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Sex gaps in education in England

Research Report

Matthew Carroll

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Author contact details:

Matthew Carroll
Assessment Research and Development,
Research Division
Shaftesbury Road
Cambridge
CB2 8EA
UK

matthew.carroll@cambridge.org
https://www.cambridge.org/

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A note on terminology

Frequently, in discussion of the issues covered by this report, sex is used interchangeably with gender, but throughout this report the word sex is used in preference to gender. Sex, here, is taken to mean biological sex, in contrast to gender, which is taken to refer to socially determined roles or personal identification. This approach is taken to simplify language and interpretation: the datasets analysed do not all conform to a single definition, terminology, or method of data collection, and these factors are rarely explicitly described in supporting information anyway. Indeed, it is likely that there are changing approaches to defining sex or gender over time *within* datasets, meaning there is no single suitable approach. Consequently, for simplicity, this report refers to sex (i.e., male and female), and assumes that the terms used by the different datasets can be taken as analogous to one of the sexes (i.e., "boys" and "men" are considered analogous to male, "girls" and "women" are considered analogous to female). It is acknowledged that this assumption may not accurately represent all individuals within the groups considered, but it is hoped that it is sufficiently accurate to identify, interpret and discuss large-scale patterns in the data. It should also be explicitly stated that the use of male and female *does not imply* that observed differences relate to inherent biological differences: the drivers of any observed patterns are likely to be highly complex, linking biological, social, cultural and personal influences.

Table of contents

Executive summary

Each year, when GCSE and A level results are published, a common talking point in media coverage is how results of male and female students differ. This reflects a popular fascination with such differences, but there is also a deeper, longstanding research interest in sex differences in education, not just in England, but around the world. Research often focuses on documenting aspects of differences, such as the magnitude and types of differences seen, and on possible reasons for the differences, bringing together political, cultural, personal and even biological explanations. There is, therefore, extensive evidence of population-level differences (or "gaps") in attainment and subject choice over many years and in many countries.

Research into educational sex gaps in England has a long history, but there have been few, if any, systematic examinations of sex gaps in recent years. This is particularly pertinent, as recent years have seen widespread disruption due to the Covid-19 pandemic, and substantial reforms to GCSEs and A levels, both of which could have affected the existence and magnitude of sex gaps. Hence, there is value in looking at the state of educational sex gaps, to gain a better understanding of the state of the system following this period of change and disruption.

This report documents the presence of sex gaps at multiple stages of education in England, using data from publicly available datasets that all provide data across multiple years. It addresses gaps from Early Years Foundation Stage, through early formal education in Key Stage 1 and Key Stage 2, through to high stakes examinations at GCSE and A level, up to Higher Education applications and undergraduate degree results. For all of these stages, gaps in attainment between male and female students are calculated; for stages where subject choice is optional, gaps in subject uptake are also calculated. In crucial post-16 and post-18 stages, gaps in participation in education, or in the types of education pursued, are also examined. The direction and size of gaps are evaluated, along with the nature of any change over time. Note that the aim of the report is to simply analyse the data and describe the patterns found: the potentially complex underlying causes are not explored.

Several prominent patterns were identified. First, attainment gaps between male and female students were common, and almost always showed higher female attainment. Such gaps were evident from the very earliest assessments in the Early Years Foundation Stage, right through to the results of undergraduate degrees. The differing nature of assessment methods means that the magnitude of the gaps could not be directly compared, but it was clear that higher female attainment persisted across all stages of education. The only subject area where male attainment was regularly higher was Mathematics, but this was only seen at the highest levels of attainment. At both GCSE and A level, the stages for which subject-level performance data from high-stakes exams was available, a large majority of subjects showed higher female attainment. A notable and interesting pattern in subject-level attainment was that female-favoured attainment gaps increased in magnitude, and male-favoured attainment gaps *decreased* in years in which examinations were cancelled due to the Covid-19 pandemic.

Substantial differences in subject entries were seen at GCSE, A level, and in Higher Education. Gaps followed "traditional" patterns that have been documented before, with higher uptake of languages, social sciences and arts subjects by female students, and higher uptake of physical sciences, technology and business by male students. Many of these gaps were remarkably consistent over time, but there was evidence of reducing male dominance (or, indeed, increasing female dominance) in uptake of some science subjects. In some subjects, however,

gaps appeared to have strengthened over time, such as increasing male dominance in uptake of Design & Technology, or persistently high male uptake of Computing. The magnitude of subject uptake gaps appeared to increase throughout the stages of education as choices became less constrained, with smaller differences at GCSE, but much larger differences at A level and in undergraduate degrees.

There were also persistent gaps in participation in education, with higher female participation in academic education at Key Stage 5 and in Higher Education. Male students were more likely to be classed as “NEET” (not in education, employment or training) after GCSEs and after Key Stage 5, and were more likely to pursue vocational routes through education. These gaps in participation, and in the type of education pursued, also showed notable growth over the years considered, suggesting that these patterns, and their underlying drivers, are continuing to develop. Perhaps these gaps, more so than even those in attainment and subject choice, may give policy makers concern about longer-term social and economic impacts.

Overall, results indicate that gaps in attainment and subject choice between male and female students have persisted over recent years, largely in the same directions as those identified by previous research. This suggests, then, that neither recent reforms nor pandemic-related disruption have changed the direction of existing patterns, and that, aside perhaps from uptake of some science subjects, there is limited evidence of any longer-term reduction in gaps. This is not to say that the existence of gaps is good or bad: there may be no “right” balance for participation, subject choice, or even attainment. Further, previous research has shown that sex gaps are often smaller than those relating to other factors like socioeconomic status, and the presence of gaps may not represent any systemic problem in teaching or assessment, so perspective must be maintained when interpreting the results. This is especially true when considering what might be done in response to patterns highlighted here: any changes that do not consider the complex and diverse interacting factors influencing educational experiences and outcomes could, at best, have limited effects, and at worst prove harmful in some way. However, given the potential for social and economic impacts of such differences, the patterns identified here should be considered when discussing the recovery of the education system from disruptions of recent years or, indeed, future developments of the system.

Introduction

Every summer, a prominent feature of discussion of high-stakes examination results is the difference in performance between male and female students[1]. This reflects a popular fascination with sex differences in educational performance. This is not the only attention paid to such differences though: over many years there has been a vast research effort to document and understand the differences, leading to numerous publications, from reports (e.g., Encinas-Martín & Cherian, 2023; Mott, 2022; Skelton et al., 2007) and academic papers (e.g., Cavaglia et al., 2021; Sutherland, 1987; Whitehead, 1996), to whole books on the topic (e.g., Francis & Skelton, 2005; Hadjar et al., 2016). The interest in this topic is not limited to England or the UK, with reports covering international comparative studies (Meinck & Brese, 2019; van Langen et al., 2006) and detailed exploration of differences individual countries (e.g., Contini et al., 2017; Gandhi Kingdon, 2002). Hence, documenting and understanding sex differences is a longstanding and widespread part of educational research.

The education system in England has undergone substantial reforms over the last decade. Almost every age group has experienced change, with reformed assessments, qualifications and accountability processes all contributing to large-scale changes in the system. However, much of the research on educational sex differences in England is from before the reforms were in place. Moreover, following the disruption caused by the Covid-19 pandemic, questions have been raised about what the 'new' normal in education may look like (e.g., Quilter-Pinner & Ambrose, 2020). Hence, as reforms settle and as recovery from Covid-related disruption takes shape, it is timely to take stock of the extent and occurrence of sex differences. By doing this, those working in the system should be better placed to establish whether existing initiatives to promote equality have worked, or whether further work is required.

The purpose of this report is to use publicly available datasets to explore the presence and direction of educational sex gaps. In this report, a "gap" is interpreted as a population-level difference in academic attainment or some other outcome of interest such as uptake of a subject, or progression to a particular type of qualification. For example, a "gap" would occur if, for a given year's cohort of A level students, a greater percentage of females obtained A* and A grades than males did. The existence of a gap in a single year might not be indicative of anything meaningful though: if one year a greater percentage of females obtained high grades, and the next a greater percentage of males did so, the pattern might simply be caused by random, year-to-year variation in performance. Accordingly, a key aspect of the analyses in this report is to look at gaps *over multiple years*, to identify how gaps have changed, or indeed persisted, in recent years. Occurrence of persistent gaps in a particular direction would be likely to indicate something systemic, rather than stochastic. The broad aim is therefore to identify the current state and the recent history of sex gaps in all stages of education in England. The scope is descriptive and quantitative: I do not seek to explain differences, but instead to simply document patterns from datasets covering different stages of education.

[1] See https://schoolsweek.co.uk/gcse-results-2023-7-key-trends-in-englands-data/, https://www.theguardian.com/education/2022/aug/18/england-a-level-result-explained-five-charts, and https://www.bbc.co.uk/news/education-66534162 for examples of 'key findings' that include comparisons of male and female performance. Note that even the Joint Council for Qualifications and Ofqual prominently highlight comparisons of male and female exam results, such as in https://www.gov.uk/government/publications/infographic-gcse-results-2023/infographics-for-gcse-results-2023 and https://www.jcq.org.uk/wp-content/uploads/2022/08/Press-Notice-GCSE-Summer-2022.pdf.

Previous research

To provide context to this work, here I briefly review existing literature on sex gaps in education. There is a substantial body of work on this topic, so the review is not, and is not intended to be, exhaustive. Instead, I seek to highlight key discussion topics in the field.

First, it is important to consider the historical perspective. Arnot and Phipps (2003) present an overview of sex gaps in UK education, and note that although there has formally been parity in access to education for much of the 20th century, there was initially an attainment gap in favour of males, which switched to a gap in favour of females by the 1990s[2]. The authors note how political developments (e.g., anti-discrimination legislation, changes to school leaving ages), economic changes (shifts from manufacturing to knowledge-based economy), educational reforms (introduction of the National Curriculum and GCSEs), and social changes (changing perceptions of female roles), have combined to influence the nature of educational sex gaps. Similar patterns can be seen throughout the world, however, so the pattern is not unique to the UK: an analysis by Evans et al. (2021) shows that every one of 126 countries analysed showed increasing access to education, and educational attainment, for females over the latter half of the 20th century. Hence, despite an earlier focus on ensuring female access to education, many economically developed countries now show females to outperform males, leading to narratives of "underperforming males"[3] and concerns about how to address this new, and growing, gap.

A major area of research has been to identify areas of learning in which males or females perform better. A common finding is that females outperform males in language skills: Steinmann et al. (2023) analysed data from large-scale comparative reading studies from the 1970s onwards, and found that females performed better in almost all studies and countries. Likewise, van Langen et al. (2006) found that in PISA data from 2000, female students were ahead in reading in every country, and a meta-analysis by Voyer and Voyer (2014) showed the largest female-favoured gaps to occur in languages. Conversely, evidence for gaps in maths often, but not always, shows male students to perform better. The study by van Langen et al. (2006) using PISA data showed males to be ahead in maths in most countries. Analysis of PISA 2018 data (Encinas-Martín & Cherian, 2023) showed higher male performance in maths, but with notable variation between countries. TIMSS data also shows higher male maths performance (Meinck & Brese, 2019). Studies from individual countries, including the USA (Bahar, 2021), Italy (Contini et al., 2017) and France (Guez et al., 2020) show similar patterns. Away from languages and maths, however, it is increasingly the case that female students show higher attainment overall (e.g., Arnot & Phipps, 2003; Cavaglia et al., 2021; Evans et al., 2021; Machin & McNally, 2005). In England, analysis of GCSE results from 2005 and 2014 showed higher female attainment in virtually every subject (Bramley et al., 2015). Hence, a common finding is of higher female attainment in most subject areas, and particularly in language and literacy, but with maths being one area where male students often show higher performance.

[2] The authors state "in the 1960s, boys outperformed girls by about 5%; for the next fifteen years, boys and girls were performing at almost equivalent levels," but this could reflect differences in access to higher level qualifications *and* performance in the qualifications. This highlights a general challenge in understanding such gaps: educational history, opportunities to progress, and performance in assessments, along with various other factors, combine to create observed gaps.

[3] It has been argued that this narrative oversimplifies the real situation, with ethnicity and socioeconomic status contributing to the size and direction of educational gaps (Skelton et al., 2007). For the purposes of this report, these extra factors cannot be addressed, but it should be considered that gaps could be exacerbated, diminished, or even reversed in some groups.

Another area of research relates to the subjects chosen by male and female students. There has long been a perception that certain subjects are associated with males or females, despite various efforts to break down these perceptions. Typically, arts, languages, social sciences and biological sciences are perceived as being associated with females, and thus are often taken by higher numbers of female students; physical sciences, maths, economics and geography are often perceived as being associated with males and, accordingly, taken by higher numbers of male students (e.g., Arnot & Phipps, 2003; Francis, 2000; Skelton et al., 2007; Warrington & Younger, 2000; Whitehead, 1996). In England, the introduction of the National Curriculum and GCSEs in the 1980s ensured that all students studied maths, sciences, and (until 2004) modern languages up to age 16 (Arnot & Phipps, 2003), but many of the traditional perceptions remain. Indeed, 20 to 30 years after introduction of GCSEs, there were still substantial sex differences in subject choice (Bramley et al., 2015). These perceptions can feed into students' attitudes toward the subjects, with some students believing that there are inherent ability differences in different subject areas (Francis, 2000; Whitehead, 1996). Such opinions could even feed into attainment gaps: male students, in particular, have been found to put less effort into subjects they perceive as unimportant (Warrington et al., 2000). Teachers' attitudes toward subjects can also influence students' perceptions of subjects and in turn influence the size of attainment gender gaps (Andersen & Smith, 2022). Hence, social perceptions of subjects can influence gaps in uptake of different subjects, and potentially even influence the size of attainment gaps.

