriber will be required to sign a confidentiality agreement as a condition of employment. Written quotes and extracts from focus groups and interviews may be used in reports, but your identity will be kept completely anonymous.

What are the possible risks of taking part?
There are no foreseeable risks in taking part.

Will my taking part be kept confidential?
What is said in the focus groups and interviews is considered confidential and will be held securely until the research is finished. If you change your mind about participating, let me know and I will remove the data. I can do this until 1 October 2017.

The UK Data Protection Act 1988 will apply to all the data we collect. I will hold the information on password-protected computers and in locked file cabinets. Focus groups and interview data will be accessed only by the researchers and a transcriber and we will protect your anonymity by using false names.

How is the project being funded?
My research is supported through a Professor Sir Richard Trainor Studentship at King's College London and a grant from the Institute of Physics (IOP).

What will happen to the results of the study?
I will write reports about the research for conferences, teachers and other researchers. These reports may also be used by policymakers and other organisations to improve science, foreign language and careers education. Your name and details will never be named in the reports.

Who should I contact for further information?
If you have any questions or require more information about this study, please contact me using the following contact details:

Sandra Takei, Doctoral Researcher
School of Education, Communication and Society, King's College London

Email: sandra.takei@kcl.ac.uk

If this study has harmed you in any way or if you wish to make a complaint you can contact King's College London using these details:

Dr Karen Skilling, Lecturer in Mathematics Education
School of Education, Communication and Society, King's College London

Email: karen.skilling@kcl.ac.uk

It is up to you to decide whether or not to participate. If you decide to take part, you are free to withdraw at any time and without giving a reason.

Thank you for reading this information sheet and for considering taking part in this research.

Appendix D: Student focus group topic guides

Physics Students

	Physics
Constructions of chosen subject	– What comes to mind when you think of science? What comes to mind when you think of physics? – What comes to mind when you think of physicists? – What can you do with a physics degree? Do you know anyone with a physics degree? What do they do now? – Describe someone who is good at science? / What kinds of things do successful physics students do or need to be good at? – Do your teachers or family members ever talk to you about what you can do with a qualification in science or physics?
Reasons for choosing subjects	– What other subjects are you studying? – How did you decide which subjects to take? – Why did you choose to study physics at A Level? – Do you remember anyone (e.g. parents, family members, teachers) who encouraged you to study physics?
Outside of school	– What kinds of activities do you do outside of school? (e.g. part-time jobs, sports, hobbies) – Do you do any science/physics related activities outside of school? (e.g. visits to science museums, watching television programmes) – Is there anyone in your family or someone that you know that has a science or physics related job? – What are your plans after you finish school or college?
School Factors	– Is physics a popular subject at your school? Why or why not? – What subjects did you study at GCSE? (How many did double science, triple science, other?) – Do you feel your GCSE course prepared you well for physics at A Level? Why or why not? – Have you done any kind of science enrichment or activities outside of class time? Were these offered by your school? – Thinking back, is there anything you wish had been different about your GCSE science courses or science education in general? – Did you have any careers advice at your schools? Do you think this had any impact on why you chose your subjects?
Constructions of modern languages (Optional)	– What comes to mind when you think of languages? – What comes to mind when you think of linguists? Do you know anyone who did a language degree? What do they do now? – Do you know anyone who is bilingual? – What did you think of studying languages at GCSE? – Describe someone who is good at languages. / What kinds of things does a successful language student do? – Have you done any kind of foreign language trips/exchanges? Were these offered by your school? Where did they go? – Do you or any close family members speak any other languages at home? Do Do your teachers or family members ever talk to you about what you can do with a qualification in languages?
Wrap Up	Is there anything you wanted to talk about that I didn't mention?

Modern Language Students

	Modern Languages
Constructions of chosen subject	– What comes to mind when you think of languages? – What can you do with a degree in languages? Do you know anyone with a language degree? What do they do now? – Describe someone who is good at languages. / What kinds of things does a successful language student do? – Do your teachers or family members ever talk to you about what you can do with a qualification in languages?
Reasons for choosing subjects	– What other subjects are you studying? – How did you decide which subjects to take? – Why did you choose to study a foreign language at A Level? – Do you remember anyone (e.g. parents, family members, teachers) who encouraged you to study languages?
Out of school	– What kinds of activities do you do outside of school? (e.g. part-time jobs, sports, hobbies) – Do you speak any other languages at home? Do your parents speak any other languages? (If not, do you know anyone who is bilingual?) Do you think this is useful for studying languages? – Do you do any activities outside of school related to languages for fun? (e.g. watch foreign films, read books in foreign languages) – What are your plans after you finish school or college?
School Factors	– Are languages popular at your school? Why or why not? – What subjects did you study at GCSE? (Which languages did you study? Which languages were offered?) – Do you feel your GCSE course prepared you well to study foreign languages at A level? Why or why not? – Have you done any kind of foreign language trips/exchanges? Were these offered by your school? Where did they go? – Thinking back, is there anything you wish had been different about your GCSE language courses or foreign languages in general? – Did you have any careers advice at your schools? Do you think this had any impact on why you chose your subjects?
Constructions of physics (Optional)	– What did you think of studying science at GCSE? – What comes to mind when you think of science? What comes to mind when you think of physics? – What comes to mind when you think of scientists/physicists? Do you know anyone who did a science degree? What do they do now? – Describe someone who is good at science? / What kinds of things do successful physics students do or need to be good at? – Do you do any science/physics related activities outside of school? (e.g. visits to science museums, watching television programmes) – Do your teachers or family members ever talk to you about what you can do with a qualification in science or physics?
Wrap Up	Is there anything you wanted to talk about that I didn't mention?

'Other' Subjects – Students who are not taking physics or modern languages

	Studying Neither Physics Nor Foreign Languages
Reasons for choosing subjects	– What subjects are you studying? How did you choose those subjects? – What subjects did you study at GCSE? (Double/Triple Science, Foreign Languages) – Are you happy with your GCSE courses? Thinking back, is there anything you wish had been different about your GCSEs? – Did you have any careers advice at your schools? Do you think this had any impact on why you chose your subjects? – Did you talk to your parents or other family members about your subject choices? What about teachers?
Out of school time	– What kinds of activities do you do outside of school? (e.g. part-time jobs, sports, hobbies) – What are your plans after you finish school or college?
Constructions of Science	– What comes to mind when you think of science? What comes to mind when you think of physics? – What comes to mind when you think of scientists/physicists? Do you know anyone who did a science degree? What do they do now? – Describe someone who is good at science. / What kinds of things do successful physics students do or need to be good at? – Is physics a popular subject at your school? Why or why not? – What did you think of studying science at GCSE? – Why did you decide to stop studying science? – Do your teachers or family members ever talk to you about what you can do with a qualification in science or physics?
Constructions of Modern Languages	– What comes to mind when you think of languages? – What comes to mind when you think of linguists? Do you know anyone who did a language degree? What do they do now? – Describe someone who is good at languages. / What kinds of things do successful language students do or need to be good at? – Are languages popular subjects at your school? Why or why not? – What did you think of studying languages at GCSE? What languages were offered? – Have you done any kind of foreign language trips/exchanges? Were these offered by your school? Where did they go? – Do you speak any other languages at home? Do your parents speak any other languages? – Why did you decide to stop studying languages? – Do your teachers or family members ever talk to you about what you can do with a qualification in languages
Wrap Up	Is there anything you wanted to talk about that I didn't mention?

Appendix E: Teacher interview topic guides

Senior Leadership (interviews)

	Senior Leadership
Introductions	– How long have you been working at this school? – Do you teach a subject? Which subject(s)?
Subject Choice at School	– When do students make their subject choices typically? – What is process for choosing subjects? – What kinds of advice and guidance are available to students when they are making their subject choices? – Are there taster sessions for various subjects? – Does the school offer any kind of careers advice or university application support? When is this normally done? – Are there any subjects that are over-subscribed? Are there any subjects that are under-subscribed or struggling to recruit students? – Do the parents or families request subjects?
Physics	– Is physics a popular subject at the school? – How big is the science department? – What are the requirements to study Physics at A-level? – Does your school offer any enrichment programmes for learning science and physics such as work placements or university research experiences?
Languages	– Are languages popular subjects at the school? What languages are offered? – How big is the language department? – What are the requirements to study languages at A-level? – Does your school offer any enrichment programmes for learning foreign languages such as trips or exchanges?
Wrap Up	Is there anything you wanted to talk about that I didn't mention?

Physics Teachers

	Physics
Introductions	– What subject is your first degree? Do you have any advanced degrees? – How long have you been teaching physics? Do you teach any other subjects? – What kind of teacher training did you do?
Constructions of taught subject	– What comes to mind when you think of science? What comes to mind when you think of physics? – What comes to mind when you think of physicists? – What can students do with a physics degree?
Constructions of students who study these subjects	– How would you describe the students in your A level physics class? – What are the requirements at your school for taking A level physics? – What would you describe as the main reasons that students choose to take physics A level? – What are some of the reasons why students might decide not to study physics? – In your opinion, what does a student need to be successful in A-level physics? / Describe the characteristics of a successful physics student.
School Factors	– Tell me about your school. Is physics a popular subject? – How big is the science department? Do you receive any CPD in physics? What kind? – What kinds of facilities does the school have for practical work? – Is there anything that you wish you had at your school to teach physics that you don't have? – Do you talk to your students about careers or opportunities to use Physics when the finish school? Do you think this has any impact on why your students chose their subjects?
Constructions of modern languages (Optional)	– Are languages popular subjects at your school? – How big is the language department? Do you ever interact with the modern language teachers?
Wrap Up	Is there anything you wanted to talk about that I didn't mention?

Modern Language Teachers

	Modern Languages
Introductions	– What subject is your first degree? Do you have any advanced degrees? – How long have you been teaching languages? What languages do you teach? – What kind of teacher training did you do?
Constructions of taught subject	– What comes to mind when you think of languages? – What comes to mind when you think of linguists? – What can students do with a degree in languages?
Constructions of students who study these subjects	– How would you describe the students in your A level language classes? – What are the requirements at your school for taking A level languages? – What would you describe as the main reasons that students choose to take languages at A level? – What are some of the reasons why students might decide not to study languages? – In your opinion, what does a student need to be successful in A-level French or German? / Describe the characteristics of a successful modern language student.
School Factors	– Tell me about your school. Are languages popular subjects? – How big is the language department? Do you receive any CPD in languages? What kind? – Does your school offer any enrichment programmes for learning foreign languages such as trips or exchanges? – Is there anything that you wish you offered at your school to teach languages that you don't have? – Do you talk to your students about careers or opportunities to use languages when the finish school? Do you think this has any impact on why your students chose their subjects?
Constructions of physics (Optional)	– Is physics a popular subject at your school? – How big is the science department? Do you ever interact with the Physics teachers?
Wrap Up	Is there anything you wanted to talk about that I didn't mention?

Appendix F: Student participants – Initial subject choice mapping

Pilot Study (Ashford Academy) – July 2017

Pseudonym	Gender	Main Subject(s)	Supporting Subject(s)	Extra Subject(s)	Plans for after school
Tiffany	Female	Chemistry, Biology		Geography, French	Apply to university for v medicine
Oliver	Male	Business	French	History	Currently being 'looked recruiter
Albert	Male	Physics	Maths	Biology, Business	Apply to university in ae engineering
Michael	Male	Physics	Maths	Chemistry, Business	Apply for apprenticeshi transport engineering
Tom	Male	Business	Maths, Physics	Theatre Studies	Business administration job
Walter	Male	Physics	Maths, Information Technology	Catering	Apply to university in vi design
Fiona	Female	History	Geography	Business	Apply to university in hi
Elise	Female	Catering	Business	Health & Social Care	Apply to catering colleg
Justin	Male	Media Studies	Business	Health & Social Care	Apply to university in m and fashion
Logan	Male	Psychology		Maths, Business	Apply to college to work Services, Level 5 nationa

Ashford Academy – February 2018

Pseudonym	Year 13?	Gender	Main Subject(s)	Supporting Subject(s)	Extra Subject(s)	Plans for after school
Ben		Male	Physics	Biology, Chemistry		Apply to college (A-level M then apply to university (P Cosmology?)
Blake		Male	Biology, Chemistry	Maths	Physics	Apply to university (Medicine)
Jessica	Yes	Female	Catering (BTEC)	EPQ Catering	Business (dropped French after Y12)	Apply to university (Catering)
Ryan	Yes	Male	Biology (Y12)	History (Y12)	Media (Y13)	Apply to university (Marin Zoology or Ecology)
Gavin		Male	Biology, Chemistry	Maths		Apply to university (Medicine)
Emmett		Male	Biology, Chemistry, English			Apply to university (English)
Jacob		Male	Catering (BTEC), Chemistry, Music			Undecided

Birch High School – November 2017

Pseudonym	Year 13?	Gender	Main Subject(s)	Supporting Subject(s)	Extra Subject(s)	Plans for after school
Yvonne		Female	Film Studies	French, German	Business (BTEC)	Apply to university (Mec Studies)
Sara		Female	Biology, Chemistry	German	Theology	Apply to university
Diana		Female	Physics	Maths, Further Maths	French	Apply to university
Christine	Yes	Female	French, Art (BTEC), History			Volunteering abroad in
Naomi		Female	Physics	Maths	Sociology, Psychology (dropped)	Apply to university
Kevin		Male	Physics	Maths	Geography	Apprenticeship (astroph electrical engineering
Leslie	Yes	Female	Physics	Maths, Chemistry	Theology (dropped)	Apply to university (Aerospace BSci/MS)
John	Yes	Male	Physics	Maths, Chemistry		Apply to university (Physics BSci/MS)
Brian		Male	Biology, Chemistry		Geography, History (dropped)	Apply to university (Medicine)
Grace		Female	Geography	Chemistry	Psychology, English Language & Literature	Apply to university (Human Geography)
Elizabeth		Female	Biology, Chemistry		Geography, History (dropped)	Apply to university (Veterinary Medicine)
David		Male	History	Economics, Sociology	Geography	Apply to university (Mod History - 1800s onward)

Daffodil Girls' School – April 2018

Pseudonym	Gender	Main Subject(s)	Supporting Subject(s)	Extra Subject(s)	Plans for after school
Teresa	Female	Physics	Maths	Chemistry	Apply to university (Mechanical Engineering
Chelsea	Female	Maths, Physics	Further Maths	Chemistry	Apply to university (Physics)
Phoebe	Female	Physics	Maths, Further Maths	Chemistry	Apply to university (Civil Engineering) & Army Apprenticeships
Erin	Female	Biology, Chemistry		Psychology	Apply to university (Dentistry)
Lily	Female	Biology, Chemistry	Psychology	English Literature	Apply to university (Neu
Brooke	Female	Biology, Chemistry		Psychology	Apply to university (Medicine)

Elmwood Independent Boys' School – June 2018

Pseudonym	Gender	Main Subject(s)	Supporting Subject(s)	Extra Subject(s)	Plans for after school
Abel	Male	Maths	French, Spanish	EPQ Finance	Gap Year, Apply to univers (Accountancy)
Adam	Male	Philosophy, French, Politics, Economics			Gap Year, Not sure
Nick	Male	French, Latin, Russian			Apply to university (Maybe
Oscar	Male	Physics	Further Maths, Maths	Chemistry, ITC Qualification	Apply to university (Cambr Natural Sciences OR Other - Physics)
Aaron	Male	Further Maths	Maths, Physics	Economics, EPQ Electric Cars	Apply to university (Cambridge – Engineering – Mechanical Engineering)
Gabriel	Male	Physics, Maths, Further Maths		Chemistry	Apply to university (Cambr Honours in Computer Scie Maths OR Other universiti Only)
Scott	Male	Physics, Maths	Further Maths	Chemistry	Apply to university (Oxford Mechanical Engineering O Materials Engineering OR Engineering w/ Business)
Nathan	Male	Physics, Maths	Further Maths	French, ITC Qualification	Apply to Flight School
Archie	Male	Philosophy, Politics	Geography	EPQ in Law	Apply to university (Law at Cambridge)
Jay	Male	Biology, Chemistry	Maths	German	Apply to university (Medic
Caleb	Male	Maths, Further Maths	Economics	EPQ Financial Services, Chemistry	Apply to university (Econo Cambridge or LSE)

Cedar Sixth Form College – February & March 2018

Pseudonym	Gender	Main Subject(s)	Supporting Subject(s)	Extra Subject(s)	Plans for after school
Penny	Female	Biology, Chemistry	Maths	French	Apply for university (Medicine or Dentistry)
Samantha	Female	French	English, Maths	History	Apply for university (French w/ English or Lin
Alice	Female	French, History, Politics			Apply to university (Inte Relations w/ French)
Amy	Female	French	Philosophy	Economics	Apply for university (Ecc possibly joint honours w
Amir	Male	Physics	Maths	French	Apply for university (Engineering)
Eric	Male	Economics	Maths, French	History	Apply for university (Accounting or Economi
Harriet	Female	Maths, Physics		Psychology	Apply for university (Astrophysics or Nuclear
Felicity	Female	Physics	Maths, Further Maths	Biology	Apply for university (Astro-biology or Astrop
Lucy	Female	Chemistry, Biology	Maths	Physics	Apply for university (Medicine)
Marco	Male	Chemistry, Biology	Maths	Physics,	Apply for university (Medicine)
Ron	Male	Chemistry,	Physics	Maths,	Apply for university (Chemical Engineering)
Claire	Female	History, English Literature, Drama, Psychology			Apply to university (Hist English)
Jennifer	Female	Psychology	Religious Studies	English Language/Lit	Apply to university (Criminology and Psycho
Allen	Male	Maths, History, Economics and Politics			Apply to university (Inte Relations)
Malik	Male	Maths, Computing	Further Maths		Apply to university (Computer Science)
Hassan	Male	Philosophy, Maths	History	Chemistry	Apply to university (Law
Connor	Male	History	Politics	English	Apply to university (Law
Daniel	Male	History, English, Politics		Economics	Apply to university (Law
Leah	Female	History	English Literature and Language	Theatre Studies	Apply to university (Law
Sophie	Female	Economics	Maths	History	Apply to university (Eco
Isabel	Female	History, Economics	Maths		Apply to university (Eco

Appendix G: Coding tables from Phase 2

Most common reasons for choosing physics A-level

Code	Description	Data Examples	#Students (out of 25)
Enjoyment **(Students)**	Student chose physics because they enjoy the subjects and find it interesting.	Um, oh, I really like sciences and stuff so… and there wasn't really anything else that I wanted to do (..) so I just kind of (.) went with (.) how, what I liked. (Ben, Ashford Academy) I've always been interested in it like, since ages ago. Like, I already knew from Year 7 that I wanted to do Physics at like A-level… I think it was mainly Astrophysics and like that sort of section of the Physics that I liked more. (Felicity, Cedar Sixth Form) I knew that I had a very strong interest in the Maths and sciences and um, and I when I had to take my A-levels I had been attending the computer modelling society for three years… so I was actually massively enjoying physics and the concept of modelling of the real world using mathematical equations. So I took Physics because it just seems like fun. (Gabriel, Elmwood Independent Boys' School)	24
Chosen career **(Subject & Students)**	Student chose physics because they need it for a specific job or career.	Well, I'm planning to go to uni to do video game design and I'm going to use Physics for that. (Walter, Pilot Study, Ashford Academy) Umm, (clears throat) going to uni doing aerospace engineering. Yeah and you need physics to do that. (Albert, Pilot Study, Ashford Academy) I always (..) kind of wanted to pursue Physics or like Maths because when I grow up I want to be a Chemical Engineer or something like those sort of lines, or some sort of Engineer. (Ron, Cedar Sixth Form College) From a young age I always loved flying and I always wanted to be a pilot. So when I grew up and got to like Year 9 and 10, I started researching it and I realised that I needed Physics and Maths. (Nathan, Elmwood Independent Boys' School)	16
Family **(Students)**	Student chose physics because their families encouraged them.	My dad, uh, is involved with Physics. He's got a degree in it and he helps me a lot with it so… I think that's why I've got such a big interest in it and why I'm good at it as well because he can help me at home. (Leslie, Birch High School) Um, well my parents are doctors so, they were always telling us to do sciences and stuff like that. Yeah, so it was always Maths, Biology, Chemistry but then my dad really liked Physics and I like Physics too and my cousin likes Physics. So, yeah (laughs) I have loads of people in my family who like Physics as well. (Lucy, Cedar Sixth Form College) My dad did a science degree so I spent a lot of time doing science with him when I was, and I liked it and wanted to take it further so I knew I wanted to take Physics. (Oscar, Elmwood Independent Boys' School)	8
Employability, usefulness **(Subject & Students)**	Student chose physics because they felt it would 'open doors' and help them find more jobs	I think you can work in more industries. If you're more because…obviously with physics…I think it's more valuable because the skills you learn are more applicable to other types of work. (Tom, Pilot Study, Ashford Academy) I think it can be applied to like, a lot of jobs like maybe a project manager which is a lot of like concepts from Physics to like maybe build structures, um, I think like, Physics is maybe the one science that you can apply to a lot of jobs. (Amir, Cedar Sixth Form College) Mainly to keep options open but it is interesting um, but definitely you know, taking Physics out from Chemistry and Biology, it takes out a lot	8

		of options in term of career and because I'm not exactly sure where I want to go, I feel like dropping it, it would sort of, it would definitely close down the amount of areas I could go into after I finish studying. (Marco, Cedar Sixth Form College)	
Challenging subject **(Subject & Students)**	Student finds physics challenging but they like the subject because they enjoy the challenge.	I like Physics because it's like challenging, (Ben, Ashford Academy) I like a good challenge. It's a challenging, challenging subject but that's what makes it enjoyable. (Leslie, Birch High School) I think that the first thing that people think of with Physics is that it's extremely hard. So most people would stay away from it... But I think that's why it's very interesting. (Amir, Cedar Sixth Form College)	3
Ability or sense of ability **(Subject & Students)**	Student chose a physics because they found it easy or it was their strongest subject	… so with Physics, Chemistry and Maths I got an A* in all three of those at GCSE so… it was almost like… I have to go for them just because like… I was best at them and I enjoyed it the most. (John, Birch High School) I did Triple Science. I got two As and a B but it was quite easy. I don't know, I just like sciences. (Michael, Pilot Study, Ashford Academy)	2

Most common reasons for choosing modern language A-levels (French or German)

Code	Description	Data Examples	#Students (out of 17)
Enjoyment **(Students)**	Student chose French or German because they enjoy the subjects and find it interesting.	I think just from learning it from first school, middle school and high school I just enjoyed it and it was something that I found quite easy and…I don't know. It was just one of those subjects that I knew I'd want to do in the future because of how much I enjoyed it. (Tiffany, Pilot Study, Ashford Academy) I just literally enjoy it, I like languages and learning about something different. I feel like when you see people as well, and they can like speak a language. I think it's so interesting. There was literally nothing that could put me off. (Alice, Cedar Sixth Form College) I don't think I will have like do something at like university with French because I've got like Maths and science subjects so I want to do something with that but, I think I'll want to keep learning French after, just because I like it. (Penny, Cedar Sixth Form College)	11
Ability or sense of ability **(Subject & Students)**	Student chose a French or German because they found it easy	Languages have also been something that I've been good at since I was younger. So, I'd quite like to continue with it for the rest of my time at school. (Yvonne, Birch High School) Um, with French in particular I guess it was just that it was one of my strong subjects at GCSE and um, I found it came quite naturally in general. (Samantha, Cedar Sixth Form College) I enjoyed it at GCSE and I could speak it at home so I thought it would be a safe option to take and like, I'd enjoy it because I'd be good at it. (Amir, Cedar Sixth Form College) Um, so for me it was um, one sort of major factor was um, it was because that was what I, what I sort of, the thing that I considered most was whether I'd, which came sort of easiest to me and... So French, I sort of, I've been quite successful at previous exams so I thought I'd do quite well at French. (Nick, Elmwood Independent Boys' School)	7
Good skill to have **(Students)**	Student chose French or German because they felt it would be useful or a 'good skill' generally (not for jobs)	I thought that a language was a good thing to have so that's why I picked it, I guess. (Samantha, Cedar Sixth Form College) thought French was going to be like a useful skill anyway... because you're going to use it after aren't you? Because some other subjects you don't really use it after, do you? (Eric, Cedar Sixth Form College) I thought that French is genuinely just useful, you can use it. Even if you maybe don't go into something French-related in your life you can still speak French, it's something that genuinely helps you like other subjects don't. I thought it was just a good option to take. (Amir, Cedar Sixth Form College)	7
Family **(Students)**	Student chose French or German because their families encouraged them or otherwise influenced their decision.	My dad played a part in French as well. Umm... because I was struggling to pick something as my third option… My dad learned French in his studies, my mum learned her French from living over at France. (Oliver, Pilot Study, Ashford Academy) Uhh… the family that I have in Belgium, which is why I went, they speak French there, they also speak Dutch I think it is which is similar to German which is uh, part of the reason why I took it up at GCSE. (Sara, Birch High School) Yeah, because my mum speaks French but not like natively but she speaks it and she is really useful to have help practice and like some of my friends speak French natively… my mum really wanted me to do it	6