Some research has looked at the impacts of assessment methods on differential outcomes. A common finding is that teacher assessment appears to favour female students while written tests appear to favour male students. Datasets from several countries, containing results of both teacher grading and standardised tests, have shown that teacher assessed grades are associated with larger gaps in favour of females, while standardised tests show smaller female-favoured gaps or, in some cases, male-favoured gaps (e.g., Angelo & Reis, 2021; Campbell, 2015; Graetz & Karimi, 2022; Guez et al., 2020; Lievore & Triventi, 2023; Protivinsky & Munich, 2018). This means that observed sex gaps in attainment could be, at least partially, influenced by the assessment methods used. The exact reasons behind the apparent bias toward females in teacher assessment are unclear, but are likely to relate to the wider range of considerations that influence teacher assessed grades, such as classroom behaviour and work ethic (e.g., Protivinsky & Munich, 2018). Hence, these differences may reflect rational decisions rather than signs of bias. Indeed female students show more developed social and behaviour skills at young ages (DiPrete & Jennings, 2012), meaning that differences in behaviour, and accordingly teacher perceptions of students, establish early. However, this also means that different outcomes in teacher grading and feedback could influence subsequent progress, attainment and educational decisions (Campbell, 2015; Protivinsky & Munich, 2018; Terrier, 2020).

An area that receives particular research and policy attention is female uptake of Science, Technology, Engineering and Maths (STEM) subjects. In the UK and elsewhere there remains evidence that despite overall attainment gaps showing higher female performance, males are over-represented and females under-represented in STEM subjects following compulsory education (e.g., Cavaglia et al., 2021; Encinas-Martín & Cherian, 2023). The exact reasons for these patterns are unclear, but some of this low uptake by females may be linked to gender stereotypes in teachers' views (Andersen, 2023), and some may be linked to students' own views of which subjects are 'appropriate' for them (Skelton et al., 2007). Nevertheless, various initiatives have been put in place to address the issue, and uptake of STEM subjects remains a priority area for promoting gender equality in Higher Education (Mott, 2022).

Hence, the existing literature suggests we should expect to see differences in attainment, with higher female performance in most cases, and in subject uptake, with 'traditional' patterns continuing to dominate. The extent to which reforms, and indeed more recent disruption, will have affected these patterns remains unclear, with the most recent published analyses of patterns in England only including data up to around 2017 (Cavaglia et al., 2021), and with the most recent international comparisons largely based on PISA data from 2018 (Encinas-Martín & Cherian, 2023). This report therefore looks at gaps across multiple stages of education in England, from Early Years to Higher Education, with a specific aim to look at how gaps have evolved over time, including the most recent years of data available, to present an up-to-date picture of the system.

Data and Methods

Analyses were carried out using publicly available, open-access datasets, acquired from January to March 2023. In this section, all datasets and analytical methods are described.

Early years foundation stage

Data from Early Years Foundation Stage (EYFS) Profile assessments was acquired from the Department for Education's "Explore Education Statistics" service (https://explore-education-statistics.service.gov.uk). The EYFS Profile is a series of teacher assessments carried out in the summer term of the school year in which children turn 5, and which aims to support the transition to Key Stage 1. Assessments are made for seventeen "early learning goals", which cover seven "areas of learning": Communication and Language; Physical Development; Personal, Social and Emotional Development; Literacy; Mathematics; Understanding the World; and Expressive Arts and Design. Children are assessed against expected standards for their age group, and can be classed as "emerging" (i.e., not yet meeting the expected standard) or "expected" (i.e., meeting the standard). Current guidelines only use these two categories, but previous guidelines also used an "exceeded" category for those children exceeding the expected standard. No assessments were carried out in 2019/20 or 2020/21 due to the Covid-19 pandemic, and the redeveloped assessments used in 2021/22 cannot be directly compared to previous years. Consequently, the analysis here used data from 2012/13 to 2018/19.

In the present analysis, comparisons between male and female children were carried out at two levels. First, those who *at least* met expected standards were compared (i.e., those in either "expected" or "exceeded" categories). Then, just those who exceeded standards were compared. The primary unit of data was the percentage of children who met/exceeded standards for all goals in each area of learning.

Key Stage 1

Data from Key Stage 1 (KS1) assessments was acquired from the Explore Education Statistics service. Data related to two forms of assessment. First, there were teacher assessments carried out at the end of KS1 (during the summer term of the year in which children turn 7), in Reading, Writing, Maths, and Science. In Reading, Writing and Maths, children are assessed as "working towards the expected standard", "working at the expected standard", or "working at greater depth"; in Science, only the "working at the expected standard" classification is used. Data was available from 2015/16 onwards, but with no data in 2019/20 and 2020/21 due to the Covid-19 pandemic. Changes to assessment frameworks in 2018/19 for Reading, Maths and Science,

and in 2017/18 for Writing, limit the ability to compare results between years. However, comparisons at the relatively coarse level of inference here can still be informative. As with EYFS, two groupings were used for comparisons: those children who *at least* met the expected standard, and those who met the higher standard (i.e., working at greater depth).

The second KS1 assessment was the Phonics Screening Check. This is a standardised check carried out by teachers to indicate children's ability in phonics decoding. The check is carried out in the summer term of Year 1 (i.e., the year in which children turn 6), but if children do not meet the expected standard, they will be checked again the following summer. Children are only evaluated as to whether they meet the expected standard. Hence, two groupings were used for comparisons: children who met the expected standard in Year 1, and those who met it by the end of Year 2 (i.e., all children who met the standard before the end of KS1). Data for the Year 1 check was available from 2011/12 onwards, while the "by the end of Year 2" grouping was available from 2015/16 onwards. Again, no data was collected during 2019/20 or 2020/21.

Key Stage 2

Data from assessments at the end of Key Stage 2 (KS2) was acquired from the Explore Education Statistics service. Unlike EYFS and KS1, KS2 assessments include both externally marked tests and teacher assessment. Written tests are used to assess Reading, Maths, and Grammar, Punctuation and Spelling (GPS; previously known as "SPaG"). Teacher assessment is used for Writing and Science. For Reading, Maths, GPS and Writing, children are evaluated against the expected standard and a higher standard; for Science, only an expected standard is considered. Scaled scores are calculated for KS2 written tests, but these were not used here, with the analyses simply reflecting whether children met the expected or the higher standard. Hence, comparisons again were made between the percentage of children in these groupings. Data was available for 2015/16 onwards, but with no data from 2019/20 or 2020/21.

GCSE subject uptake and performance

Data on GCSEs was acquired from the Explore Education Statistics service. The data described the numbers of entries for different GCSE subjects, along with the percentages of students obtaining grades at or above key threshold grades. The grade thresholds related to three levels of attainment: high attainment (grade A/7 or above), a "standard" pass (grade C/4 or above) and gaining *any* grade (G/1 or above)[4]. The data covered all schools in England, including independent schools, alternative provision, etc. Analysis focused on differences between male and female students in terms of the subjects taken, and in terms of the grades achieved. Data was available from 2009/10 to 2021/22, including the years in which the Covid-19 pandemic prevented examinations from being taken. In these disrupted years, GCSEs were awarded via teacher judgement, so grades, ostensibly equivalent to those in any other year, are available[5].

[4] With the introduction of reformed GCSEs from 2015 onwards, numbered grades from 9-1 were introduced, replacing the A*-G grade system. The two grade scales are distinct but there are three points at which they are comparable: grades A and 7, grades C and 4, and grades G and 1. Consequently, where comparisons over time include both grade scales, comparisons can only be made at these points.

[5] The cancellation of examinations in 2020 and 2021 meant that grades were awarded via teacher assessment ("centre-assessed grades" in 2020, and "teacher-assessed grades" in 2021). In both years, the grades awarded were intended to be comparable to those awarded in normal years, but outcomes were substantially higher than normal. For the official decisions around awarding of grades in 2021, see https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/965005/6747-1_decisions_-_GQ_consultation_on_awarding_grades_in_2021.pdf.

Most subjects or subject groupings were taken directly from the dataset. However, for Design and Technology, separate subjects were manually aggregated to create a grouping that was coherent over time. Specifically, prior to 2018/19 (from first teaching in 2017), separate Design and Technology subjects were available, including D&T: Food Technology. After this point, a single Design and Technology option was available, along with a separate Food Preparation and Nutrition option, which effectively took over from both D&T: Food Technology and Home Economics. Accordingly, to derive a single time series, all Design and Technology options, along with Home Economics and Food Preparation and Nutrition were aggregated.

Along with data on individual subjects, data relating to the English Baccalaureate (EBacc) was available from 2010 to 2022. The EBacc is achieved when GCSEs are gained from several Government-determined "pillars" (subject areas), and entry for the EBacc is a headline school performance measure[6]. Accordingly, data on entry for EBacc and on achievement of grade C/4 or above in EBacc subjects was also used to compare male and female students. Note that although EBacc performance measures were calculated from 2010, the first cohort of students to have made subject choices in full knowledge of the EBacc were those in the 2011/12 GCSE cohort. Note also that from 2015/16, the percentages of pupils entering and achieving the EBacc became headline performance measures, which would be expected to alter school behaviour. Accordingly, these changes should be considered when interpreting the results.

Along with the DfE-provided data, data was also acquired from the Joint Council for Qualifications (JCQ; https://www.jcq.org.uk/examination-results). This data was available back to 2000/01, but subjects were often aggregated into large groupings, and in some cases changing aggregation approaches made it challenging to map subjects across years. Hence, for simplicity, only the DfE data is presented here. However, analysis was still carried out using the JCQ data, and it was confirmed that the patterns identified were the same as those seen in DfE data, and largely unchanged in the extra years available.

Post-KS4 destinations

Data on destinations of students after completing KS4 was acquired from the Explore Education Statistics service. The data described the percentage of students from state-funded mainstream schools in England that went on to different categories of destination in the year after completing KS4. The years covered were 2010/11 to 2020/21, but note that these refer to the years in which destinations were recorded. Hence, the *cohorts* included were those who finished KS4 in 2009/10 through to 2019/20. Identification of destinations is carried out by the DfE by using the National Pupil Database to identify the KS4 cohort of interest, along with various different administrative datasets to identify the destinations. Destinations are only recorded if they are sustained over a period of six months (or, in the case of employment, five months). Detailed methodology for the dataset is available at https://explore-education-statistics.service.gov.uk/methodology/key-stage-4-destination-measures-methodology.

Here, several groupings were considered, either taken directly from the dataset or created by aggregating smaller categories. These were: Overall (i.e., going into education, an apprenticeship or employment); Education (any education destination); Further Education (FE); Sixth Form (combining school sixth form and sixth-form college groupings); Apprenticeship;

[6] See https://www.gov.uk/government/publications/english-baccalaureate-ebacc/english-baccalaureate-ebacc for more information on the EBacc.

Work (i.e., sustained employment); No Sustained Destination (not meeting any of the above categories or recorded as being not in education, employment or training); and Unknown (no participation in anything identified, or student not found in administrative databases). The percentages of male and female students in the cohort going into each destination category were compared.

A level subject uptake and performance

Data on A levels was acquired from the Explore Education Statistics service. A levels are just one possible educational route at age 16-18, and are typically taken by relatively high-attaining students, so analysis of A level patterns does not tell us about the whole cohort. However, the complexity of working with vocational qualification data (i.e., different levels and sizes of qualification, which can be taken at different ages, along with substantial changes to the qualifications during the period of interest) meant that I focused on A levels for simplicity. As with the GCSE data, the data described numbers of entries for a range of different subjects, along with the percentage of students gaining grades at or above key thresholds. In A levels, only two thresholds were considered: A/A*, indicating very high attainment, or E and above, indicating receipt of *any* grade. Data was available from 2009/10 to 2021/22. A levels were awarded via teacher judgement in 2020 and 2021, but grades are ostensibly comparable to those in other years (see footnote 5). Subjects and subject groupings were largely consistent over the years of data, so manual aggregation was only required in a small number of cases where earlier data provided aggregated groupings, and later data provided individual subjects.

Again, data was also acquired from the JCQ, going back to 2000/01. However, as with the GCSE data, subject groupings were more aggregated, and fewer subjects were available, so although this data was analysed, only the DfE results are reported here.

The above descriptions refer to data on individual subjects, but students typically take three or four A levels, and the combination of grades achieved determines key things like offers for university places. Accordingly, along with results for individual subjects, the DfE data also reports the percentages of students obtaining either three A/A* grades or at least two As and a B. These of course reflect very high attainment, but no metrics of lower attainment were consistently reported over the time period concerned. Therefore, the percentages of male and female students meeting these multiple-grade criteria were also analysed.

Participation at ages 16-18

The DfE collates statistics on participation and those not in education, employment or training (NEET) for 16-18 year olds, so this data was also acquired from the Explore Education Statistics service. The data is based on combining various different administrative datasets from the school, Further Education (FE), and Higher Education (HE) sectors, as well as the Labour Force Survey. Population estimates are taken from the Office for National Statistics. Full methodology relating to the dataset is given at https://explore-education-statistics.service.gov.uk/methodology/participation-in-education-and-training-and-employment-methodology.

The dataset describes various different types of participation, including training, apprenticeships, education, and employment, along with those not in education, training or employment. For this study, just the coarse-scale headline measures were used: “all education and training”, “in employment (not in education)”, and NEET. Although estimates were available

for individual ages (16, 17 and 18) and for the age 16-17 grouping, here the 16-18 grouping was used to give a single picture for the whole “KS5” age group. Although broadly similar to the measure of post-16 destinations described earlier, this dataset, crucially, provided a much longer time series, with data available from 1994 to 2021.

Post-KS5 destinations

This dataset was acquired from the Explore Education Statistics service, and describes destinations of those students who completed their 16-18 study. It is the analogue of the post-KS4 destinations dataset described earlier, but with several key differences. First, it covers state-funded mainstream schools, independent schools, sixth form colleges, and FE providers, whereas the earlier dataset just refers to students in state-funded mainstream schools. However, for several school groupings data was unavailable for all years, so the “state-funded mainstream schools and colleges” grouping was used; this has the added benefit of improving comparability with the earlier destinations data. Second, several subgroups within the overall 16-18 cohort can be determined due to the diversity of qualifications available. Here, only those students who took Level 3 qualifications (i.e., A levels and vocational qualifications of an equivalent level) were considered. Note that this introduced some complexity, as in earlier years this cohort included all students taking “approved Level 3 qualifications”, but in 2017/18 a large number of qualifications ceased to be “approved”[7]. Consequently, for years up to and including 2016/17, the “approved Level 3” cohort was used, but after this the “total Level 3” cohort was used to maintain comparability. Data was available from 2010/11 to 2020/21, but as with the earlier destinations data, the years refer to the period in which the destination was recorded, i.e., the students involved completed their study the year before. Full methodological details for the dataset are available at https://explore-education-statistics.service.gov.uk/methodology/16-18-destination-measures-methodology.

Several key destinations were used, but in this case no manual aggregation was required: all groupings were as recorded in the dataset. These were: Overall (going to education, apprenticeship or employment); Education (any form); Further Education (any FE institution or an FE course at an HE provider); Higher Education (any HE provider, including HE courses at FE providers); Work (any sustained employment, i.e., in paid employment in at least five months from October to March); apprenticeships; no sustained destination (those who were recorded but did not go to any of the above destinations, or who were recorded as not in education, training or employment); and Unknown (those not found to have any recorded destination or who could not be found). Analyses compared the percentages of male and female students progressing to each destination.

Higher Education applications

A key outcome of education for many young people, and indeed at a policy level, is entry to Higher Education. Accordingly, an important metric of possible sex gaps is in those young

[7] In this context, “approved” means approved for inclusion in performance tables. The Government published criteria in 2015 around the size, recognition and assessment of vocational and technical qualifications that had to be met for the qualifications to continue to be eligible for inclusion in performance tables. Prior to this, many vocational qualifications were 100% internally assessed, but this rendered them ineligible for inclusion in performance tables. For example, the “2012 suite” of Cambridge Technicals were no longer eligible, leading to development of the “2016 suite” that included external assessment. Nevertheless, the popularity of the internally-assessed qualifications meant that many continued to be taught despite being ineligible for performance tables.

people applying to HE institutions. Data on this was acquired from the Universities and Colleges Admissions Service (UCAS), the body that manages the process of HE applications. Data was taken from the regular "end of cycle" reports, available at www.ucas.com/data-and-analysis/undergraduate-statistics-and-reports. Data described several metrics in relation to the HE application process, and was available from 2010 to 2022. Metrics used are described further below.

The metrics analysed related to virtually every stage of the HE application process. These included the number of applicants, the number of applications (each applicant can make up to five applications), the number of offers received, and the number of "placed" applicants (i.e., those who took up a place at an HE institution). Along with these population-based measures, the rate of offers made per application was also analysed, as this indicates the relative success of applications (a student who makes multiple applications, each of which is successful, would be recorded the same as one who received just a single successful offer in the "placed applicants" metric, whereas the offer rate metric would identify this difference). Metrics of applicants per 10,000 population and placed applicants per 10,000 population were also analysed (with these metrics intended to take account of underlying differences in the pool of available applicants) but results were similar to those from the simpler metrics, so are not reported here. For each of these, the percentage (or rate) for males and females was compared.

Higher Education subject choice and performance

The final dataset analysed was acquired from the Higher Education Statistics Agency (HESA), who collect and publish data on HE in the UK. Data was acquired on the subjects undergraduates enrolled for (https://www.hesa.ac.uk/data-and-analysis/students/what-study) and on performance in undergraduate degrees (https://www.hesa.ac.uk/data-and-analysis/students/outcomes). Data was available from 2015 to 2022.

For subject enrolment, the subject grouping scheme changed over the period covered by the data. From 2019/20, the Higher Education Classification of Subjects was brought in to replace the Joint Academic Coding System. The Common Aggregation Hierarchy was introduced to connect the two schemes, so all subject enrolment analyses were carried out using these 22 aggregated subject groupings. The percentages of male and female students enrolling into each subject group were compared; as with earlier analyses of subject choice, the baseline for comparison was the total percentage of male and female enrolments across all subjects.

For degree outcomes, comparisons were made for each of the main UK degree classifications: first, upper second (2i), lower second (2ii), third, and unclassified. The percentages of male and female students gaining each classification were compared; unlike earlier analyses of outcomes at GCSE and A level, the values analysed here were *not* cumulative (i.e., data simply described the percentage obtaining each classification, *not* that classification *or better*). Note that these comparisons were made over all subjects, as subject-level performance data was not available.

Making comparisons

The purpose of the analysis was to understand the nature and size of gaps between males and females. Under most circumstances, this could be done simply by comparing the percentage of males and females who met a particular condition. For example, when comparing the percentage of male and female students gaining grade 7/A or above in a GCSE subject, we can

simply calculate the percentage of students *of that sex who took the subject* who gained the focal grades. For example, if 100 males and 1000 females took a subject, an equal attainment rate of 10% would lead us to expect 10 males and 100 females to achieve the focal grade. Hence, for attainment comparisons, this simple approach was used. The gap is then calculated as the difference between the two percentages, in percentage points. For consistency, all comparisons subtract the male percentage from the female percentage, such that a negative value indicates a male-favoured gap and a positive value indicates a female-favoured gap; a difference of zero percentage points would indicate no observed gap.

This simple interpretation was not possible for all metrics. For subject choice comparisons, the population was not always equally split between male and female students. Hence, for a given subject, if 50% of students taking it were male and 50% were female, this might appear to represent equality, but if the population taking the qualifications was 70% female, the subject would actually be more male-biased than expected based on the population. Hence, for subject choice, the percentages of males and females taking the subject were calculated and the difference taken, but this was compared to the equivalent *overall* difference across all subjects for that qualification. Note that this 'population-level' gap was determined based on the total numbers of *entries* (i.e., the datasets did not describe the total numbers of *individuals*, but the total number of grades awarded across all subjects). In these cases, a negative difference still represented a greater male percentage, but particularly at higher levels of education, where the population has a greater percentage of females, it would be possible to see more males than expected even in a subject with a small *positive* difference. It must be noted here, however, that there is no "right" distribution of male and female students against which observed gaps can be compared: this choice of the overall gap is just one possible baseline.

These calculations were carried out for each year of data, and then time series of differences were plotted to understand how gaps had changed over time. To give simple metrics for interpretation, the mean, minimum and maximum values for the percentages and the difference were calculated across all years. Interpretation focused, then, on several key factors:

1. What *direction* was the gap in?
2. How *big* was the gap?
3. Did the size or direction of the gap *change* over time?

Results

Results are presented chronologically, with those pertaining to the earliest stages of education first.

Early years foundation stage

Figure 1 and Figure 2 show the difference between female and male children in all seven areas of learning assessed at EYFS, first for those “at least meeting expectations”, and then for those “exceeding expectations”. It should be noted that all of these are based on teacher assessments. Summary statistics calculated across all years of data are shown in Table 1.

In all areas of learning, a greater percentage of females were classed as meeting or exceeding the expected standard (Figure 1), with the mean differences all in the range 8 to 14 percentage points (Table 1). The largest mean difference was for Literacy at 13.9 percentage points, although the largest difference observed overall was for Expressive Arts and Design at 17.3 percentage points in 2013. Some learning areas showed slight reductions in the size of the gap over time, but the overall picture was of relatively stable differences over the seven years of data.

When considering whether children *exceeded* the expected level (Figure 2), the pattern was broadly similar but with two key differences. First, a slightly greater percentage of males exceeded the expected level in Maths (mean difference 0.8 percentage points), with the difference slightly growing over the years considered. Further, the “Understanding the World” learning area showed much more similar performance, with female attainment only 0.4 percentage points higher on average (Table 1). In the remaining areas of learning, female attainment was 5 to 9 percentage points higher.

Hence, in the earliest assessments carried out in the education system in England, females showed higher performance in all areas, with males only showing better performance at the higher standard of Maths, and even then by a relatively small amount.

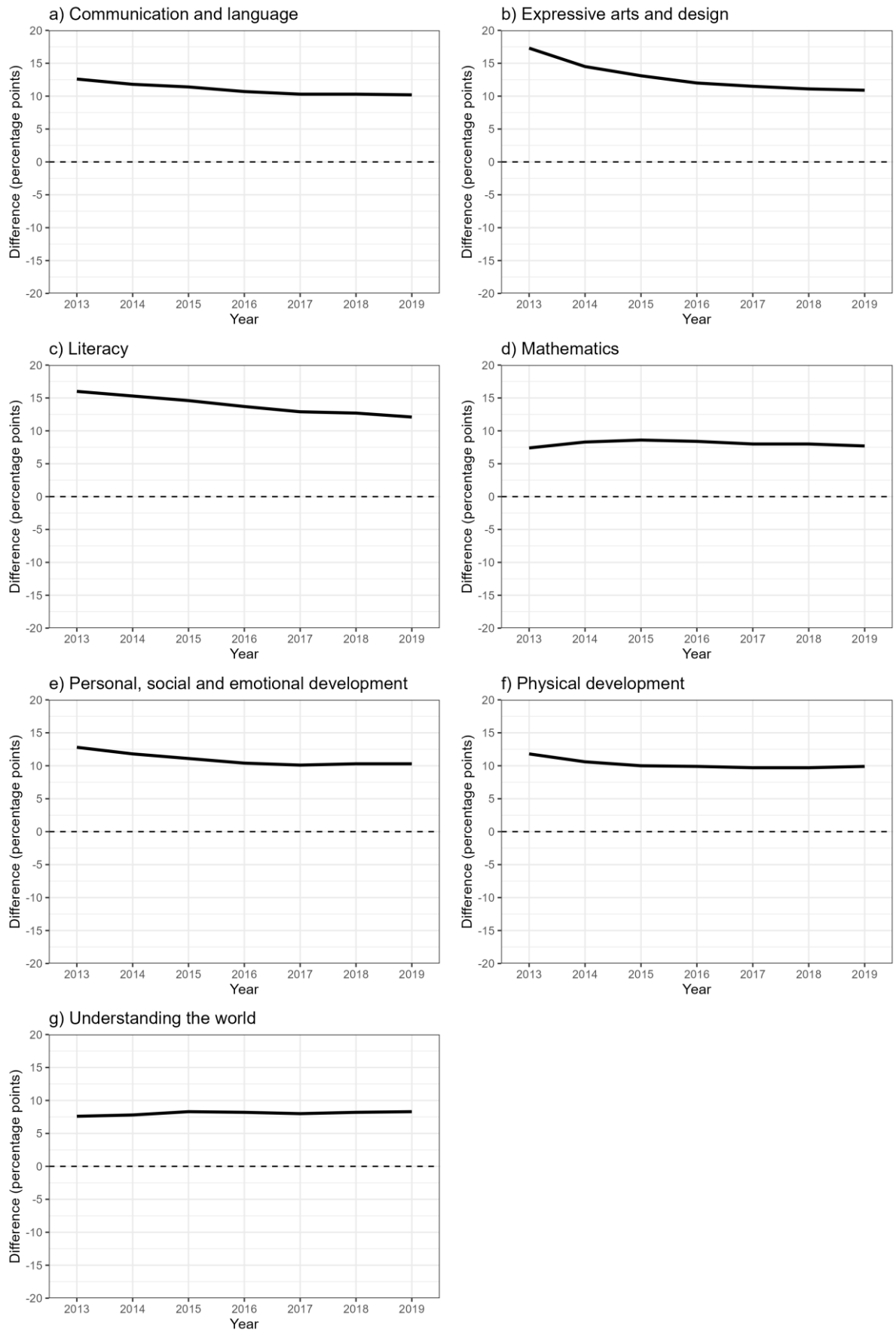


Figure 1. Differences between the percentages of female and male children attaining at least the expected level in each EYFS area of learning. A positive value indicates a greater female percentage.