		because she was like, Oh you'd be like really good at it and you really enjoy it. (Amy, Cedar Sixth Form College) Yeah, my mum speaks French… so she's kind of, I don't know, she wants me to go through but we don't speak it at home. She would like me to do it but she can't really… (Eric, Cedar Sixth Form College)	
Employability, usefulness **(Subject & Students)**	Student chose French or German because they felt it would 'open doors' and help them find more jobs	I think it could help me if I wanted to do a degree where I could do French combined with another subject and then I'd be able to go to France and search for other job opportunities there rather than just in England. (Tiffany, Pilot Study, Ashford Academy) in terms of, setting you up for…umm…such as job interviews for employers and whatnot, it widens your options as a whole. So, for example, ummm I think I looked at a study, I think last year, where the percentage of people who studied a foreign language compared to those who didn't have an increased income or...yearly salary. (Oliver, Pilot Study, Ashford Academy) Uh… there's a lot of industry abroad and stuff. It's… just a good job skill… it makes you more employable. (Sara, Birch High School) I think languages open up options because most businesses need overseas, like they will need someone to speak French overseas. So I think that if you have a language it's sort of easier to get a job. (Eric, Cedar Sixth Form) I think it could maybe allow you to work abroad a lot easier as well… So I think it gives you an edge maybe, over other people who might be fighting you for the same places in a job, knowing that you can speak another language. (Amir, Cedar Sixth Form College)	5
Status, high-status subject **(Schools & Subject)**	Student chose French or German because it has a higher status than others.	Uh… I'm aware that universities uh, really like uh, languages and I wanted to be, you know, be able to get into competitive universities and also I know that German is… Germany is becoming a sort of world power and I know they have very good technology and science. (Sara, Birch High School) No, when I say I do a language everyone is like, Wow you must be really clever. Like it's good… Yeah because I think, um I was only doing it because it's something else to use as well… because normally with courses like Dentistry or Medicine, everyone does Bio, Chem and Maths so having French is like something else. (Penny, Cedar Sixth Form College)	5
Chosen career **(Students)**	Student chose French or German because they need it for a specific job or career.	Um, I want to do International Relations and French at university and I hope to become a diplomatic service officer in the foreign office… I don't really want to stay in France if I'm truly honest. I'd want to go to like francophone countries, mainly in like Africa or the Caribbean or Asia, it wouldn't just be a thing where I'd want to stay in France. (Alice, Cedar Sixth Form College) I wanted to go into Physics and study at uni, um… quite a lot of the research… um… I don't know… centres, are in Europe so like CERN and stuff so I thought it would be erm… a good idea to have, if I was going to study abroad… to have a language to enable me to do so. (Diana, Birch High School)	3
Explicit encouragement **(Schools & Subject)**	Student chose French or German because their teachers encouraged them.	Yeah, teachers encouraged me because they'd say like, that I was quite good, and then I could (pauses), I could reach higher aspirations if I knew another language. (Tiffany, Pilot Study, Ashford Academy) I really liked my French teacher, we got on well and so she recommended I take it and I thought that a language was a good thing to have so that's why I picked it, I guess. (Samantha, Cedar Sixth Form College	2

Most common reasons for NOT choosing physics at A-level

Code	Description	Data Examples	#Students (out of 41)
Too difficult **(Subject & Students)**	Student chose not to study physics because they found the subject too difficult	I didn't like Physics. I found it really difficult when I was learning it. Like the teacher would say stuff and it would go straight through my head. So, I don't know, I just found it really difficult compared to the other two sciences. I didn't understand it. (Tiffany, Pilot Study, Ashford Academy) Because at GCSE, probably Physics would be the hardest one to understand, people probably thought that at A-level you'd need to have much higher knowledge level. When I was coming into Year 11, I was planning on doing sciences. I think in Year 11 sciences just got a lot harder, I think. Especially Triple Science because Physics was the hardest bit out of that. (Eric, Cedar Sixth Form College) I was thinking about maybe doing like Physics A-level but once I got to the end of the Physics curriculum (..) uh, I realised that there was, of GCSEs I realised that I wasn't going to be able to do the Physics A-level. I did fine in Physics GCSEs it was just, it got really hard at the end and I realised that Physics A-level was going to be even harder so it probably wasn't going to work for me. (Allen, Cedar Sixth Form College)	16
Not relevant to my future plans **(Students)**	Student chose not to study physics because they did not feel the subject was relevant to their future plans	I want to do veterinary medicine and Chemistry and Biology are both required for that. I think, I suppose Chemistry and Biology just seem more like you can fit into like more different things whereas Physics just seems more specialised, I guess? (Elizabeth, Birch High School) It was quite a difficult decision because I said, oh it could look good but, in the grand scheme of things I don't think it really does unless you want to go and do science in the future. So I just, I picked to do another subject which I thought would be more relevant. (Daniel, Cedar Sixth Form College) For me it just didn't fit what I wanted to do. I didn't need to take it and I didn't like it. But, I know, I mean I did like it but I didn't need to take it so I just didn't. (Brooke, Daffodil Girls' School) If you don't really want to be a scientist or something to do with science, it wasn't interesting. I know that [Justin] wants to do something with fashion so why? He doesn't really need to take science. A lot of people didn't really see a future with science. (Elise, Pilot Study, Ashford Academy)	14
Bad experience at GCSE **(Schools, Subject & Students)**	Student chose not to study physics due to negative experiences at GCSE	I was put in classroom with other people who, a lot of these people had been forced to drop Triple um, or you know, some people who needed extra support and I feel like, for me, I would get all the work done and stuff like that but because I wasn't in an environment that maybe was up to my speed, or um, because I maybe had other students around me who were maybe kind of like, not doing the work and I was, I think that kind of impacted me in the progress I was making but also my grade because it was more relaxed. (Leah, Cedar Sixth Form College) The thing is, mine was very much like a wild ride, you know how it's like, if you go up a hill, it's really good and then suddenly you're like crashing down and you go back again and like recovering. See, that sounds like, just remember it now is kind of like, giving me some like traumatic memories. (Isabel, Cedar Sixth Form College) I remember in my old science class in high school, there were like four girls and this was a class of thirty and there were like twenty-six boys. And loads of boys, literally when I used to say something all the boys would laugh if you got it wrong. It was kind of like, oh well let me just keep quiet and I literally have nothing to say. That's why I don't really like sciences as well because I feel like, I feel like if you're a woman and you try and go	6

		into science, I feel like you're disregarded. (Alice, Cedar Sixth Form College) If I had stayed in my other school then I definitely would not do Physics at all because uh, it was just boys who signed up… you don't understand these boys, man! (laughs) I don't know, they were just, um rude, very rude people. I didn't like the dynamic so I thought that, if it was just me and them in that classroom I wouldn't have enjoyed it. (Lily, Daffodil Girls' School)	
Did not like the teacher **(Schools & Subject)**	Student chose not to study physics because they did not like the teacher	Yeah, we had a pretty bad Physics teacher at Year 10 and the start of Year 11 so that might have been… (Jacob, Ashford Academy) I thought that the concepts were effectively of the same difficulty in both Physics and Chemistry but because I was, well I was taught to a higher standard in Chemistry as well, and because of that, yeah, I feel like they were about the same standard in my opinion. (Caleb, Elmwood Independent Boys' School) I went to the science block and I spoke to the Physics teachers and I didn't really like the one I spoke to. (Hassan, Cedar Sixth Form College)	5

Most common reasons for NOT choosing modern languages at A-level (French, German or Spanish)

Code	Description	Data Examples	#Students (out of 50)
Too difficult **(Subject & Students)**	Student chose not to study French, German or Spanish because they found the subject too difficult	For me it was that it was difficult. I didn't enjoy doing them. That's why I didn't take them for GCSE. (Fiona, Pilot Study, Ashford Academy) I found it so difficult. So difficult but that was because it wasn't, everyone else, to me, just seemed like they were way more educated in Spanish than I was. (Leah, Cedar Sixth Form College) It was so difficult. It was just such a difficult language to learn. I feel like with Spanish, something about it is quite simple. It's quite, in a way, similar to English. Whereas, I feel like, I don't know if in French they have so many complicated rules or what it was. It just didn't come as naturally. (Erin, Daffodil Girls' School)	12
Boring, not interesting **(Students)**	Student chose not to study French, German or Spanish because they found it boring or not interesting	The thing is that like in GCSE we were doing translations and they're just so boring …I didn't want to do it anymore. Because you have a dictionary, a textbook and a piece of paper. It's so boring. It was horrible. (Albert, Pilot Study, Ashford Academy) Nah, I just speak English. I feel that I was never going to take a language to A-level. I was never really interested in it. (Ron, Cedar Sixth Form College) I hated French… Yeah, I found it very boring at GCSE. (Teresa, Daffodil Girls' School)	11
Not relevant to my future plans **(Students)**	Student chose not to study French, German or Spanish because they did not feel they were relevant to their future plans	Yeah, I didn't believe like, the language was as relevant as the other subjects I could have taken. Because obviously I knew that I wanted to take Geography but I didn't see how like a language would fit in. (Grace, Birch High School) Yeah, I enjoyed the classes but (..) when it came to like the outside world, I would have never used it if like, there was no point in me even thinking about it at A-level because I wouldn't, I would do nothing with it, so yeah. (Ron, Cedar Sixth Form College) It just felt like a (.) waste of lesson because like not many people wanted to choose languages for A-level any way. (Lucy, Cedar Sixth Form College)	7
Inconsistent teaching at GCSE **(Schools & Subject**)	Student chose not to study French, German or Spanish because they had a bad experience at GCSE, specifically, teaching was inconsistent	I mean, I didn't necessarily not enjoy it… we had a string of teachers that (..) like kept leaving or got pregnant and it was just really heart-breaking. And it never really felt like a subject that I knew like really well. There was always like, oh well is the teacher going to leave? Like in my GCSE, in my final year my teacher retired halfway through left us with this other teacher who, by this point, no one really respected her because we'd gone so long with one teacher. (Claire, Cedar Sixth Form College) I chose like Spanish but literally from Year 7 to Year 11 it was just like a constant swapping of teachers and one was in, one wasn't in, you'd get a new one. It was getting quite ridiculous. I feel like things very like, the whole department knew that the kids don't really like or take it seriously so they gave up before they could even start to get us motivated. Because they, I like languages and I'd love to learn another language but because of that experience in high school, I was so like (.) I just wasn't motivated and there was no like, there was no passion that was set up like teaching us. (Jennifer, Cedar Sixth Form College) I did have a lot of teachers uh, that were changing. In Year 8, I did get a really good teacher and I did actually begin to really enjoy French and I	6

		was actually learning proper French. But in Year 9 she left and then I got a new teacher who wasn't as good and the class didn't really like her either so that was disruptive during lessons um (..) so I didn't really enjoy the lessons so I was just had to do the class and I didn't really learn. (Malik, Cedar Sixth Form College) Our teacher left because she got married… In like, Year 8, um, we had so many different French teachers, we'd get a new one like every month. (Felicity, Cedar Sixth Form College)	
A-levels are different to GCSEs **(Subject)**	Student chose not to study French, German or Spanish because	For A levels it gets harder. So it's normally why people don't choose it. (Elise, Pilot Study, Ashford Academy) The thing with the French syllabus where I think that you can get caught out in A-level was that at GCSE… you had predicted speaking questions which you'd be told and then there'd be unpredicted ones which they'd ask you on the spot. And with the predicted ones you could prepare lovely answers to them... writing out your response, getting all your structures in, hitting the mark scheme and then, I would work on my pronunciation… practice it over and over again and by the time I went into the exam I could talk like I was French but obviously I can't actually do that. And it's the same with the writing assessment…I suppose this is why I was put off A-level, you know. (Daniel, Cedar Sixth Form College) Well, I think like, at GCSE they're like really easy to get like high grades in them because you have like, the controlled assessment and they're not very difficult, you just memorise stuff, which isn't really understanding the language at all. And then like, and then the A-level is like loads of writing and stuff and I didn't really want to do any writing. (Chelsea, Daffodil Girls' School)	6
You can learn languages later, outside of school **(Subject & Students)**	Student chose not to study French, German or Spanish because they felt they could learn the subject later outside of school	I do kind of think that because I was considering continuing, continuing with German but then I thought, why do I want to take up one of my options when I can just continue it on my own outside of school and do something else in school. (Elizabeth, Birch High School) I would like to learn French. I could go to like an evening class, you know? To be useful and actually learn it for its value rather than, you know, what the examiner wants to see. (Daniel, Cedar Sixth Form College) I've always had on my bucket list to be bilingual. And again, I said to myself, one of my reasons for swapping it for English was because I don't have to do it now, I can do it when I graduate. I can do it in the future, it's one of these things that I don't have to do in school. (Leah, Cedar Sixth Form College)	5
Lack of options, desired language not available **(Schools & Subject)**	Student chose not to study French, German or Spanish because their desired language was not offered by the school	I thought they were good but there wasn't that many choices of languages you could do. (Walter, Pilot Study, Ashford Academy) I was given a choice of Spanish, French or German but they didn't end up running a German class so I didn't really have a choice of German. (Allen, Cedar Sixth Form College) I got French and German. I reckon if I got Spanish I might have continued with it because I've kind of always like that to an extent. Whereas with German I never would have chosen that. (Hassan, Cedar Sixth Form College)	5