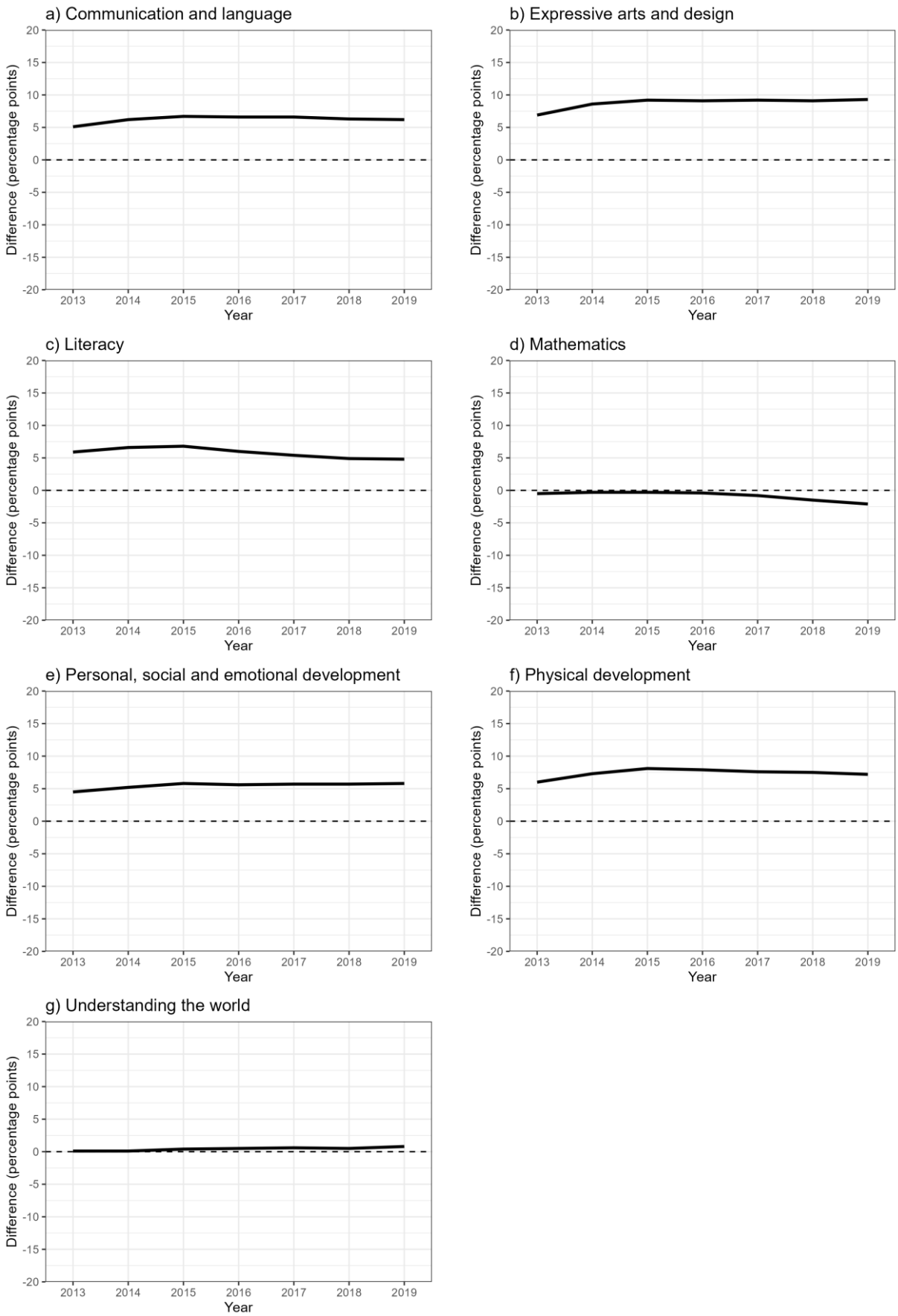


Figure 2. Differences between the percentages of female and male children exceeding the expected level in each EYFS area of learning. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

Table 1. Summary statistics for differences between female and male children in EYFS assessments. Statistics are calculated across all years of available data (here, N = 7). Differences are calculated as female % - male %, thus a positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

	Area of learning	Mean			Minimum			Maximum		
		F	M	Diff	F	M	Diff	F	M	Diff
At least expected	Communication and language	85.4	74.3	11.0	78.6	66.0	10.2	87.7	77.4	12.6
	Expressive arts and design	91.4	78.5	12.9	87.1	69.8	10.9	92.9	81.9	17.3
	Literacy	76.9	63.0	13.9	68.9	52.9	12.1	79.8	67.5	16.0
	Mathematics	79.3	71.3	8.1	70.0	62.6	7.4	82.4	74.7	8.6
	Personal, social and emotional development	88.6	77.6	11.0	82.9	70.1	10.1	90.5	80.2	12.8
	Physical development	91.7	81.4	10.2	88.7	76.9	9.7	92.6	82.7	11.8
	Understanding the world	85.8	77.7	8.1	79.2	71.6	7.6	88.2	80.0	8.3
Exceeded	Communication and language	17.2	10.9	6.2	13.1	8.0	5.1	18.8	12.6	6.7
	Expressive arts and design	15.5	6.7	8.8	11.1	4.2	6.9	17.7	8.4	9.3
	Literacy	13.5	7.7	5.8	12.6	6.8	4.8	15.0	8.2	6.8
	Mathematics	11.1	12.0	-0.8	7.7	8.2	-0.3	12.2	14.3	-2.1
	Personal, social and emotional development	12.5	7.1	5.5	10.0	5.5	4.5	13.6	7.8	5.8
	Physical development	16.4	9.0	7.4	13.4	7.4	6.0	17.6	9.7	8.1
	Understanding the world	7.1	6.7	0.4	3.9	3.8	0.1	9.5	8.7	0.8

Note: here, and in all similar tables, the values are calculated as the mean (or maximum, or minimum) of the percentages and differences for each individual year. That is, for each year, the female percentage, male percentage, and the difference are calculated. Then, the mean (or maximum, or minimum) is calculated over all such values. For the minimum and maximum, the values will not necessarily align: the maximum female percentage, maximum male percentage, and maximum difference could have come from three different years.

Key Stage 1

Children are assessed by their teachers at the end of KS1 in the key areas of reading, writing, maths and science. Along with this, they take the phonics screening check at the end of year 1, and those who do not meet expected standards take the check again at the end of year 2. Consequently, there is the opportunity to see if gaps identified in EYFS remain once the children have spent time in formal education at KS1.

Results from teacher assessments are shown in Figure 3 (expected standard) and Figure 4 (higher standard), whilst phonics screening check results are shown in Figure 5. Summary statistics for all assessments are shown in Table 2. A greater percentage of female children met the expected standard in all four areas assessed by teachers and in the phonics screening check. The largest gap was for Writing (mean gap 13.2 percentage points), and the smallest was for Maths (mean gap 1.4 percentage points). Differences were stable over time, although Maths showed a shift to a small male-favoured gap of one percentage point in 2022.

When assessed against the higher standard, female children again showed higher attainment in Reading and Writing, but with smaller gaps than those seen at the expected standard. Maths, however, showed a different pattern, with a greater percentage of male children meeting the higher standard (mean gap 4.4 percentage points in favour of males). Hence, a similar pattern to that seen in EYFS assessments was seen here.

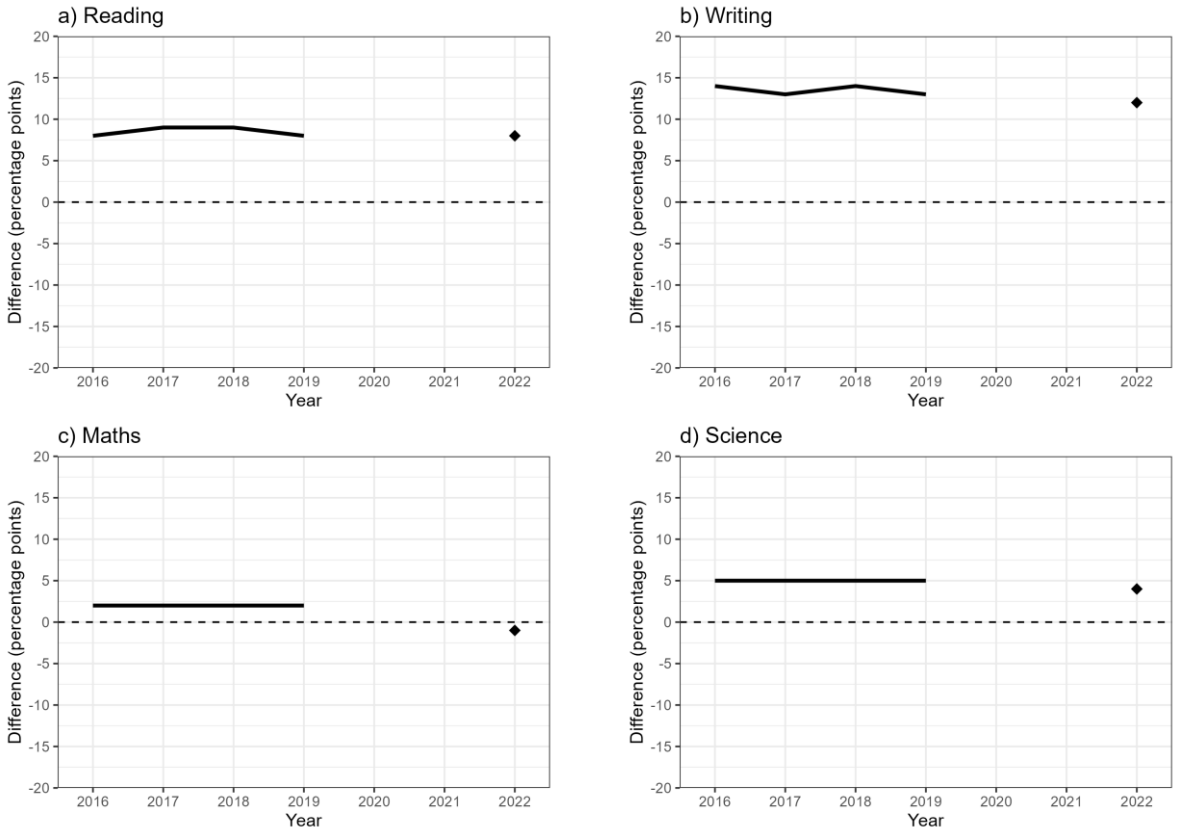


Figure 3. Differences between the percentages of female and male children meeting the expected standard in each teacher-assessed KS1 area. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

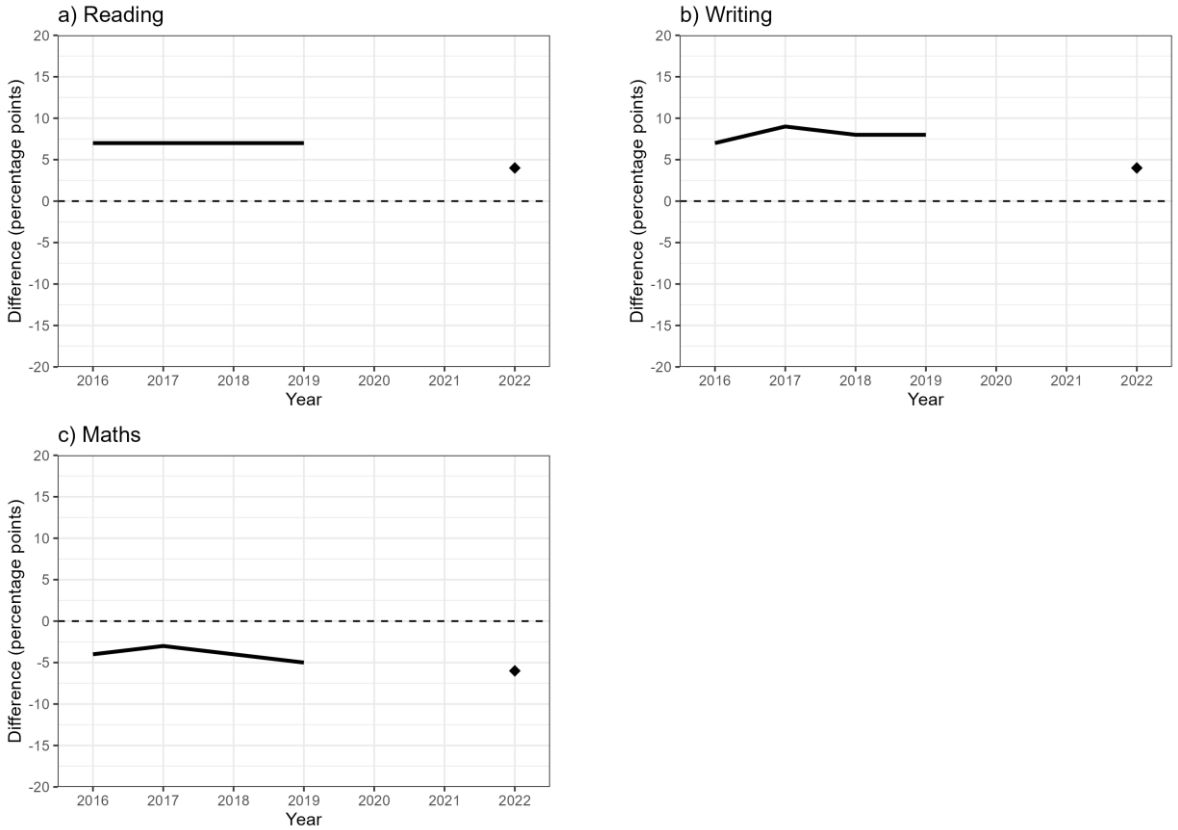


Figure 4. Differences between the percentages of female and male children meeting the higher standard in each teacher-assessed KS1 area. Science was not assessed against this standard. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

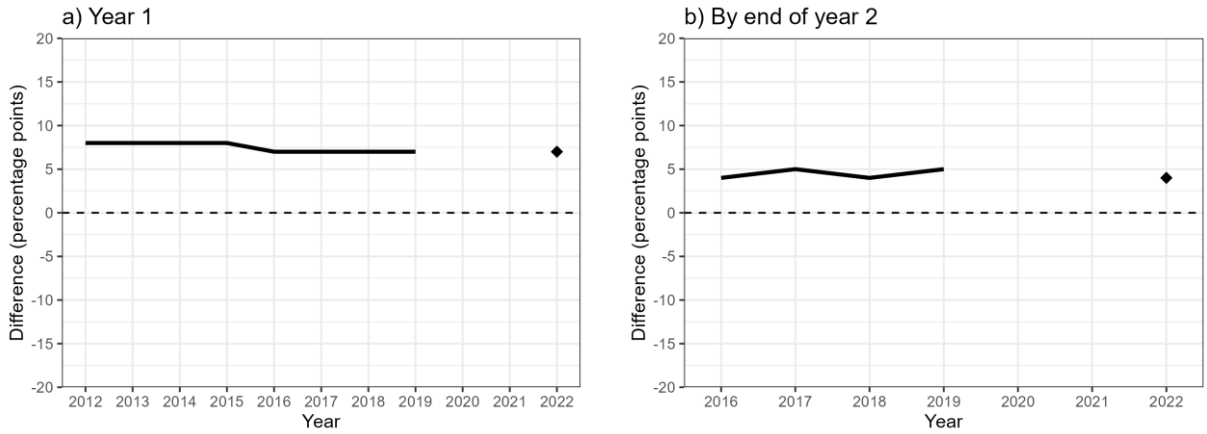


Figure 5. Differences between the percentages of female and male children meeting the expected standard in KS1 phonics screening checks in year 1 and by the end of year 2. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

Table 2. Summary statistics for differences between female and male children in KS1 assessments. Statistics are calculated across all years of available data (here, N = 5 for Reading, Writing, Science and Maths, and N = 9 for Phonics). Differences are calculated as female % - male %, thus a positive value indicates a greater female percentage and a negative value indicates a greater male percentage. Note that Science and Phonics are not assessed against the "higher" standard. Note also that for minimum and maximum values, percentages are reported as integer values, as this is the level of reporting in the data.