Students' 'taken-for-granted' assumptions and perceptions of physics (and science)

Code	Data Examples	# Refs
Physics is a 'boy' thing **(Subject)**	There's a stigma attached to Physics and Engineering which means women feel pressurised not to go into that. (Gavin, Ashford Academy) Yeah, because if you think of like a Physicist or an Engineer you think of like a middle-aged man. (Jacob, Ashford Academy) Yeah. People think of like the sciences and stuff and they don't really think, oh yeah, like, female scientists they kind of, they picture men with crazy hair and lab coats… I think more women would be interested if there was more, if there was more like socially acceptable. (Ben, Ashford Academy) I feel like on a conventional level most boys, more boys are attracted to Physics than girls are. (Leslie, Birch High School) I feel like if you're a woman and you try and go into science, I feel like you're disregarded. There's something about it, I feel like they don't really take you as seriously. (Alice, Cedar Sixth Form College) I feel like, yeah it depends on what sort of job you want to do and there are a lot of girls who want to be Doctors and that's why Biology and Chemistry does have a really like, mixed gender ratio. Then I feel like Physics, there's not many girls in it because (..) they don't always want to do (.) things like engineering. (Allen, Cedar Sixth Form College)	30
Physics is really difficult **(Subject)**	I didn't like Physics. I found it really difficult when I was learning it. Like the teacher would say stuff and it would go straight through my head. So, I don't know, I just found it really difficult compared to the other two sciences. I didn't understand it. (Tiffany, Pilot Study, Ashford Academy) I mean even though I got three B's in all three of the sciences at GCSE, I still felt that Physics was the hardest to kind of like understand. (Jacob, Ashford Academy) Because at GCSE, probably Physics would be the hardest one to understand, people probably thought that at A-level you'd need to have much higher knowledge level… I think in Year 11 sciences just got a lot harder, I think. Especially Triple Science because Physics was the hardest bit out of that. (Eric, Cedar Sixth Form College) I was thinking about maybe doing like Physics A-level but once I got to the end of the Physics curriculum (..) uh, I realised that there was, of GCSEs I realised that I wasn't going to be able to do the Physics A-level. I did fine in Physics GCSEs it was just, it got really hard at the end and I realised that Physics A-level was going to be even harder so it probably wasn't going to work for me. Then when I came here I heard that Physics A-level is meant to be pretty hard so I think I made the right choice. (Allen, Cedar Sixth Form College)	23
Physics is different to other subjects **(Subject)**	There's always that link between like Chemistry and Biology, like Biochemistry and like, kind of natural sciences but like Physics is just sort of on the side of the rest of the science. (Jacob, Ashford Academy) I feel like if you pick Physics, that's one path that you're going down and that's it then. You're kind of capped off. (Jessica, Ashford Academy) It's like uh, Physics is a lot more (..) isolated (.) than the other two (..) because like (..) the other two kind of cross into each other a bit. For like the biological molecules and stuff (..) I think like Biology and then you cover the same thing in Chemistry (..) or um, organic molecules in Chemistry (..) but with Physics it's all kind of separate. (Blake, Ashford Academy)	18
Physics is important for engineering (**Subject & Students)**	I sort of knew okay, for Engineering what do I have to do? I had already, I was already, I knew that I liked Maths. So I, um, decided to take on Further Maths um, and I liked Physics and of course it would help with Engineering but I was interested in it. (Aaron, Elmwood Independent Boys' School)	14

	I just had a big interest in Engineering and when I knew that I might need Physics and Maths but when looking at what universities would like uh, they prefer you to do Further Maths so I think that was why I chose to do my three A-levels. (Scott, Elmwood Independent Boys' School) I just had a big interest in Engineering and when I knew that I might need Physics and Maths but when looking at what universities would like uh, they prefer you to do Further Maths so I think that was why I chose to do my three A-levels. (Phoebe, Daffodil Girls' School)	
Physics offers many transferrable skills **(Subject & Students)**	I think you can work in more industries. If you're more because…obviously with physics…I think it's more valuable because the skills you learn are more applicable to other types of work. (Tom, Pilot Study, Ashford Academy) So I think it opens up a lot of… doors… into knowing, like, information that you should know… …and with like a Physics degree I think it's very transferable. You can go into a lot of fields. Transferrable skills, phyiscs is widely applicable (Leslie, Birch High School I think that Physics is the one science that you don't have to really go into something like science/science-related. I think there's a lot more like, learning concepts about like things around you rather than things that maybe you would never think about beforehand. You would always think maybe how a lightbulb works, it's just things that you would use day-to-day in your house and how they work. (Amir, Cedar Sixth Form College) I think all the sciences are said to be facilitating subjects… Physics is useful where it can apply to everything else as well. You don't have to stay in the subject. (Eric, Cedar Sixth Form College)	9

Students' 'taken-for-granted' assumptions and perceptions of modern languages (French, German or Spanish)

Code	Data Examples	# Refs
Languages are really difficult **(Subject & Students)**	For me it was that it was difficult. I didn't enjoy doing them. That's why I didn't take them for GCSE. (Fiona, Pilot Study, Ashford Academy) I found it so difficult. So difficult but that was because it wasn't, everyone else, to me, just seemed like they were way more educated in Spanish than I was. (Leah, Cedar Sixth Form College) It was so difficult. It was just such a difficult language to learn. I feel like with Spanish, something about it is quite simple. It's quite, in a way, similar to English. Whereas, I feel like, I don't know if in French they have so many complicated rules or what it was. It just didn't come as naturally. (Erin, Daffodil Girls' School)	25
You can learn languages later, outside of school **(Subject & Students)**	I do think like, for Spanish, I could just maybe go and live there and pick it up. I wouldn't mind… Whereas, I'm not going to teach myself Psychology. I doubt that if I didn't take it. (Erin, Daffodil Girls' School) I think learning the French GCSE and learning French are two completely different things. Like, I'd rather just like, maybe have my own personal tutor and like learn it by myself the actual language than do French GCSE. (Teresa, Daffodil Girls' School) I do kind of think that because I was considering continuing, continuing with German but then I thought, why do I want to take up one of my options when I can just continue it on my own outside of school and do something else in school. (Elizabeth, Birch High School)	18
Good grades are not indicators of fluency **(Subject)**	I got an A and I can't speak a word of French. (Jacob, Ashford Academy) If you had an A-level in (..) Spanish or French or whatever and you were going to do a course which required you to go abroad, possibly, I'd look at that. But I don't think GCSE, an A in GCSE Spanish really says that you can speak Spanish. (Gavin, Ashford Academy) I can't actually speak Spanish, I got a B in the exam but I can't actually speak it because I basically just cheated on my coursework… (Allen, Cedar Sixth Form College) I memorised my coursework and I managed to get an A* which helped because it was Google Translate and my teacher would do corrections. Um, and when it came to the exams, we had a reading and listening exam and I didn't even know how to speak French, all I did was just memorise words and phrases. (Malik, Cedar Sixth Form College) I don't think the GCSE really, like the grades you get actually show that you know any of the language because I wish I knew how to speak Spanish but I don't really know anything and I go there most years and I still don't know anything. (Chelsea, Daffodil Girls' School)	13
Languages are useful for travel **(Students)**	I thought it would be erm… a good idea to have, if I was going to study abroad… to have a language to enable me to do so. (Diana, Birch High School) I'd like to be able to travel in the future as well and languages have also been something that I've been good at since I was younger. (Yvonne, Birch High School) I think like travelling with the different countries and then you'd be able to communicate with different people that speak the other language such as French. (Tiffany, Pilot Study, Ashford Academy) It gives you the opportunity to potentially go to other countries, if you speak that language. (Oliver, Pilot Study, Ashford Academy)	12
Languages are 'hard work' and require a lot of time **(Students)**	…it is a time thing. To learn a languages you've got to have a lot of time basically. You need to keep practicing it. Which I think is what puts people off languages. (Tom, Pilot Study, Ashford Academy) Yeah, like it is, the grammar is like, I find it really hard to keep up sometimes. Like you do have to put in a lot more work at home which is kind of harder, it's harder to revise a	11

	language I think then maybe something like Maths because it more of like, genuinely remembering something rather than remembering one rule. (Amir, Cedar Sixth Form College) I think it would be helpful but I think it would take me so much longer and it would take so much more effort to like, be good at Spanish than it would for like another subject. (Chelsea, Daffodil Girls' School)	
Languages are not useful **(Students)**	I don't think languages are particularly useful… It was sixty percent coursework and there was a lot of just very much memorising stuff without actually understanding any actual Spanish. So, yeah, you know I can't actually speak any Spanish at all but I passed the GCSE and so I felt like it was a complete waste of five years. (Allen, Cedar Sixth Form College) I enjoyed the classes but (..) when it came to like the outside world, I would have never used it if like, there was no point in me even thinking about it at A-level because I wouldn't, I would do nothing with it so, yeah. (Ron, Cedar Sixth Form College)	11
Everyone speaks English **(Students)**	That's the problem, I don't find any of it useful. I don't really use it. I think when I go abroad, they all speak English. That's the problem. (Michael, Pilot Study, Ashford Academy) It was hard to learn a language because I was like, oh I'm not going to need to learn to speak Spanish because they speak English there and there's Google Translate. (Allen, Cedar Sixth Form College) We had like French exchange students and they spoke really good English and they seemed to enjoy it and I think it's because (..) we had that notion of, oh they will speak English we kind of feel less inclined to learn another language. (Claire, Cedar Sixth Form College) It's very, obviously learning a language is very useful but I think it's just because like, British culture, like lots of things are in English so when you go abroad, you don't really feel like the need to learn it. (Sophie, Cedar Sixth Form College)	10
Languages are beneficial in addition to something else **(Students)**	I think it could help me if I wanted to do a degree where I could do French combined with another subject and then I'd be able to go to France and search for other job opportunities there rather than just in England. (Tiffany, Pilot Study, Ashford Academy) I've always had the idea of like studying French at university but I would never do like a full French course but I'd always want to do French and something. I always wanted to do International Relations because I like politics… (Alice, Cedar Sixth Form College) I'm thinking of going into a job in Accountancy, possibly. Which would I think would help me to, which would allow me to mix my skills in languages as well as Maths. Um, if I'm working abroad as well, that would potentially become useful. Um, so yeah, I think would, that's one area in which I could use my language skills. (Abel, Elmwood Independent Boys' School)	10
Languages are useful for employability **(Subject & Students)**	In terms of, setting you up for…umm…such as job interviews for employers and whatnot, it widens your options as a whole. So, for example, ummm I think I looked at a study, I think last year, where the percentage of people who studied a foreign language compared to those who didn't have an increased income or...yearly salary. (Oliver, Pilot Study, Ashford Academy) Uh… there's a lot of industry abroad and stuff. It's… just a good job skill… it makes you more employable. (Sara, Birch High School) I think languages open up options because most businesses need overseas, like they will need someone to speak French overseas. So I think that if you have a language it's sort of easier to get a job. (Eric, Cedar Sixth Form) I think it could maybe allow you to work abroad a lot easier as well… So I think it gives you an edge maybe, over other people who might be fighting you for the same places in a job, knowing that you can speak another language. (Amir, Cedar Sixth Form College)	9
Languages are learned at birth **(Students)**	The thing is mentioned about learning languages is like… for me, language is something that you always learn at birth, uh so people might be put off learning languages because it's not something that they've always known. (David, Birch High School) That's how the majority of people learn when they're younger. And I think that's why when people are bilingual, it's because of that early learning. (Sophie, Cedar Sixth Form College)	8

	My dad, he speaks like three languages, well he speaks fluent Dutch because that's where he's from and he speaks fluent English…. I know, these people were telling me that Dutch is really hard to learn but if, I think, if he had taught me it like when I was younger. If… yeah, if he'd just spoke to me in Dutch then I would have learned it. (Chelsea, Daffodil Girls' School)	
Girls like French (and Spanish) **(Students)**	I just don't think that it's a subject that a lot of boys go, or really want to do at A-levels. I feel like it's just got a, not like (..) it's just been like a feminine subject but like, I think it's just because French is kind of like a dainty language and it's just like, I don't know. That's just the impression I get so, like no boys would be like, Oh yeah, I really want to do well in French. (Amy, Cedar Sixth Form College) French, Spanish, Italian, I feel like because they call them the languages of love… those languages are more like female dominated (Alice, Cedar Sixth Form College) I think that also maybe, French is like, it's a language which means that there's just as many women speaking it as males do. Whereas Physics is something that you learn so an Engineer would be like, I don't know, you can't really relate the two. French is a lot more broad and I think that's why like maybe girls would be more interested in doing that. (Amir, Cedar Sixth Form College)	4
Boys like German **(Students)**	…whereas, more like German, boys are likely to do German because of business and stuff and like how many businesses are in Germany. (Alice, Cedar Sixth Form College)	2

Appendix H: Student subject combinations

Physics A-level students

School	Name	Maths	Further Maths	Chemistry	Biology	Other
Ashford Academy	Albert	X			X	Business
	Michael	X		X		Business
	Tom	X				Business Drama
	Walter	X				Catering ICT
	Ben			X	X	
	Blake	X		X	X	
Birch High School	**Diana**	X	X			French
	Naomi	X				Sociology
	Leslie (Y13)	X		X		
	Kevin	X				Geography
	John (Y13)	X		X		
Daffodil Girls' School	Teresa	X		X		
	Chelsea	X	X	X		
	Phoebe	X	X	X		
Elmwood Independent Boys' School	Oscar	X	X	X		ICT
	Aaron	X	X			Economics EPQ Electric Cars
	Gabriel	X	X	X		
	Scott	X	X	X		
	Nathan	X	X			French
Cedar Sixth Form College	**Amir**	X				French
	Harriet	X				Psychology
	Felicity	X	X		X	
	Lucy	X		X	X	
	Marco	X		X	X	
	Ron	X		X		
TOTAL	**n = 25**	**24**	**9**	**14**	**6**	**12** Languages = 3 Business = 3 (All others n = 1)

(All students are taking physics)

Modern language A-level students

School	Name	Modern Language(s)	Maths	Science	Arts & Humanities	Other
Ashford Academy	Tiffany	French		Biology Chemistry	Geography	
	Oliver	French			History	Business
Birch High School	Yvonne	French German			Film Studies	Business
	Sara	German		Biology Chemistry	Theology	
	Diana	French	Maths Further Maths	Physics		
	Christine (Y13)	French			Art History	
Elmwood Independent Boys' School	Abel	French Spanish				EPQ Finance
	Adam	French	Maths		Philosophy Politics	Economics
	Nick	French Latin Russian				
	Nathan	French	Maths Further Maths	Physics		ICT
	Jay	German	Maths	Biology Chemistry		
Cedar Sixth Form College	Penny	French	Maths	Biology Chemistry		
	Samantha	French	Maths		English History	
	Alice	French			History Politics	
	Amy	French			Philosophy	Economics
	Amir	French	Maths	Physics		
	Eric	French	Maths		History	
TOTAL		French = 15 German = 3 Spanish = 1 Other = 1	Maths (only) = 6 M + FM = 2	Physics = 3 Biology + Chemistry = 4		
		n = 17	8	7	10	6

Appendix I: Students' future plans and aspirations

Physics A-level students

School	Name	Plans after school	Career Aspirations
Ashford Academy	Albert	Apply to university (Aerospace Engineering)	Aerospace engineer
	Michael	Apply for higher apprenticeships (Transport Engineering)	Transportation engineer
	Tom	Applying to Navy Apprenticeships (Level 3 Engineering)	Engineer in Navy
	Walter	Applying for university (Video Game Development)	Video game developer
	Ben	College (A-level Maths) and then apply to university (Physics)	Physics/Cosmology
	Blake	Apply to university (Medicine)	Doctor
Birch High School	**Diana**	Apply to university (Physics)	Physicist, possibly at CERN
	Naomi	Apply to university	Not sure?
	Leslie (Y13)	Apply to university (Aerospace BSc/MS)	Physicist, possibly at European Space Agency
	Kevin	Apply for apprenticeships (Astrophysics or Electrical Engineering)	Electrical Engineer
	John (Y13)	Apply to university (Physics BSc/MS)	Physicist
Daffodil Girls' School	Teresa	Apply to university (Mechanical Engineering)	Mechanical Engineer
	Chelsea	Apply to university (Physics)	Something in finance
	Phoebe	Apply to university (Civil Engineering) & Army apprenticeships	Mechanical Engineer in Army
Elmwood Independent Boys' School	Oscar	Apply to university (Cambridge – Natural Sciences OR other universities – Physics)	Physicist
	Aaron	Apply to university (Cambridge – Engineering OR Imperial – Mechanical Engineering)	Mechanical Engineer
	Gabriel	Apply to university (Cambridge – Joint Honours in Computer Science w/ Maths OR Other universities – Maths only)	Computer Modelling
	Scott	Apply to university (Oxford – Mechanical Engineering OR Imperial – Materials Engineering OR UCL – Engineering w/ Business)	Mechanical or Material Engineering or Engineering with Business
	Nathan	Apply to flight school	Professional Pilot
Cedar Sixth Form College	**Amir**	Apply to university (Engineering)	Engineer
	Harriet	Apply to university (Astrophysics or Nuclear Physics)	Physics researcher or Physics Teacher at GCSE or A-level
	Felicity	Apply for university (Astrobiology or Astrophysics)	Astrophysics researcher
	Lucy	Apply for university (Medicine)	Doctor
	Marco	Apply for university (Medicine)	Doctor
	Ron	Apply for university (Chemical Engineering)	Chemical Engineer or some kind of engineer
TOTAL	**25**	University = 21 Apprenticeships = 4 Flight School = 1 (some counted twice)	Engineer = 10 Physicist/Researcher = 8 Doctor = 3 (All others n = 1)

Modern language A-level students

School	Name	Plans after school	Career Aspirations
Ashford Academy	Tiffany	Apply to university (Veterinary Medicine)	Veterinarian
	Oliver	Currently being 'looked at' by a recruiter	Professional Sportsman
Birch High School	Yvonne	Apply to university (Media and Film Studies)	Work in television or film, perhaps as a camera person
	Sara	Apply to university	Politics or Teacher
	Diana	Apply to university (Physics)	Physicist, possibly at CERN
	Christine (Y13)	Volunteering abroad in Kenya	Not sure
Elmwood Independent Boys' School	Abel	Gap Year, Apply to university (Accountancy)	Accountancy, Financial Services
	Adam	Gap Year, Not sure	Undecided
	Nick	Apply to university (Law?)	Lawyer?
	Nathan	Apply to flight school	Professional Pilot
	Jay	Apply to university (Medicine)	Doctor
Cedar Sixth Form College	Penny	Apply to university (Medicine)	Doctor
	Samantha	Apply to university (French w/ English or Linguistics)	Linguist?
	Alice	Apply to university (International Relations w/ French)	Diplomatic services
	Amy	Apply to university (Economics, possible joint honours w/ French)	Economics, not sure
	Amir	Apply to university (Engineering)	Engineer
	Eric	Apply to university (Accounting or Economics)	Accounting & Finance or Economics
	TOTAL	University = 12 Gap Year = 3 Other = 2	Medical or Veterinary = 3 Economist = 2 Financial Services / Accounting = 2 Undecided / Not Sure = 2 (All others n = 1)

Appendix J: Students with connections to other languages

	Student (Language)	**School**	**Focus Group**
Student self-identifies as a 'native-speaker' or 'bilingual'	Aaron (French, Lebanese)	Elmwood	Physics
	*Amir (French)	Cedar	French (Male)
	Caleb (Mandarin)	Elmwood	Other
	Lily (French)	Daffodil	Other
	Marco (Italian)	Cedar	Physics (Male)
Parent(s) speak other languages	Abel (Hebrew)	Elmwood	French
	Albert (Cantonese)	Ashford	Physics
	*Amy (French)	Cedar	French (Female)
	Chelsea (Dutch)	Daffodil	Physics
	*Eric (French)	Cedar	French (Male)
	Felicity (Tamil)	Cedar	Physics (Female)
	Harriet (Ethiopian)	Cedar	Physics (Female)
	Lucy (Arabic)	Cedar	Physics (Female)
	*Nick (Russian)	Elmwood	French
	*Oliver (French)	Ashford	French
	*Penny (Guajarati)	Cedar	French (Female)
	Phoebe (Hindi)	Daffodil	Physics
	*Sara (Arabic, Urdu)	Birch	Modern Languages
	Teresa (Twi)	Daffodil	Physics
	*Tiffany (Cantonese)	Ashford	French
Close family member(s) speak other languages	*Christine (French)	Birch	Modern Languages
	Elizabeth (German)	Birch	Other
	Isabel (French)	Cedar	Other (Female)
	*Sara (French, Dutch)	Birch	Modern Languages
No bilingual parents or close family members	Everyone else (n = 44)		

* Students who are studying modern language A-levels (n = 9 out of 17)

Appendix K: Curricular offers

Key Stage 4 (GCSE) options by school (not including Cedar Sixth Form College)

	Elmwood Independent Boys' School	**Birch High School**	**Daffodil Girls' School**	**Ashford Academy**
Compulsory GCSEs (all pupils)	– Mathematics – English Literature – English Language – Science (**Triple Award**)	– Mathematics – English – Science (**Triple or Dual Awards**)	– Mathematics – English Language – English Literature – Science (**Double Award**)	– Mathematics – English Language – English Literature – Science (**Dual or Single Award**)
Humanities	*All pupils select at least one* – Classical Civilisation – Geography – History – Religious Education (RE)	**Pathways 1 & 2**: *Pupils select at least one* – History – Geography **Pathway 3**: *Not compulsory*	*Not compulsory – all listed below*	*Not compulsory – all listed below*
Modern Languages	*All pupils select at least one* – French – German – Spanish – Mandarin – Russian	**Pathway 1**: *Pupils select at least one* – French – German **Pathways 2 & 3**: *Not compulsory to select*	*Not compulsory – all listed below in **bold***	*Not compulsory – all listed below in **bold***
Other options	*Pupils select up to two additional options* – Latin – Classical Greek – Drama – Art & Design – Music	**Pathway 1**: *Pupils select up to two additional options* **Pathway 2**: *Pupils select up to three additional options* **Pathway 3**: *Pupils select up to four additional options* – Art & Design – Business Studies – Citizenship – Computer Science – Creative Media – Drama – Engineering & Product Design – Film Studies – Food – Health & Social Care – Information Technology – Music – Sport	*Pupils select up to four additional options* – Art – Computing – Design & Technology – Drama – **French** – Geography – Health & Social Care – History – Music – **Spanish**	*Pupils select up to four additional options* – Art – Catering – Drama – Engineering – **French** – Geography – Hair & Beauty – Health & Social Care – History – Hospitality – Information Technology – Media – Music – Photography – Physical Education (PE) – **Spanish** – **Triple Science**

Key Stage 5 / Sixth Form curricular offers by school

	Elmwood Independent Boys' School	Birch High School	Daffodil Girls' School	Ashford Academy	Cedar Sixth Form College
School Guidance	Boys in the Sixth Form study **either four A Level subjects, or three and any one of an Extended Project Qualification (EPQ).** Mathematics and Further Mathematics are two choices.	We currently offer a wide range of courses at [Birch High School] and are confident that students can choose combinations of courses on which they are most able to succeed. We feel that students should follow a curriculum which suits their preferred way of working, interests, ability and future aspirations. The school reserves the right not to run subjects where the size of the subject group, in the School's opinion is not of economic size.	Key Stage 5 is a two-year program of study. You will be choosing **3 subjects to study** at A level or BTEC Level 3 and your choices can be exclusively A' Level or BTEC, or a combination of the 2 courses, depending on your subject preferences and whether you achieve the entry criteria for each course.	Students in the Sixth Form will choose to study **between three and four subjects** at AS/A Level or equivalent. **The number chosen will depend upon results achieved at Key Stage 4**. Students can choose between an academic pathway (A Levels), a vocational pathway (equivalents), or a combination of the two.	The general entrance requirements for A Level courses are 7 GCSEs at C or above, including English Language, and 5 for BTEC Level 3 Extended Diploma (18 units), including English Language. Students with an average GCSE grade 4 / C or below will be programmed onto a BTEC course.
Facilitating	– Biology (Pre-U) – Chemistry – English Literature – **French** (Pre-U) – Geography (Pre-U) – **German** (Pre-U) – **Greek** – History (Pre-U) – **Latin** – **Mandarin** (Pre-U) – Mathematics (Pre-U) – Further Mathematics – **Physics** – **Russian** (Pre-U) – **Spanish** (Pre-U)	– Biology – Chemistry – English Literature – English Lang & Lit – **French** – Geography – **German** – History – Mathematics – Further Mathematics – **Physics**	– Biology – Chemistry – English Literature – **French** – Geography – History – Maths – Further Mathematics – **Physics** – **Spanish**	– Biology – Chemistry – English Literature – **French** – Geography – History – Mathematics – Further Mathematics (AS only) – **Physics**	– Biology – Chemistry – English Literature – **French** – Geography – **German** – History – **Italian** – **Latin** – Maths – Further Mathematics – **Physics** – **Spanish**