	Area of learning	Mean			Minimum			Maximum		
		F	M	Diff	F	M	Diff	F	M	Diff
Expected	Reading	77.6	69.2	8.4	71	63	8	80	71	9
	Writing	73.0	59.8	13.2	64	52	12	77	63	14
	Maths	74.2	72.8	1.4	67	68	-1	77	75	2
	Science	83.6	78.8	4.8	79	75	4	85	80	5
	Phonics – year 1	79.2	71.8	7.4	62	54	7	86	79	8
	Phonics – by end of year 2	92.8	88.4	4.4	89	85	4	94	90	5
Higher	Reading	26.8	20.4	6.4	20	16	4	29	22	7
	Writing	17.2	10.0	7.2	10	6	4	20	12	9
	Maths	17.2	21.6	-4.4	12	18	-3	20	24	-6

Key Stage 2

Key Stage 2 assessments, carried out in Year 6, the school year in which children reach age 11, are a mixture of standardised written assessments (Maths; Reading; Grammar, Punctuation and Spelling) and teacher assessments (Writing; Science). While test scores are given as scaled scores, the data analysed here simply indicated the percentage of male and female children who reached or exceeded the “expected” standard (Figure 6), or who reached the “higher” standard (Figure 7). Summary statistics across all years of data are shown in Table 3. Note that alongside the individual subject areas assessed, values are also given for those who met or exceeded standards in *all* of Maths, Reading and Writing. Note also that assessments were not carried out in 2020 or 2021, so no data is available for those years.

KS2 assessments showed female attainment to exceed male attainment in nearly every area. In terms of those meeting the expected standard, female attainment exceeded male attainment in all areas apart from Maths (Figure 6), with the mean difference ranging from 5.2 percentage points higher in Science, to 12.8 percentage points higher in Writing. In Maths, attainment of females and males was virtually identical, with a mean difference of only 0.2 percentage points. There was little evidence of any substantial directional change over time.

The patterns were largely repeated when considering the higher standard (Figure 7), with higher female attainment in reading, writing, and grammar, punctuation and spelling, all of which showed mean differences of 8 to 9 percentage points. Maths again showed a different pattern, with higher male attainment by, on average, 3.8 percentage points. Hence, patterns seen in both EYFS and KS1 were largely repeated in assessments taken at age 11.

Table 3. Summary statistics for differences between female and male children in KS2 assessments. Statistics are calculated across all years of available data (here, N = 5). Differences are calculated as female % - male %, thus a positive value indicates a greater female percentage and a negative value indicates a greater male percentage. Note that Science was not assessed against the “higher” standard. Note also that for minimum and maximum values, percentages are reported as integer values, as this is the level of reporting in the data.

	Area	Mean			Minimum			Maximum		
		F	M	Diff	F	M	Diff	F	M	Diff
Met expected	Reading	76.4	68.2	8.2	70	62	7	80	72	10
	Writing	81.8	69.0	12.8	76	63	12	85	72	13
	Maths	74.2	74.0	0.2	70	70	0	79	78	1
	Reading, writing & maths	64.6	56.6	8.0	57	50	7	70	61	10
	Grammar, punct. & spelling	80.2	71.2	9.0	77	68	8	83	74	10
	Science	84.0	78.8	5.2	82	76	4	86	80	6
Met higher	Reading	29.4	21.2	8.2	22	16	6	33	24	10
	Writing	21.6	12.8	8.8	16	10	6	25	15	10
	Maths	20.4	24.2	-3.8	15	18	-3	24	29	-5
	Reading, writing & maths	10.0	7.0	3.0	6	5	1	13	9	4
	Grammar, punct. & spelling	34.8	26.2	8.6	27	18	7	41	31	10
	Science	–	–	–	–	–	–	–	–	–

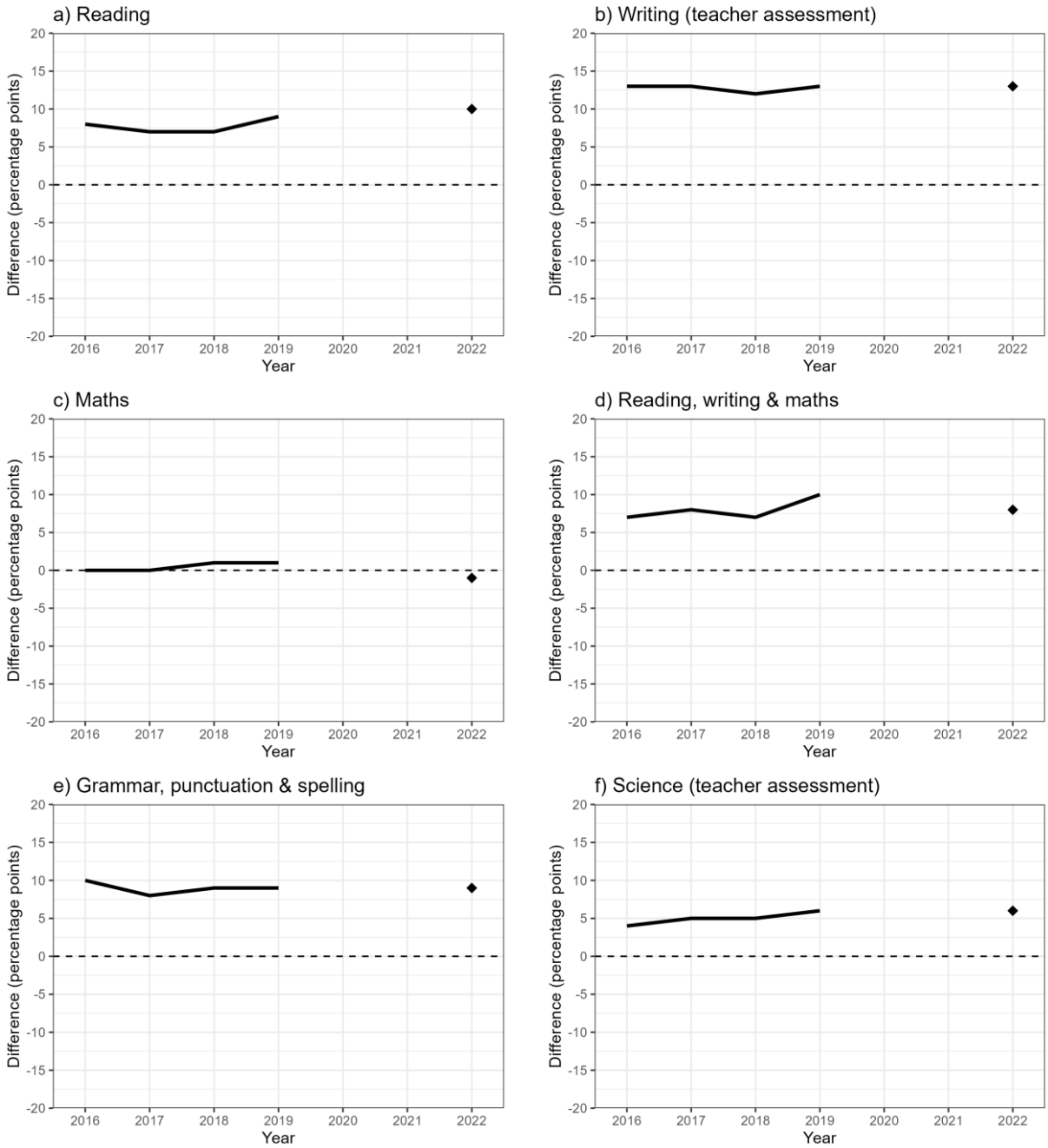


Figure 6. Differences between the percentages of female and male children meeting the expected standard in each KS2 area. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

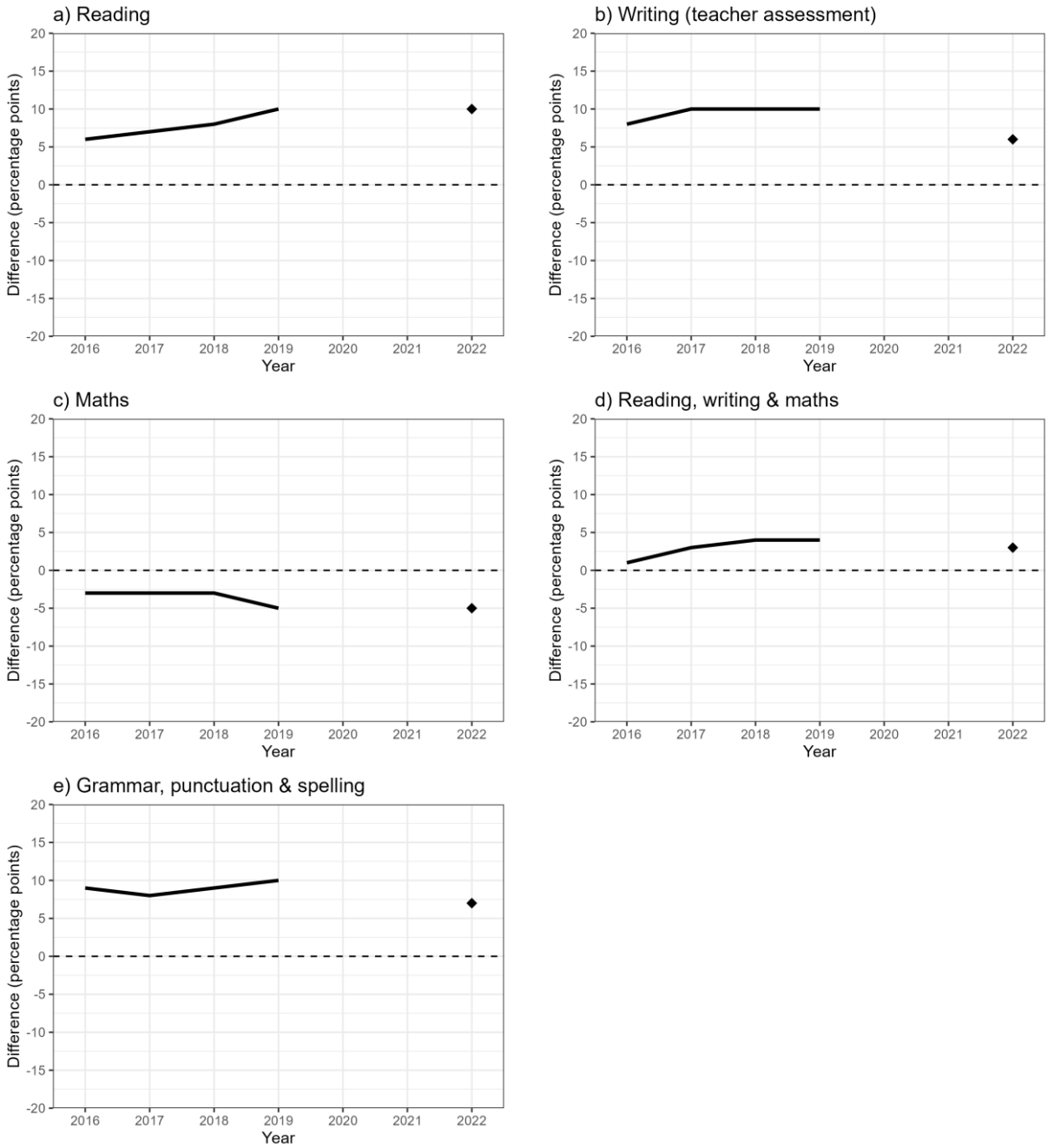


Figure 7. Differences between the percentages of female and male children meeting the higher standard in each KS2 area. Note that Science was not assessed against this criterion. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

GCSE subject uptake

The next point in the English education system at which national-level data becomes available is at age 16, when students take GCSEs. Along with permitting analysis of sex differences in attainment, this also permits analysis of differences in subject choice, as the programme of study can be chosen (albeit with certain constraints) by the students themselves. Hence, in this section I first evaluate differences in the subjects studied, and then I consider attainment in those subjects.