Useful	– Classical Civilisations – Economics – English Language – Government & Politics (Pre-U) – Music (Pre-U) – Philosophy & Theology (Pre-U)	– Economics – Music – Psychology – Theology – Sociology	– Music – Psychology – Sociology	– Music – Psychology	– Classical Civilisation – Computing – Economics – English Language & Literature – Government & Politics – Music – Philosophy – Psychology – Religious Studies
Other	– Art & Design – Drama Extended Project Qualifications (EPQ): – Cyber Security – Securities and Investment – ICT Certificate	– Accounting – Applied Science (BTEC) – Art (BTEC) – Business Studies (BTEC) – Child's Play (BTEC) – Film Studies – Health & Social Care (BTEC) – ICT (BTEC) – Performing Arts (BTEC) – Physical Education – Product Design – Sport (BTEC)	– Applied Science (BTEC) – Art – Business (BTEC) – Drama – Fashion & Clothing (BTEC) – Graphics (BTEC) – Health & Social Care (BTEC) – Information Technology (BTEC) – Photography	– Applied Science (BTEC) – Art & Design: Fine Art – Art & Design: Photography – Business Studies (Cambridge Technical Level 3) – Catering/Food Science & Nutrition (Level 3 Diploma) – Drama/Creative and Performing Arts – Health & Social Care – Information Technology (BTEC) – Media Studies – Physical Education – Product Design	– Art & Design – Art History – Business (BTEC) – Business Studies – Design & Technology – Drama & Theatre Studies – Law – Physical Education
Total	23	28	22	22	30

'Facilitating' subjects have been identified by Russell Group Universities as being required more often for admission onto university degree courses (Russell Group, 2016)

'Useful' subjects appear on at least one Russell Group university approved list of A-levels and are absent from all non-preferred lists (Dilnot, 2015)

'Other' subjects are all subjects offered by the schools in this study that do not appear on either the 'facilitating' or 'useful' subject lists

Appendix L: Coding frames for *institutional habitus* (Phase 3)

Category	**Description**				
1. Cultural and expressive characteristics	How the schools present themselves, their views of higher education and expectations of their students including 'tastes' or preferences for specific institutions, qualifications and pathways.				
Code	**Examples from data**	**Schools**	**Students**	**Other Source(s)**	**Total References**
a. Focus on academic rigour	*We are unashamedly academic. Our teaching is rigorous and exceptional, and our teachers challenge pupils appropriately and sensitively, to that they can thrive in university, work and life.* (Elmwood Independent Boys' School Website, accessed June 2018)	Birch	Sara	Ms. BL Ms. BM	25
		Cedar	Eric Amir Alice Samantha Penny	Ms. CL Website	
		Elmwood	Archie	Mr. EL Mr. EP Website	
b. 'Taste' or preference for elite universities (e.g. Oxbridge, Russell Group)	*Our results speak for themselves: 35 confirmed places at Oxford & Cambridge and 90% of pupils were accepted at Russell Group Universities. We are enormously proud of our pupils' academic performance, and we recognise that it is a privilege to be able to display the results shown above.* (Elmwood Independent School's Website, accessed June 2018)	Birch		Ms. BL Website Field notes	21
		Cedar	Alice Allen Amy Marco	Ms. CM Ms. CL Website	
		Elmwood	Oscar Aaron Gabriel Scott Archie Caleb	Mr. EL Mr. EM Website Field notes	

c. Fostering a supportive and inclusive learning environment	*Our mission is to provide students with the opportunity for academic success in a warm and friendly environment…through high teaching standards and exceptional pastoral care*. (Daffodil Girls' School's Website, accessed April 2018) "I think I preferred the personal touch that you know, [Daffodil] gives you, you know? I think because it's a smaller school, the teachers get to know you better and you know like what you're actually capable of so, I think I preferred this environment." (Teresa, Daffodil Girls' School)	Ashford	Tiffany Fiona Elise	Website Field notes	16
		Daffodil	Erin Lily Teresa	Website Field notes	
Category	**Description**				
2. Curricular and extracurricular offers	How the schools articulated their rationale for the curricular and extracurricular offers				
Code	**Examples from data**	**Schools**	**Students**	**Other Source(s)**	**Total References**
a. Focus on academic A-levels and facilitating subjects	"From a sixth form point of view, one of our biggest determiners are the facilitating subjects because the vast majority of our cohort will go on to higher education… What we're looking at, at the moment is whether our curriculum is broad and balanced enough to make that happen. As I've said we've traditionally always made sure that we had a good range of facilitating subjects, we offer virtually all of the facilitating subjects." (Ms. BL, Deputy Head of Sixth Form, Birch High School)	Birch		Ms. BL Ms. BM Website	15
		Cedar		Ms. CL Website	
		Daffodil		Ms. DP	
		Elmwood		Mr. EL	
b. Modern languages are valued at school	"I'm fortunate in this school they do value languages so we're very fortunate. Um… other schools I've worked at don't value languages. so therefore, for example, with the A-level numbers, if we have two or three students some schools will say, no, we're not running the course at all. So therefore, the students are then either told to change options or end up going to another school. Here, we're very fortunate." (Ms. BM, Head of Modern Languages, Birch High School)	Birch		Ms. BL Ms. BM	12
		Cedar	Alice Amy		
		Elmwood	Oscar Aaron Gabriel Nick	Mr. EL Mr. EM	

	"For a French teacher or for a language teacher, this place is a real find because you have a lot of people taking the language at GCSE because that's basically compulsory here and… certainly from what I've seen, it's quite a high-status subject and quite popular as well." (Mr. EM, French Teacher, Elmwood Independent Boys' School)				
c. Modern languages are not valued by students	"That's the problem, I don't find any of it useful. I don't really use it. I think when I go abroad, they all speak English. That's the problem." (Michael, Physics Focus Group, Ashford Academy) "Nah, I just speak English. I feel that I was never going to take a language to A-level. I was never really interested in it." (Ron, Male Physics Focus Group, Cedar Sixth Form College) "Especially in our school as well, a lot of our students don't have lots of money, you know, and that is an issue… Like I said, we're not a middle-class school, and languages, in my opinion, I know when I went to university everyone else was from a middle-class background." (Ms. DM, Head of Languages, Daffodil Girls' School)	Ashford	Michael Jessica Gavin Fiona	Ms. AM	12
		Cedar	Allen Malik Lucy Ron Hassan		
		Daffodil		Ms. DM	
d. Lack of modern language options at Key Stage 4	I think I'd like German but they scrapped German at my school. I probably would have done that. (Daniel, Other Male Focus Group, Cedar Sixth Form College) I thought they were good but there wasn't that many choices of languages you could do. (Walter, Physics Focus Group, Ashford Academy) My school was a language college but we only did two languages. We went on like, no trips, no kind of exchange students, nothing (..) There was just nothing there for languages. (Jennifer, Other Mixed Focus Group, Cedar Sixth Form College) They taught German here until 2006, behaviour in German lessons was particularly bad so they took it off the curriculum and they just delivered French for a long time… We introduced Spanish because French uptake had dropped and a lot of our kids go to school in Spain… (Ms. AM, Head of Modern Languages, Ashford Academy)	Ashford	Tom Walter Emmett Gavin	Ms. AM	12
		Cedar	Samantha Jennifer Eric Allen Malik Daniel Hassan		

e. Offering 'useful' or supporting subjects (e.g. Psychology)	"Psychology is massively oversubscribed. Psychology is very often that forth subject. Students will be doing Bio, Chem, Maths and Psychology, and you know, it's a side subject also for the humanities, so it's kind of that subject that covers a couple of bases." (Ms. CL, Assistant Principal, Cedar Sixth Form College)	Birch		Ms. BL Website	8
		Cedar		Ms. CL Website	
		Daffodil		Ms. DP	
f. Offering BTECs and other vocational qualifications	"We do offer five vocational subjects, Health and Social, Business, Sports, um… umm… and a couple of others but basically, we're mainly an academic curriculum…While BTECs have had bad press, I think that's shifting and maybe parents are seeing that actually BTEC is perhaps a better route for something that's more vocational." (Ms. BL, Deputy Head of Sixth Form, Birch High School) "We try and get them into the right kind of level of course because we do BTEC as well as A-level and sometimes some students um, who might struggle for one reason or another, might be better suited to a BTEC course which is a lot more coursework based." (Ms. CL, Assistant Principal, Cedar Sixth Form College)	Ashford	Tom Albert	Website	7
		Birch	David	Ms. BL Website	
		Cedar		Ms. CL	
g. Maintaining numbers in low uptake subjects (generally)	"Greek, Latin and Classic and also English Language/Literature has slightly lower numbers for the last few years… I think we try to keep our A-level offer not too broad because, for one, it keeps subjects that have decent numbers in there and stuff." (Mr. EL, Deputy Head of Sixth From, Elmwood Independent Boys' School) "if they want to do Politics or Business or subjects like that, they can't do it here unfortunately. These subjects, because of funding, all these subjects have been slowly cut down, unfortunately… I think it's mostly about intake, about the amount of students they are taking in." (Ms. DP, Physics Teacher, Daffodil Girls' School)	Ashford		Ms. AM	6
		Birch		Ms. BL Ms. BM	
		Daffodil		Ms. DP	
		Elmwood		Mr. EL	
h. Offering Pre-U qualifications	"I mean, it is exactly what it says, Pre-U, it's a pre-university qualification. At the Russell Group, and it's designed by, it was the Russell Group and, you know, along with some of the elite schools who put it together because the courses at those universities do demand a lot more wider reading and this kind of thing." (Mr. EM, French Teacher, Elmwood Independent Boys' School)	Elmwood	Archie	Mr. EL Mr. EM Website	4

	"So this is the third year for some subjects and the first year for some as well, I think the general feeling is that they're sort of nice, challenging, reliable exams." (Mr. EL, Deputy Head of Sixth Form, Elmwood Independent Boys' School)				
Category	**Description**				
3. Types of support and guidance for post-16 choices	The types of support and guidance that schools and teachers reported providing for students, including when they were offered and how often				
Code	**Examples from data**	**Schools**	**Students**	**Other Source(s)**	**Total References**
a. Information sessions and taster days for subject choosing	"We have an open day in October and that's open to anyone who, you know, who wants to come, visit the college and see the subjects. Normally, obviously, it's the students, prospective students who would be applying to us for the following year. We ask students to come in and help us on this day to show the prospective students and their parents around." (Ms. CL, Assistant Principal, Cedar Sixth Form College) "I came on a taster, on like one of the days where they had people in and I just looked at what they taught and I started watching videos on it at home and I just loved it." (Hassan, Male Other Focus Group, Cedar Sixth Form College) "I remember, at this sort of taster day back in fifth form, they um, they had different sixth formers give uh, they talked about their experience… They were quite honest as well and if there were some subjects which were particularly hard, they would try and tell you the advantages but they would also warn us that these subjects were gonna take quite a lot of perseverance…" (Nick, Modern Language Focus Group, Elmwood Independent Boys' School)	Birch		Ms. BL Website	12
		Cedar	Daniel Hassan Connor Isabel	Ms. CL Website	
		Daffodil	Phoebe Chelsea	Website	
		Elmwood	Nick	Mr. EL	

b. External work experience or mentorship schemes facilitated by the school	We have a dedicated um… careers advisor. Um… who has worked with connections and so on for many years. She's independent from the school, she's in two days a week, hugely experienced. She's one of the people that's got quite a lot of the contacts with the apprenticeship service and things like that. (Ms. BL, Deputy Head of Sixth Form, Birch High School) "I didn't really know what I wanted to do at first, I thought I wanted to do a physics degree, but I couldn't see how I could use that beyond university… I found out more through a programme called [Programme Name] where they uh, give you a mentor for three months… I kind of just asked her how did she decide what specialisation to go into because I know that's a tough decision for most engineers." (Teresa, Physics Focus Group, Daffodil Girls' School) "So, in Year 11 [Careers Advisor] asked that everyone make an appointment with her and speak to her and then when I went to her, she told me about [Pre-Dentistry Summer School]. So, when the time came, I applied… I feel so lucky that I live in London and have the opportunity to do this because I feel like I've learned so much… I don't really know anyone who's applied to like Medicine or Dentistry and it's completely different to the way that you'd apply for a normal university degree and so it's also so nice to be going to these like sessions with these other pupils who are in a similar boat to me." (Erin, Other Focus Group, Daffodil Girls' School)	Birch	Christine Kevin	Ms. BL	12
		Cedar	Sophie Isabel	Mr. CP Ms. CC	
		Daffodil	Teresa Erin		
		Elmwood	Abel Oscar Gabriel	Website	
c. Guided pathways or attainment groupings	*Students are divided into two equal bands and students are set, based on ability, within each band for English, maths and science. (*Ashford Academy Curriculum Rationale Document, accessed February 2018) *In our Sixth Form you can follow purely A-Level or Vocational Courses or a combined pathway. Entrance to these is dependent upon your prior attainment at GCSE.* (Birch High School's Prospectus, accessed December 2017)	Ashford	Jessica Fiona	Website	9
		Birch	Elizabeth Brian David	Ms. BL Website Field Notes	

d. Individualised guidance for subject choices	"Every student signs up with their subjects and we give them some induction work to do. The following day they go in front of what we call the academic board with the heads of department and heads of subject, three interviewing one student... Every single student who has signed up gets an academic board discussion and the plan behind that is that we try and get them into the right kind of level of course." (Ms. CL, Assistant Principal, Cedar Sixth Form College) "We had like interviews to decide what subjects to take or what would be most suitable." (Logan, Ashford Academy) *All Year 12 students participate in mock interviews with sixth form staff and receive practical, personalised advice.* (Daffodil Girls' School Prospectus, accessed April 2018)	Ashford	Fiona Logan Ben		8
		Cedar		Ms. CL Website	
		Daffodil	Teresa Erin	Website	
		Elmwood		Mr. EL	