Differences in entry numbers for a range of GCSE subjects are shown in Figure 8, with summary statistics calculated over the 13 years of data shown in Table 4. First, it should be noted that across all subjects (Figure 8, panel a) there is very little difference in the number of entries for each sex, although Table 4 shows that there were *slightly* more female entries, with a mean difference of 1 percentage point and a maximum difference of 2.4 percentage points. Nevertheless, this means that subject-by-subject evaluations can, roughly, be made against a baseline expectation of 50% entries for each sex.

Figure 8 highlights two key patterns. First, there was a range of sex ratio differences, from highly female-dominated to highly male-dominated. Most subjects fell within the ±20 percentage point difference range, although a small number showed larger differences. Next, most subjects showed stable patterns across the thirteen years, with few signs of changing uptake patterns. Notable exceptions to this were the single sciences (Biology, Chemistry, Physics), which shifted from male-dominated to approximately equal, Classical Civilisation, which shifted from male-dominated to slightly female-dominated, Media/Film/TV Studies, which shifted from equal to slightly male-dominated, Music, which shifted from slightly male-dominated to female-dominated, and Chinese, which shifted from slightly male-dominated to roughly equal. Design and Technology grew more male-dominated over time, moving to around 20 percentage points in favour of males, but it should be noted that this subject grouping included both Design and Technology *and* Food Preparation and Nutrition; without Food Preparation and Nutrition, the shift was even larger, moving to around 40 percentage points in favour of males.

Table 4 shows the subjects ordered by the mean difference in sex ratio, allowing further key patterns to be identified. Subjects that are more female-dominated largely constitute arts and creative subjects (Dance, Art and Design, Drama), and modern foreign languages (Urdu, French, Spanish, Italian, German). More male-dominated subjects include Computer Science, business-related subjects (Economics, Business Studies), Physical Education, and some classical subjects (Classical Greek, Ancient History). The table also indicates that the most extreme differences are seen for Dance (mean difference 87.0 percentage points in favour of females) and Computer Science (mean difference 61.4 percentage points in favour of males). Notably, subjects that show sex ratios closer to equality were, perhaps inevitably, those that form part of the mandatory set of subjects (English Literature, English, Maths, Sciences).

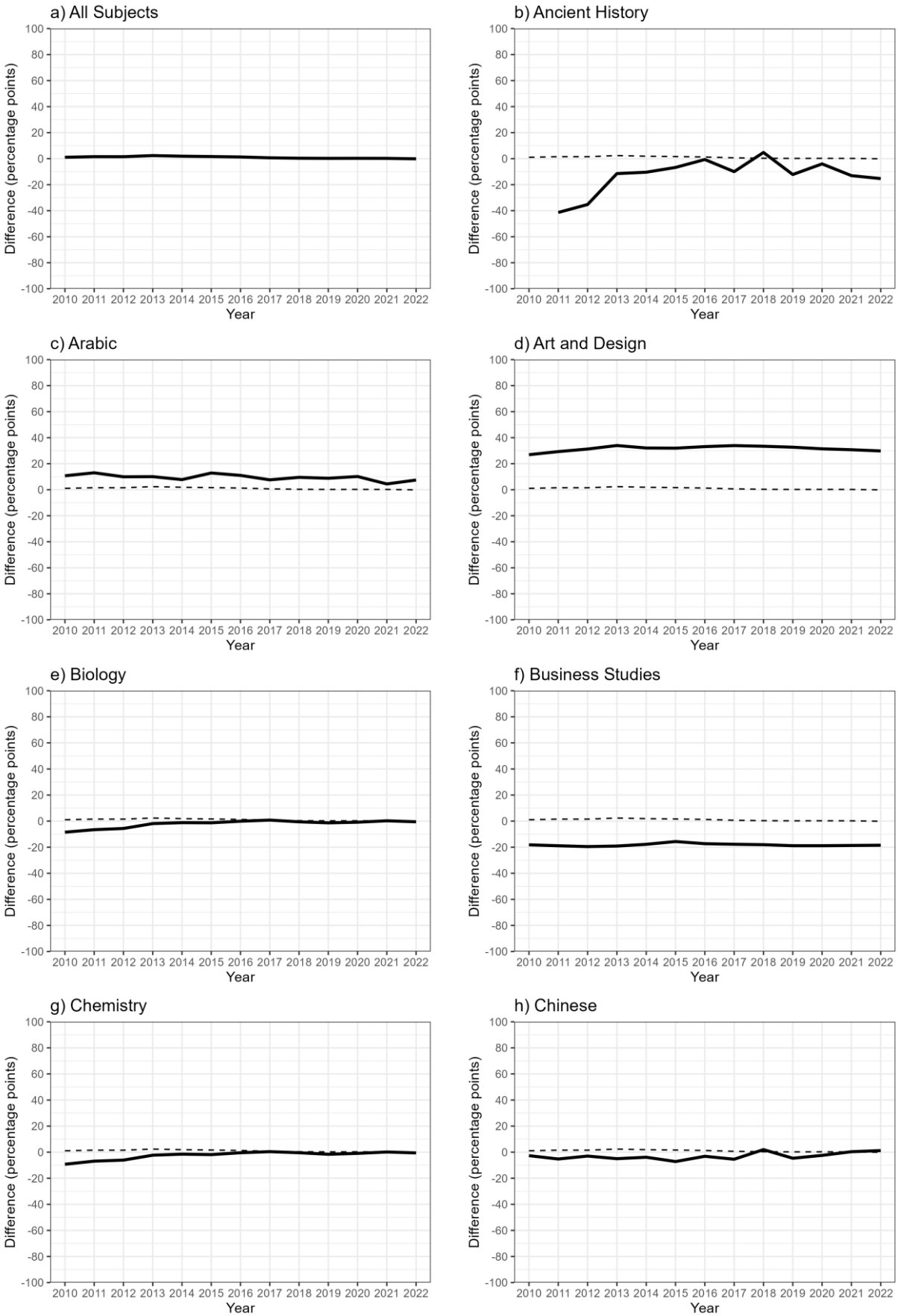


Figure 8. Differences between the percentages of female and male entries in different GCSE subjects. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage. The dashed line indicates the difference in total entries across all subjects (as in panel A).

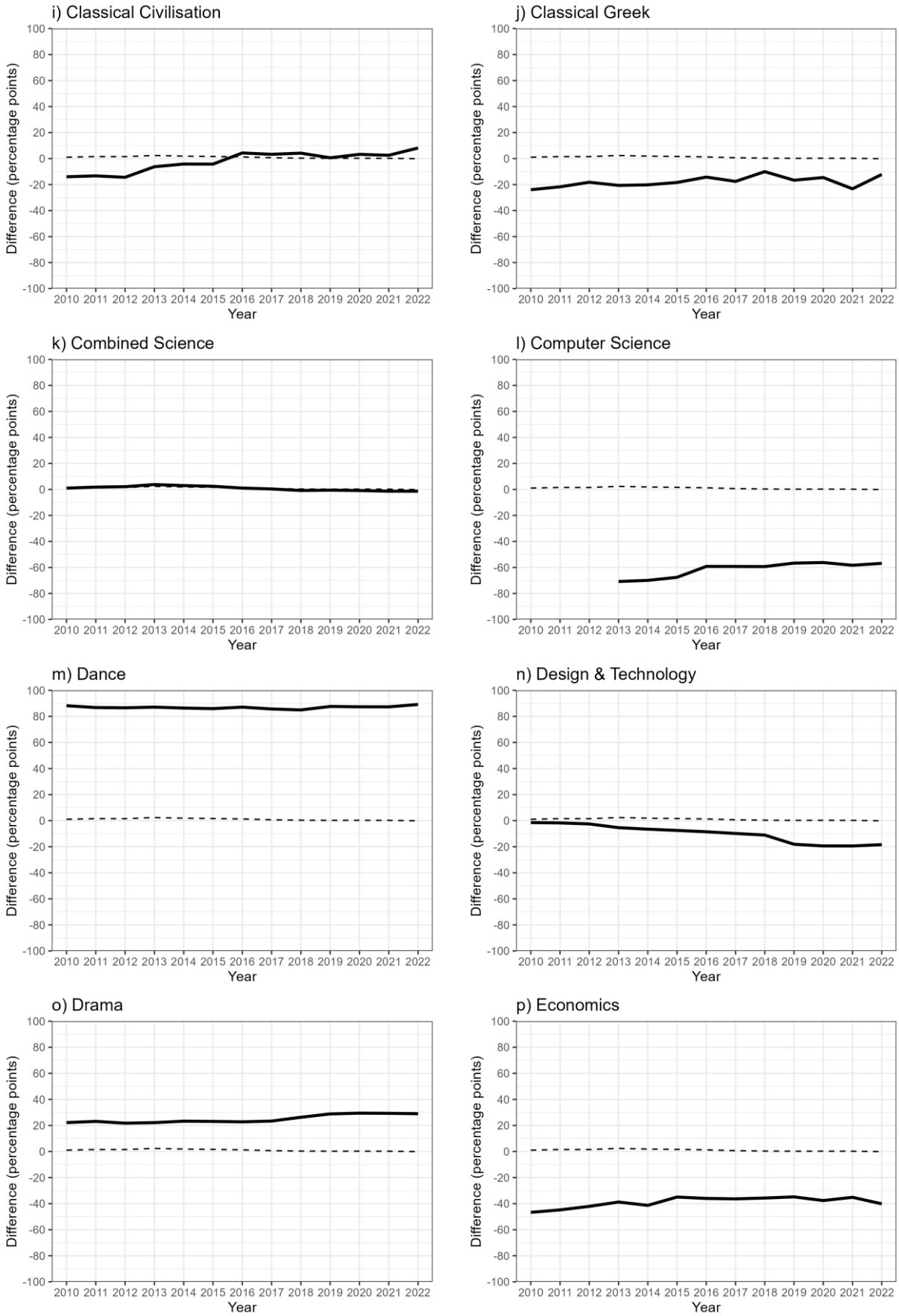
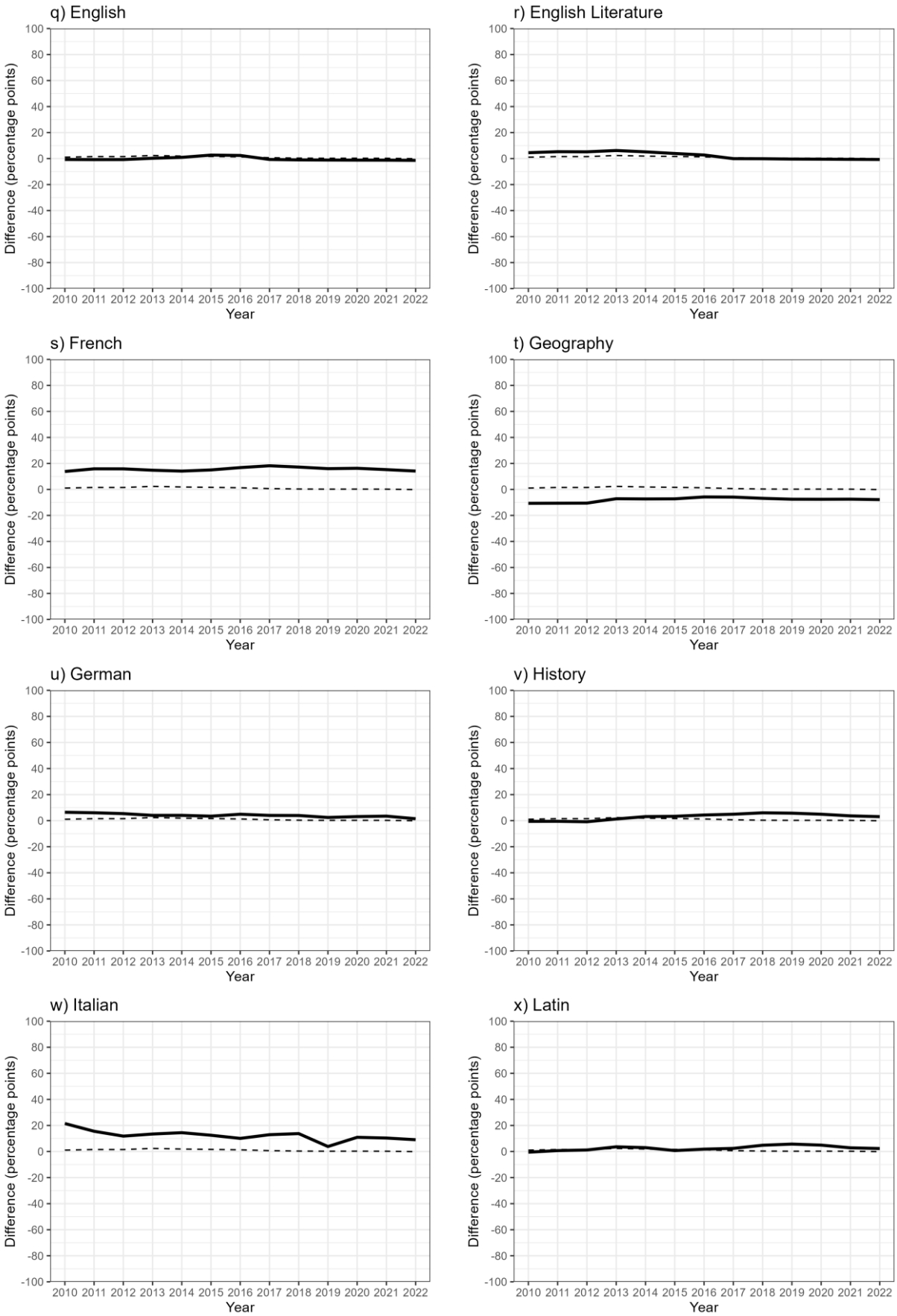


Figure 8. (continued)



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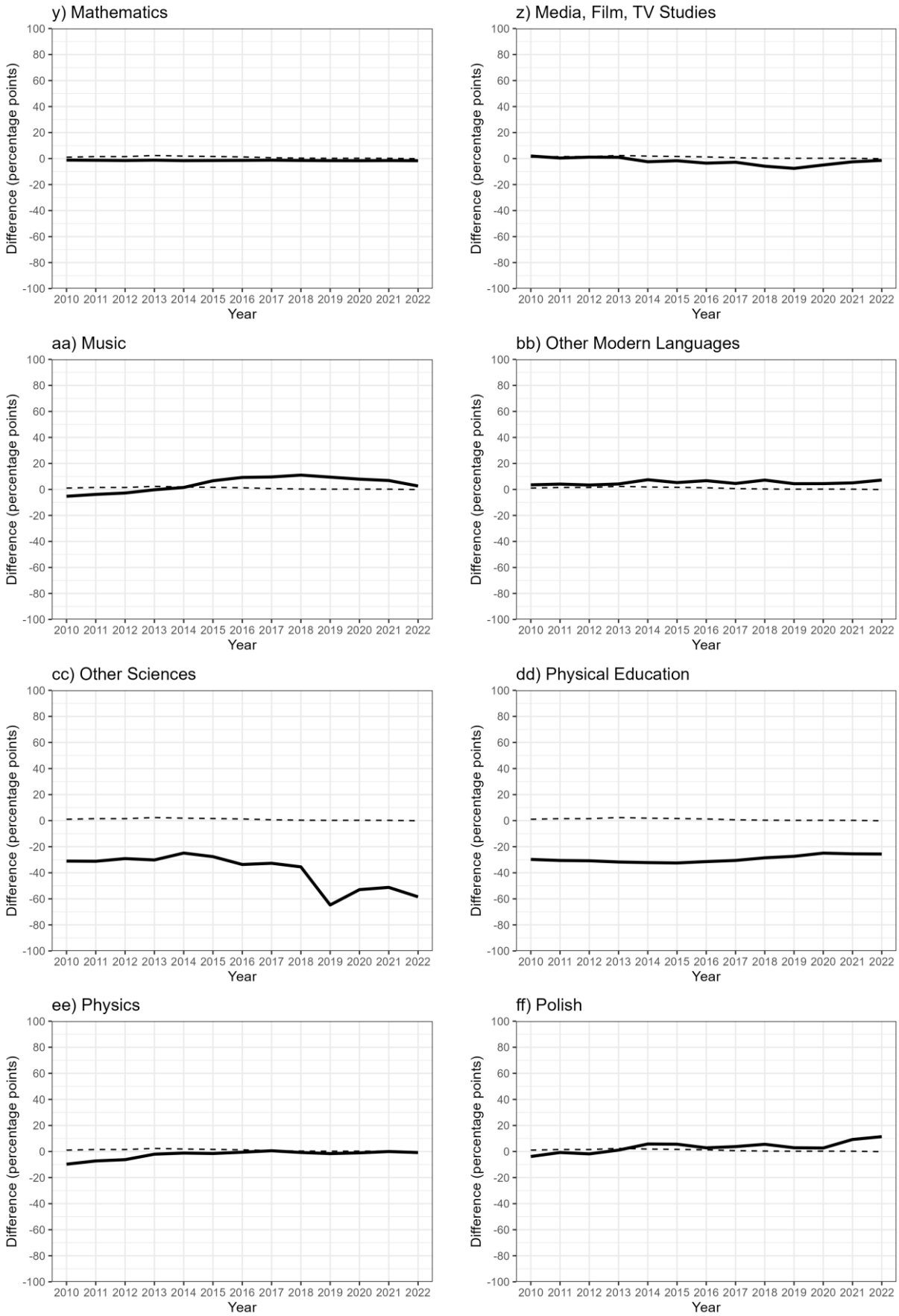

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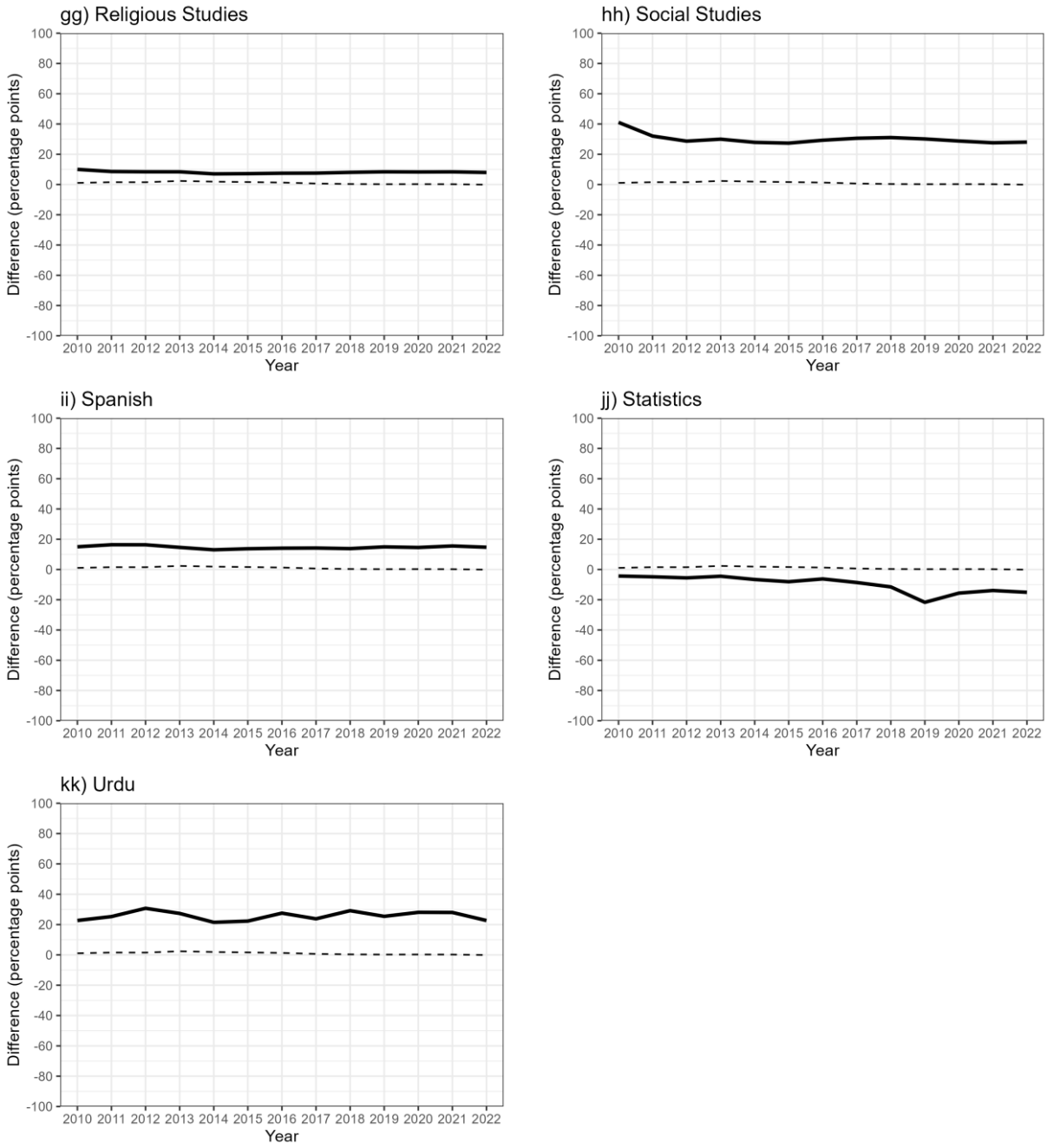


Figure 8. (continued)

Table 4. Summary statistics for differences between female and male students in GCSE entries. Statistics are calculated across all years of available data (here, N = 13). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage. The table is sorted in order of mean difference, from the largest female-favoured difference to the largest male-favoured difference. The dashed line indicates the position of the 'all subjects' difference.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
All Subjects	50.5	49.5	1.0	49.9	48.8	-0.1	51.2	50.1	2.4
Dance	93.5	6.5	87.0	92.5	5.4	85.0	94.6	7.5	89.1
Art and Design	65.8	34.2	31.6	63.5	33.0	26.9	67.0	36.5	34.0
Social Studies	65.1	34.9	30.2	63.7	29.5	27.3	70.5	36.3	41.1
Urdu	62.9	37.1	25.7	60.7	34.6	21.5	65.4	39.3	30.7
Drama	62.5	37.5	25.0	60.9	35.3	21.8	64.7	39.1	29.4
French	57.8	42.2	15.6	56.9	40.9	13.8	59.1	43.1	18.2
Spanish	57.3	42.7	14.7	56.5	41.8	13.0	58.2	43.5	16.4
Italian	56.2	43.8	12.3	51.9	39.3	3.8	60.7	48.1	21.5
Arabic	54.7	45.3	9.5	52.2	43.5	4.4	56.5	47.8	13.0
Religious Studies	54.1	45.9	8.1	53.5	45.0	7.0	55.0	46.5	10.0
Other Modern Languages[8]	52.6	47.4	5.2	51.7	46.3	3.4	53.7	48.3	7.5
German	52.0	48.0	4.1	50.7	46.8	1.5	53.2	49.3	6.4
Music	52.0	48.0	4.1	47.4	44.5	-0.3	55.5	52.6	11.0
Polish	51.7	48.3	3.4	48.1	44.3	-0.8	55.7	51.9	11.4
History	51.5	48.5	3.0	49.6	47.0	-0.5	53.0	50.4	6.0
Latin	51.3	48.7	2.6	49.7	47.1	-0.5	52.9	50.3	5.7
English Literature	51.2	48.8	2.4	49.6	46.9	-0.1	53.1	50.4	6.2
Combined Science	50.4	49.6	0.8	49.3	48.1	0.4	51.9	50.7	3.8
English	49.9	50.1	-0.2	49.3	48.7	0.2	51.3	50.7	2.7
Mathematics	49.3	50.7	-1.4	49.2	50.6	-1.2	49.4	50.8	-1.7
Biology	48.9	51.1	-2.1	45.8	49.6	-0.1	50.4	54.2	-8.5
Media, Film, TV Studies	48.9	51.1	-2.2	46.2	49.0	0.4	51.0	53.8	-7.5
Classical Civilisation	48.8	51.2	-2.3	42.8	45.9	0.6	54.1	57.2	-14.4
Chemistry	48.8	51.2	-2.4	45.4	49.8	0.1	50.2	54.6	-9.3
Physics	48.8	51.2	-2.5	45.1	49.7	0.0	50.3	54.9	-9.7
Chinese	48.5	51.5	-3.0	46.4	49.0	0.4	51.0	53.6	-7.2
Geography	46.1	53.9	-7.9	44.7	52.9	-5.8	47.1	55.3	-10.7
Statistics	45.1	54.9	-9.7	39.1	52.2	-4.3	47.8	60.9	-21.7
D&T	45.0	55.0	-10.0	40.3	50.7	-1.5	49.3	59.7	-19.4
Ancient History	43.5	56.5	-13.0	29.3	47.6	-0.7	52.4	70.7	-41.4
Classical Greek	41.1	58.9	-17.8	38.0	55.0	-10.1	45.0	62.0	-24.0
Business Studies	40.9	59.1	-18.2	40.2	57.8	-15.7	42.2	59.8	-19.5
Physical Education	35.3	64.7	-29.3	33.8	62.5	-24.9	37.5	66.2	-32.5
Other Sciences[9]	30.7	69.3	-38.7	17.6	62.4	-24.9	37.6	82.4	-64.7
Economics	30.6	69.4	-38.8	26.7	67.4	-34.8	32.6	73.3	-46.7
Computer Science	19.3	80.7	-61.4	14.6	78.1	-56.2	21.9	85.4	-70.8

[8] Other Modern Foreign Languages includes Bengali, Dutch, Gujarati, Irish, Japanese, Modern Greek, Modern Hebrew, Persian, Portuguese, Punjabi, Russian, Turkish, Welsh (Second Language), Welsh Language, and Welsh Literature.

[9] Other Sciences includes Applied Science, Astronomy, Electronics, Environmental Science, Geology, Science in Society, and Science for Public Understanding.

GCSE performance

At an individual level, performance in GCSEs is indicated by numbered (previously lettered) grades. At a population level, performance can therefore be described by looking at the proportion of students that obtained grades at or above key threshold grades. Accordingly, here, I show the percentages of candidates gaining high grades of A/7 or above (Figure 9, Table 5), those gaining a standard pass of grade C/4 or above (Figure 10, Table 6), or those awarded *any* grade at G/1 or above (Figure 11, Table 7). For these comparisons, percentages were calculated as the percentage of all grades awarded in that subject *to students of that sex*. Take, for instance, the first row of Table 5; this indicates that, on average, 28.1% of grades awarded to female candidates across all subjects were at grade A/7 or above, and 20.6% of grades awarded to male candidates across all subjects were grade A/7 or above. This approach ensures that a skewed sex ratio of entries should not preclude simple comparison of percentages achieving particular grades; similar levels of attainment would lead to similar percentages and a difference at, or close to, zero percentage points.