Category	**Description**
4. Advice and guidance for post-16 subject choices	Advice and guidance given to students at their schools about their post-16 subject choices

Code	**Examples from data**	**Schools**	**Students**	**Other Source(s)**	**Total References**
a. Take subjects that will support your future education and career pathways	"We remind them that getting into university is competitive if you want to get into a Russell Group university, they will look at language because they'll see that you have that, ability… The more academic universities and the more desirable universities will look for a language amongst their GCSE qualifications." (Ms. AM, Head of Languages, Ashford Academy) "It's something that I try to mention quite a lot because I think that for a lot of students it's one of the things that will persuade them to choose certain things and I really strongly feel that if they are able in Physics, if they can do it then it's something which really helps them to succeed in the future." (Ms. BP, Physics Teacher, Birch High School)	Ashford	Oliver Tiffany Walter Tom Albert Michael Gavin Blake Ben	Ms. AM Website	36
		Birch	Sara Diana Leslie Kevin	Ms. BP Website	

	"I chose all mine with Law and then wanted to do Economics because when I went to one of the careers days they told me how there were so many opportunities you can do just studying Economics." (Isabel, Female Other Focus Group, Cedar Sixth Form College)		Elizabeth David		
		Cedar	Eric Amir Felicity Lucy Ron Marco Connor Sophie Leah Isabel	Ms. CL Website	
		Daffodil	Lily	Ms. DM	
		Elmwood	Scott Aaron Oscar	Mr. EL Mr. EP Website	
b. Take subjects that you are best at and can be successful at, make realistic choices	"The advice tends to be if you can achieve highly in your four subjects, that's impressive and that's a good signal to universities. Um, if doing four subjects is going to cost you any grades, you need to think quite carefully about it." (Mr. EL, Deputy Head of Sixth Form, Elmwood Independent Boys' School) "Well, if they haven't got the grades, they don't do it, end of story, because um, there is no point in setting them up to fail. You know, we can't just, you know, we'd know enough to kind of talk them down, talk them out of things." (Ms. CL, Assistant Principal, Cedar Sixth Form College) "…we take great care during enrolment and induction to ensure that students are on appropriate programmes given their prior performance in order to ensure the greatest chance of success." (Cedar Sixth Form College Curriculum Booklet)	Ashford	Tiffany Michael Tom Jessica Jacob Gavin Emmett		32
		Birch	Diana Yvonne Leslie John Brian	Ms. BL	
		Cedar	Alice Samantha Amir Eric	Ms. CL Website	

	"I knew from teachers that said, at my school they said what you should do at A-level what you'd be able to, keep up with the course." (Eric, Male French Focus Group, Cedar Sixth Form College)		Marco Jennifer Malik Daniel Hassan Leah		
		Daffodil	Chelsea Teresa Lily	Ms. DP	
		Elmwood	Archie Nick Abel	Mr. EL	
c. Fitting in with timetables	"I mean there is the limits to the option blocks in school. Like, they give you some blocks and you can't have two of those subjects in the same block so, you kind of like, what do I do when two subjects that I want to do are like, you have to just leave one of them behind." (Jessica, Other Focus Group, Ashford Academy) "We're quite a small sixth form. I said that a few times but we like, so one of the things that happens is, um… we have option blocks where students can pick their options but they can't choose two things in the same block because the timetable wouldn't work. Um… so occasionally that means that they can't get the combination of subjects that they'd like so sometimes that might mean that they study elsewhere." (Ms. BP, Physics Teacher, Birch High School)	Ashford	Oliver Walter Fiona Jessica Elise Justin		25
		Birch	Diana Elizabeth Grace Brian David	Ms. BP	
		Daffodil	Chelsea	Ms. DP	
d. Take subjects you enjoy	"Some advice is given about what subjects might be prerequisites for certain areas but we try to get students to focus on subjects that they enjoy rather than push them too heavily towards certain areas." (Mr. EL, Deputy Head of Sixth Form, Elmwood Independent Boys' School) "Well, they need to really enjoy the subject. I think that's the first thing. They really need to enjoy it, I think for any science subject or A-level	Ashford	Tiffany Oliver Tom Albert Fiona Ryan		17
		Cedar		Mr. CP	

	subject, very independent." (Ms. DP, Head of Physics, Daffodil Girls' School) "The key thing is enjoyment of the subject. If you can enjoy a subject, if you can relate to it and see your career, something along the lines of the subject, while you, you should see that link. Otherwise it will be hard work, there's no other substitute. A lot of practice." (Mr. CP, Physics Subject Lead, Cedar Sixth Form College)	Daffodil		Ms. DP	
		Elmwood	Abel	Mr. EL Mr. EP	

Appendix M: Coding frames for *pedagogic work* (Phase 3)

Types of pedagogic work in physics

Category	**Description**				
Key Stage 4	Evidence of attainment-based gatekeeping for triple science at Key Stage 4				
Code	**Examples from data**	**Schools**	**Students**	**Other Sources**	**Total References**
'Clever students' or top sets take triple science (**symbolic violence**)	I did Triple Science but, it was kind of, because I was in top set, they made top set do it… (Connor, Cedar Sixth Form College) Then some people took triple science which was three units of each of the sciences. So it was top set that took triple science. (Elizabeth, Birch High School)	Ashford	Fiona Elise Michael Jessica		15
		Birch	Elizabeth Brian	Ms. BP Website	
		Cedar	Eric Allen Claire Sophie Connor Daniel		
Heavier workload and stress of triple science (**symbolic violence**)	"The thing is, mine was very much like a wild ride, you know how it's like, if you go up a hill, it's really good and then suddenly you're like crashing down and you go back again and like recovering. See, that sounds like, just remember it now is kind of like, giving me some like traumatic memories." (Isabel, Other Mixed Focus Group, Cedar Sixth Form College) "I used to stress about it all the time… because it was Triple Science as well so it's like an extra lot of things you had to remember as well. I used to just stress about it. I had the choice to move down as well but, in the end, I was like, I've done the majority of the work for it so I might as well just continue going with it." (Claire, Other Mixed Focus Group, Cedar Sixth Form College)	Ashford	Tiffany Walter Jessica Jacob		10
		Cedar	Amy Claire Allen Sophie Isabel Connor		

Getting 'forced' into double science (**disbarring & expulsion)**	A lot of people weren't allowed to move up, even if they wanted to… but that was just because teachers were like, from your grades and some other things, we think it would be like too much stress and stuff. (Sophie, Other Female Focus Group, Cedar Sixth Form College) We didn't get a choice as much as, if you were less (..) good at sciences you would do um, Double or a less intensive course which would mean you'd be able to get a better grade. (Marco, Cedar Sixth Form College) I was put in classroom with other people who, a lot of these people had been forced to drop triple um, or you know, some people who needed extra support. (Leah, Cedar Sixth Form College)	Cedar	Sophie Marco Leah		5
Getting dropped down to double science (**disbarring & expulsion)**	So the school makes you do Triple Science until your mock GCSEs in Year 11 and then, if you underperformed in your mock GCSEs then they'll say, okay you should drop to Double… Triple is definitely standard. (Jay, Elmwood Independent Boys' School) All boys embark on the Triple Award Science and the vast majority will take Triple. After the Mocks in January of the Fifth Form, the Head of Science recommends that some boys take the Double Award and parents are consulted then about this decision. (GCSE Curriculum Booklet, Elmwood Independent School)	Elmwood	Jay Archie	Website	4
Steering from teachers (**compliance & acceptance**)	I did Triple Science because I really liked science, I was like well add some more GCSEs to my thing, I'll get one for each of them. I was like, it's like one of my options they've given me because they only offer it to certain people if they feel you're capable of doing it. (Jessica, Ashford Academy)	Ashford	Tiffany Jessica Ryan		5
	I did double science solely because I didn't really like science and I wanted to spend the extra GCSE on another subject I liked, um, but if you did well in science at Key Stage 3, I did quite okay in it, the Head of Science put a lot of pressure on you. There was only about ten of us who refused. We just said, no we don't want to do it, and that whole year they were kind of on our backs. (Daniel, Cedar Sixth Form College)	Cedar	Daniel		
	"Yeah, it was kind of neglected as well because a lot of the teachers that were were better, so to speak, went to the classes that were taking Triple and that also meant for a lot of us	Cedar	Leah Sophie		3

Less support for double science (or lower sets) (**socialisation**)	who wanted to get good grades, we couldn't because we weren't provided the resources or the teacher who could help us develop that further because there was a couple of times where I wanted to walk upstairs and just join their lesson because they were doing the same thing." (Leah, Female Other Focus Group, Cedar Sixth Form College)	Daffodil		Ms. DP	
Steering from parents	I did Triple Science but I could have moved down to double science, if my mum had let me… She was right to tell me that I had to keep going. Uh, I was a bit worried about it, uh science and I wanted to go down because I thought I wasn't going to be able to do it and she just said, no you're stressing but you don't need to. (Allen, Cedar Sixth Form College) "Particularly in the minds of a lot of parents, they have the opinion that doing separate science better prepares you for the A-level… and I think that the opinion that more is always better and, you know, if there is this extra thing that you can do, why not do it for the most able students." (Ms. BP, Physics Teacher, Birch High School)	Birch		Ms. BP	2
		Cedar	Allen		

Category	**Description**
A-level Physics	Evidence of attainment-based gatekeeping for A-level physics at Key Stage 5 (**socialisation, disbarring & expulsion**)

Code	**Examples from data**	**Schools**	**Students**	**Other Sources**	**Total References**
Grade entry requirements (**disbarring & expulsion**)	So the intake criteria at the moment is, they need to have an equivalent of A in Physics at GCSE and an equivalent of A in Maths at GCSE. (Mr. CP, Physics Subject Leader, Cedar Sixth Form College) A-Level Physics Entry Requirements: Three Grades 9-6 at GCSE level including Mathematics and Grade 7 in Higher Tier Combined Science Trilogy or Physics (Daffodil Girls' School Curriculum Booklet)	Ashford		Ms. AP Website	10
		Birch		Ms. BP Website	
		Cedar		Mr. CP Website	
		Daffodil		Ms. DP Website	
Co-requisite courses (e.g. maths)	I did well in maths but I just didn't enjoy it… and also if you take physics you have to take maths as well, I think...and I'd never had it in my mind taking maths at A-level. Never, never thought about it, I don't enjoy it and I had to sit through two years of it. (Brian, Birch High School) I don't think all schools do this but they require that you choose both Physics and Maths umm… in order to take Physics. And the Maths requirement was a 7, they needed to get a	Birch	Brian Elizabeth	Ms. BP Website	8
		Daffodil		Ms. DP Website	

	7 in their Maths GCSE umm… to get on to that. So, effectively it's the requirement that you need a 7 in Maths to get onto Physics. (Ms. BP, Physics Teacher, Birch School) A-level Physics Entry Requirement: Must be studied alongside A level Mathematics Desirable: Grade 7 in Mathematics (Birch High School Curriculum Booklet)	Elmwood		Mr. EP	
Steering from teachers	Yeah, every single student who has signed up gets an academic board discussion…of course, you don't get students wanting to do medicine who are trying to do Biology, Chemistry, Physics and Maths when they shouldn't be. (Ms. CL, Assistant Principal, Cedar Sixth Form College) I mean, we sort of do advise students who are really weak at Physics um, especially after the (..) you know, December mock exams, we look at them, and I think we'd be failing as teachers if we don't give them the correct advice. And our professional advise to, some, not all of them, a few of them, has been to drop the subject because we feel that the student is going to struggle and that's going to take away time form the core subjects which they want to focus on. (Mr. CP, Physics Subject Leader, Cedar Sixth Form College)	Ashford	Albert Tom	Ms. AP	8
		Birch		Ms. BP	
		Cedar	Lucy	Ms. CL Mr. CP	
		Daffodil		Ms. DP	
Maths test (**disbarring & expulsion**)	So when they come in, and the first, first lesson is they have to sit a forty minute maths test for me. And every year I will get one or two that say, well that's not for me. (Ms. DP, Physics Subject Leader, Daffodil Girls' School)	Daffodil		Ms. DP	3
Category	**Description**				
Sexist behaviour	Evidence of sexist behaviour, marginalising female students in science and physics classrooms (**socialisation**)				
Code	**Examples from data**	**Schools**	**Students**	**Other Sources**	**Total References**
Gender stereotypes in physics	People think of like the sciences and stuff and they don't really think, oh yeah, like, female scientists they kind of, they picture men with crazy hair and lab coats. (Ben, Physics Focus Group, Ashford Academy) If you look at other leading scientists, you don't see many female, you see like Stephen Hawking and things like that. I don't think there's as much coverage… with Engineering especially, it's more stereotypical people think that sort of more men should do Engineering or something. (Eric, Male French Focus Group, Cedar Sixth Form College)	Ashford	Ben Blake Emmett		20
		Cedar	Alice Eric Lucy Felicity Harriet		

	I think it's because like, in the past, it was always put as like, the men would do subjects like Physics but so like, in the past most Physicists you can think of, they're all males…. I don't think that's anything that we've ever spoken about because you can think of all the other physicists like obviously, Newton and then like Feynman, Einstein, like you can name loads of them because they all have stuff named after them. (Chelsea, Physics Focus Group, Daffodil Girls' School) I think they struggle with the abstract concepts of it… whereas in Biology, once they start to learn about themselves and the animals and they find it fascinating because it's about them and they find it a bit relevant… I try to make the Physics as relevant as possible and bring in all girls stuff, but when you open the book, you look at the test, there's always a car, a truck, an engine and I don't know, some girls are appealing to that. And I try to make it more girl-friendly, but however, everywhere else, all the resources, the questions, doesn't seem very girl-friendly. (Ms. DP, Head of Physics, Daffodil Girls' School)		Ron Claire Malik Allen Leah Sophie Isabel		
		Daffodil	Chelsea Phoebe Teresa	Ms. DP	
Doing science as 'muscular intellect' (e.g. interrupting girls in science classrooms and dominating classroom talk) (**symbolic violence**)	"It was just like in the Physics lesson. Boys would just were just like more, I don't know. I'm not sure how to describe it, well just being more boisterous or like, oh yeah I know everything. Or just, say if I was trying to explain something, it always used to get on my nerves… and they would just try correcting me while I'm explaining like (..) I know, that I'm right but it's okay whatever... They just made the assumption that I don't even know what I'm talking about." (Harriet, Cedar Sixth Form College) If I had stayed in my other school then I definitely would not do Physics at all, because uh, it was just boys who signed up… It was the specific boys that they were, you don't understand these boys, man! (laughs) They were just, um rude, very rude people. I didn't like the dynamic so I thought that, if it was just me and them in that classroom I wouldn't have enjoyed it. (Lily, Daffodil Girls' School)	Cedar	Alice Amy Harriet Felicity Lucy	Mr. CP	8
		Daffodil	Lily		
Sexist comments from teachers	I remember when I was at secondary school our teacher literally told us, oh English is more of a female subject and Maths is a male subject. (Felicity, Cedar Sixth Form College)	Cedar	Lucy Felicity Isabel		5
		Daffodil	Phoebe		

Types of pedagogic work in modern languages

Category	Description				
GCSE Languages	Evidence of attainment-based gatekeeping for modern languages at Key Stage 4 (**socialisation, disbarring & expulsion**)				
Code	**Examples from data**	**Schools**	**Students**	**Other Sources**	**Total References**
Setting and academic pathways	So, you know, the more academic universities and the more desirable universities will look for a language amongst their GCSE qualifications. So we're encouraging them, we market a language in such a way that we're encouraging the top end of the year to take it… (Ms. AM, Head of Languages, Ashford Academy) *If students wish to follow French or German, they will need [the Head of Languages] to support their wish; i.e. agree that they have a very good chance of gaining at least a Grade 4 / L2 Pass or better.* (GCSE Curriculum Booklet, Birch High School, accessed December 2017)	Ashford	Fiona Michael Ben Blake Jacob Emmett	Ms. AM Website	15
		Birch	Elizabeth Brian Grace David	Website	
Students excused from taking languages (**disbarring & expulsion**)	In this last year, a lot of kids pulled out to go and do extra English and extra Maths. And you're like, c'mon, you know, if I've got this time on my timetable, that should be protected. You shouldn't be pulling kids from me because actually, when am I going to help them catch up? Languages are really difficult, I need every minute I can get with every student I've got on my roll. (Ms. AM, Head of Modern Languages, Ashford Academy)	Ashford	Fiona Justin	Ms. AM	3
Category	**Description**				
A-level Languages	Evidence of attainment-based gatekeeping for modern languages at Key Stage 5 (**socialisation, disbarring & expulsion**)				
Code	**Examples from data**	**Schools**	**Students**	**Other Sources**	**Total References**
Grade entry requirements	"I mean we say they generally have to get at least an A in the GCSE. Most of the kids here get A*s anyway. Um, and actually the A is seen as, a disadvantage, kind of sign of, you're not really kind of good enough, kind of thing. Although we do take people on, um, yeah, it's true that actually the kids I teach, there's one or two who got an A at GCSE and they're	Ashford		Ms. AM Website	10
		Birch		Website	

	the ones who are struggling the most at Pre-U." (Mr. EM, French Teacher, Elmwood Independent Boys' School)	Cedar		Ms. CM Website	
		Daffodil		Ms. DM Website	
		Elmwood		Mr. EM	
Concerns about grade severity	I just wish the exam boards would not make, would be quite fair on the exams. They are seen to be harshly marked, they need a very, very high percentage… So the grade boundaries are massively high. Um… so I just think the exam boards they'd make it a bit fairer for the students. (Ms. BM, Head of Modern Languages, Birch High School) I mean I think there's a national uh, awareness that we don't get a lot of A*s in languages, I think for French it's only eight percent of A*s. So it's definitely more difficult to get an A* in French than it is in other subjects… (Ms. CM, French Teacher, Cedar Sixth Form College) "I was going to do Spanish but then, I was speaking to a teacher and… asked her if I should do it, and the language teacher said, no because only the people who are native speakers get the top grades so therefore there's no point taking it, because you can't really get an A or an A*, that put me right off it." (Erin, Other Focus Group, Daffodil Girls' School)	Ashford	Gavin	Ms. AM	9
		Birch		Ms. BL Ms. BM	
		Cedar		Ms. CM	
		Daffodil	Erin	Ms. DM	
Steering from teachers	I was going to do Spanish but then, I was speaking to a teacher and… asked her if I should do it, and the language teacher said, no because only the people who are native speakers get the top grades so therefore there's no point taking it, because you can't really get an A or an A*, that put me right off it. (Erin, Daffodil Girls' School) I wanted to do either Spanish or Italian at A-levels because I've, I do enjoy languages and because I have my native language of Italian… um, either of those would have been not too much to add onto what I was already doing but uh, my careers advisor said um, there wouldn't be a point. (Marco, Cedar Sixth Form College)	Cedar	Marco	Ms. CM	3

Appendix N: Coding frames for *celebrated subject identities* (Phase 3)

Students' celebrated subject positions in physics

Code	Examples from data	# of Students (out of 67)	Total References
a. Physics is a masculine subject	"I think people who take engineering anyway, girls who take it, they're seen as a tomboy even if they're really, really feminine just because they're… taking like, a male-dominated subject and then they're labelled a tomboy because they're like the only girl doing it." (Sophie, Female Other Focus Group, Cedar Sixth Form College)	19	30
b. Clever, high achievers	"I think physicists must be really smart." (Tiffany, French Student, Ashford Academy) "I think that the first thing that people think of with Physics is that it's extremely hard. So most people would stay away from it." (Amir, Cedar Sixth Form College)	16	23
c. Focused on science only, science-brain	"I feel like if you pick Physics, that's one path that you're going down and that's it then. You're kind of capped off." (Jessica, Other Focus Group, Ashford Academy)	13	18
d. Independent learners, hard working	"You've got, to be more motivated to do extra work and not just homework that's set but like, if you are struggling with something, you've got to really work on it because you can learn something but you've got to be able to apply it." (John, Physics Focus Group, Birch High School)	9	14
e. Practical and hands-on	"I've always liked Engineering and like, making stuff, breaking stuff, finding out how things work. So, I looked into that and I saw Physics was there with Maths. And I liked those subjects as well so I thought to take them both." (Phoebe, Physics Focus Group, Daffodil Girls' School)	7	11

Students' celebrated subject positions in modern languages

Code	Examples from data	# of Students (out of 67)	Total References
a. Independent learners	"To learn a languages you've got to have a lot of time basically. You need to keep practicing it. (Tom, Physics Focus Group, Ashford Academy) "I think because it's more independent learning because, I don't know, I think at especially in secondary school, they put a lot of pressure on you. The teachers always did but it's on you to do the work, so if you don't do it, it's up to you. " (Eric, Male French Focus Group, Cedar Sixth Form College)	25	45
b. Fluent speakers	"You actually have to learn how properly how to speak French and you need to be able to apply it. That's been the biggest step up I think. Yeah, because it's twenty minute conversation, you can't really prepare or plan for that." (Eric, Male French Focus Group, Cedar Sixth Form College)	17	28
c. Clever, high achievers	"When I say I do a language everyone is like, Wow you must be really clever." (Penny, Female French Focus Group, Cedar Sixth Form College)	7	12
d. French is a feminine subject	"I think it's just because French is kind of like a dainty language..." (Amy, Female French Focus Group, Cedar Sixth Form College)	3	4
e. German is a masculine subject	"like German, boys are likely to do German because of business and stuff and like how many businesses are in Germany." (Alice, Female French Focus Group, Cedar Sixth Form College)	2	2

Teachers' celebrated subject positions in physics

Code	Examples from data	Teachers (out of 14)	Total References
a. Confident, takes risks	"The only thing that I saw having a positive effect was…having extra things to encourage them to join in and just trying to have a space where it's alright to fail. That's the big thing, isn't it? So trying to make it so that it's alright to have a go and get it completely wrong." (Mr. EP, Head of Physics, Elmwood Independent Boys' School)	Ms. AP Ms. BP Mr. CP Ms. DP Mr. EP	7
b. Clever, high achievers	"Our girls were very competitive… because they were always the ones in the top set. They chose Physics, they think they're very clever and that's why they chose physics." (Ms. DP, Head of Physics, Daffodil Girls' School)	Mr. CP Ms. CL Ms. DP	6
c. Physics is a masculine subject	"Well Physics, certainly, is one of the defaults for boys. If you don't know what do to, go and do Maths and Physics." (Mr. EP, Head of Physics, Elmwood Independent Boys' School)	Mr. CP Ms. DP Mr. EP	5
d. Independent learners, hard working	"I think for any science subject or A-level subject, they need to be very independent. So those who are very successful, they don't wait for me to tell them to go to certain lectures when it comes to Year 12 and Year 13. They come and tell me, Miss I went to this lecture and it was so interesting." (Ms. DP, Head of Physics, Daffodil Girls' School)	Ms. BP Ms. DP	3
e. Practical and hands-on	"Physics is such a hands-on subject that you want them to do more hands-on things. Of course theory is very important uh, but the more they do hands-on, the better they learn. So we try to incorporate one practical every week if not more." (Mr. CP, Physics Teacher, Cedar Sixth Form College)	Mr. CP Ms. DP	2

Teachers' celebrated subject positions in modern languages

Code	Examples from data	Teachers (out of 14)	Total References
a. Independent learners	"They definitely need to do extra learning outside of lessons. They need to be reading, they need to be listening to news reports, consolidating and reviewing their work constantly…" (Ms. BM, Head of Modern Languages, Birch High School)	Ms. AM Ms. BM Ms. CM Ms. DM Mr. EM	11
b. Clever, high achievers	"I mean we say they generally have to get at least an A in the GCSE. Most of the kids here get A*s anyway. Um, and actually the A is seen as, a disadvantage, kind of sign of, you're not really kind of good enough, kind of thing." (Mr. EM, French Teacher, Elmwood Independent Boys' School)	Ms. AM Ms. CM Ms. DM Mr. EM	6
c. Native speakers are disadvantaged in modern languages	"Sometimes having a language is a benefit and sometimes it's a bit of a hindrance because you've got to unpick the bad grammar rules, as well…" (Ms BM, Head of Languages, Birch High School)	Ms. BM Ms. CM Ms. DM	4
d. German is a masculine subject	"I think the boys go for German over the girls because of the engineering route and they see science and engineering and German together umm… as an interesting route." (Ms. BM, Head of Modern Languages, Birch High School)	Ms. BM Ms. DM	3
e. Middle-class	"I think, a very, along with the privilege and the upper middle-class milieu that a lot of these kids come from, is this idea that, of course I have to learn French, or, of course I have to learn Spanish, because I go there all the time." (Mr. EM, French Teacher, Elmwood Independent Boys' School)	Ms. AM Ms. BM Ms. DM Mr. EM	4