Considering grades A/7 and above first (Figure 9, Table 5), we see that in almost all subjects, a higher percentage of female students obtained these high grades. Only Maths, Economics, Physics, Ancient History and "Other Sciences" (see footnote 9) showed greater percentages for male students on average, with the largest mean difference for "Other Sciences" (9.3 percentage points). Maths, often found to show higher male attainment, showed a mean difference of 0.4 percentage points in favour of males. All other subjects showed higher attainment for female students, with the largest differences for Art and Design (16.4 percentage points), Media/Film/TV Studies (15.8 percentage points) and Religious Studies (14.9 percentage points). Notably, this group also contained high profile subjects including English Literature (mean difference 12.0 percentage points), English (mean difference 10.9 percentage points), Biology (mean difference 7.8 percentage points) and Chemistry (mean difference 4.7 percentage points). It should also be noted that several of the subjects showing male-dominated entry patterns showed higher rates of female students obtaining the highest grades, most notably Design and Technology, Physical Education, Business Studies and Computer Science.

Unlike temporal patterns in numbers of entries, there was some evidence of change over time in top grades awarded. Figure 9 shows that some subjects showed gradual increases in the sex gap, with Arabic, Dance, Drama, Media/Film/TV Studies, Physical Education and Social Studies all showing increases in favour of females. Some subjects showed gradual *decreases* in the gap (albeit remaining female-favoured), with Chemistry, Latin, and Polish showing this type of pattern. Only "Other Sciences" showed a gap that was male-favoured *and* increasing in magnitude. Most other subjects appeared relatively stable or showed fluctuations without a clear overall direction of change.

Another notable pattern in temporal trends relates to results in 2020 and 2021. In these years, grades were awarded based on teacher judgement rather than written examinations. Several subjects showed increased sex gaps in these years, seen in Figure 9 as a sustained jump in the gap. Prominent examples of this include Art and Design, Business Studies, Computer Science, Dance, Design and Technology, Drama, Economics, Music, and Physical Education. However, several other subjects showed the same pattern, albeit with smaller jumps. Indeed, even "Other Sciences", which showed a male-favoured gap over all years considered, showed a big *reduction* in the size of the gap in those years, before returning to a larger gap again when examinations resumed in 2022.

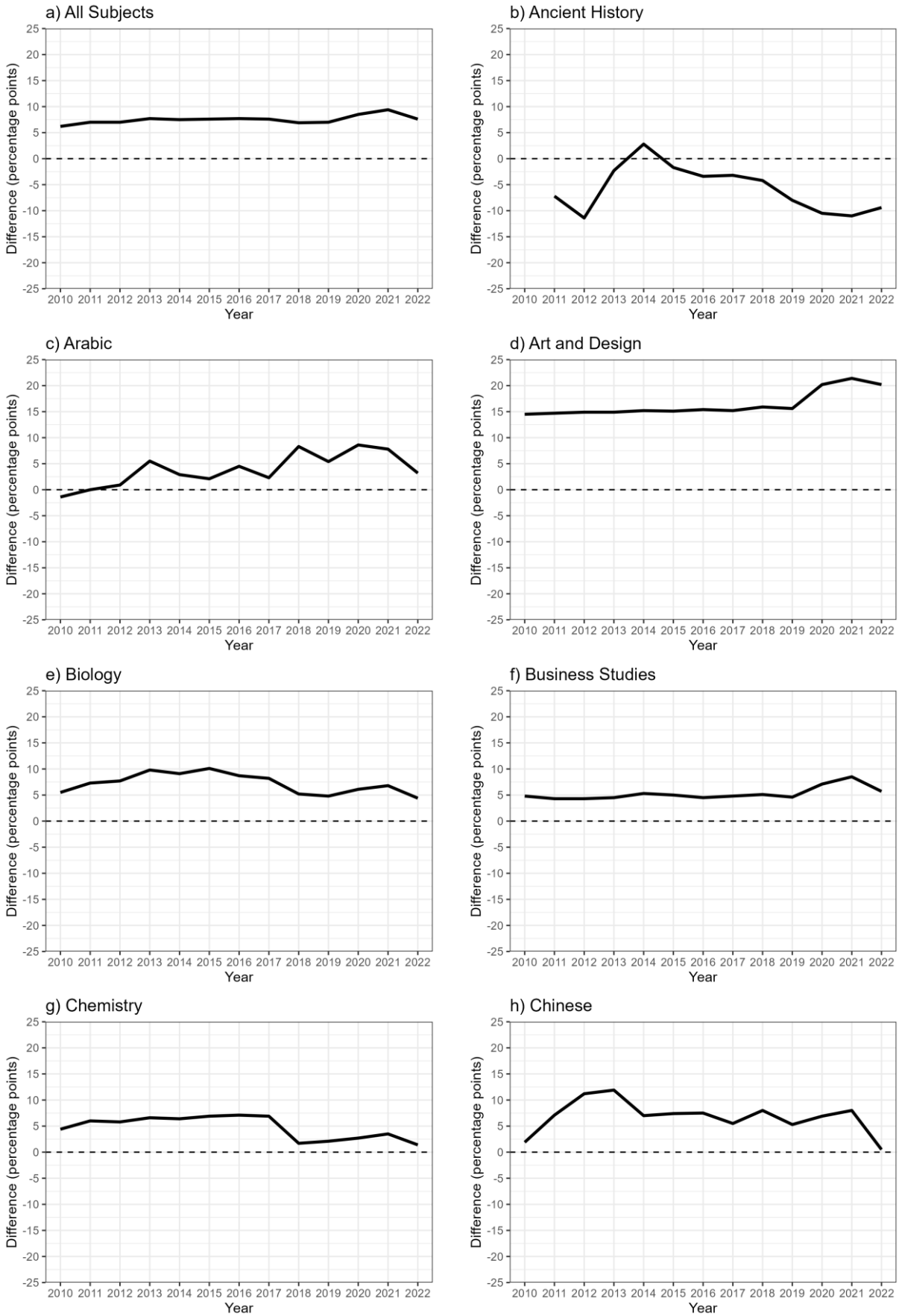


Figure 9. Differences between the percentages of female and male students gaining grade A/7 or better in different GCSE subjects. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

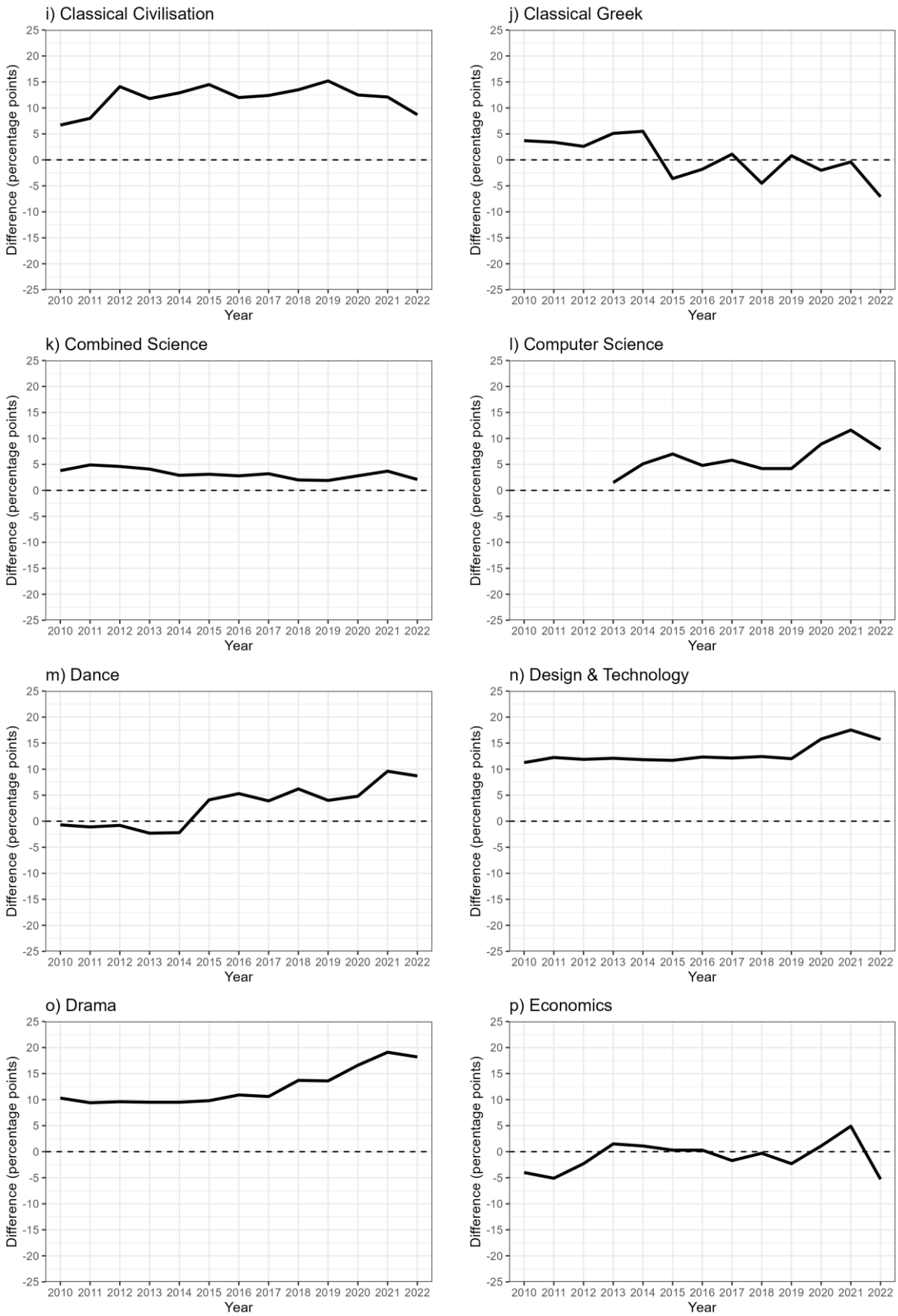
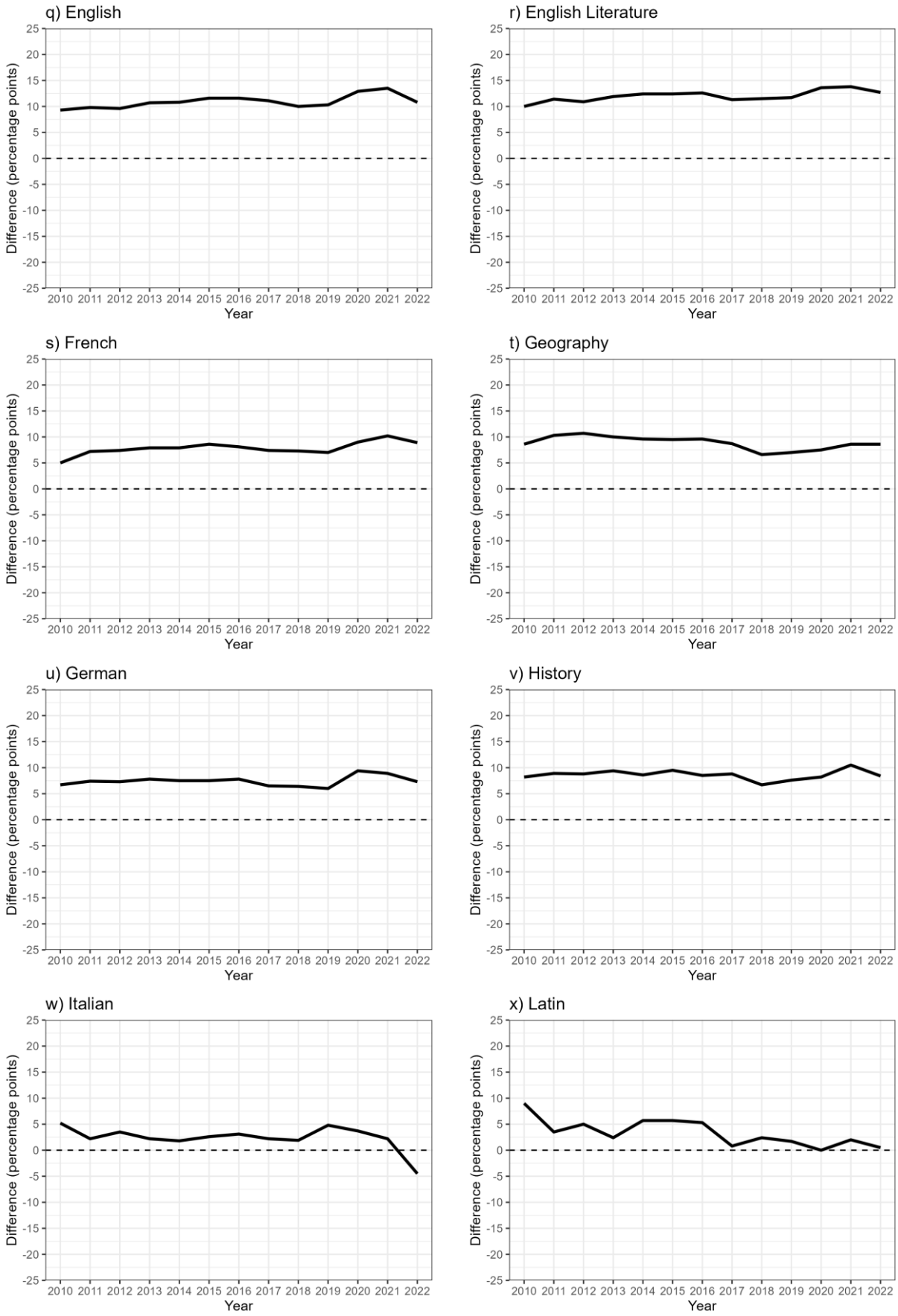


Figure 9. (continued)



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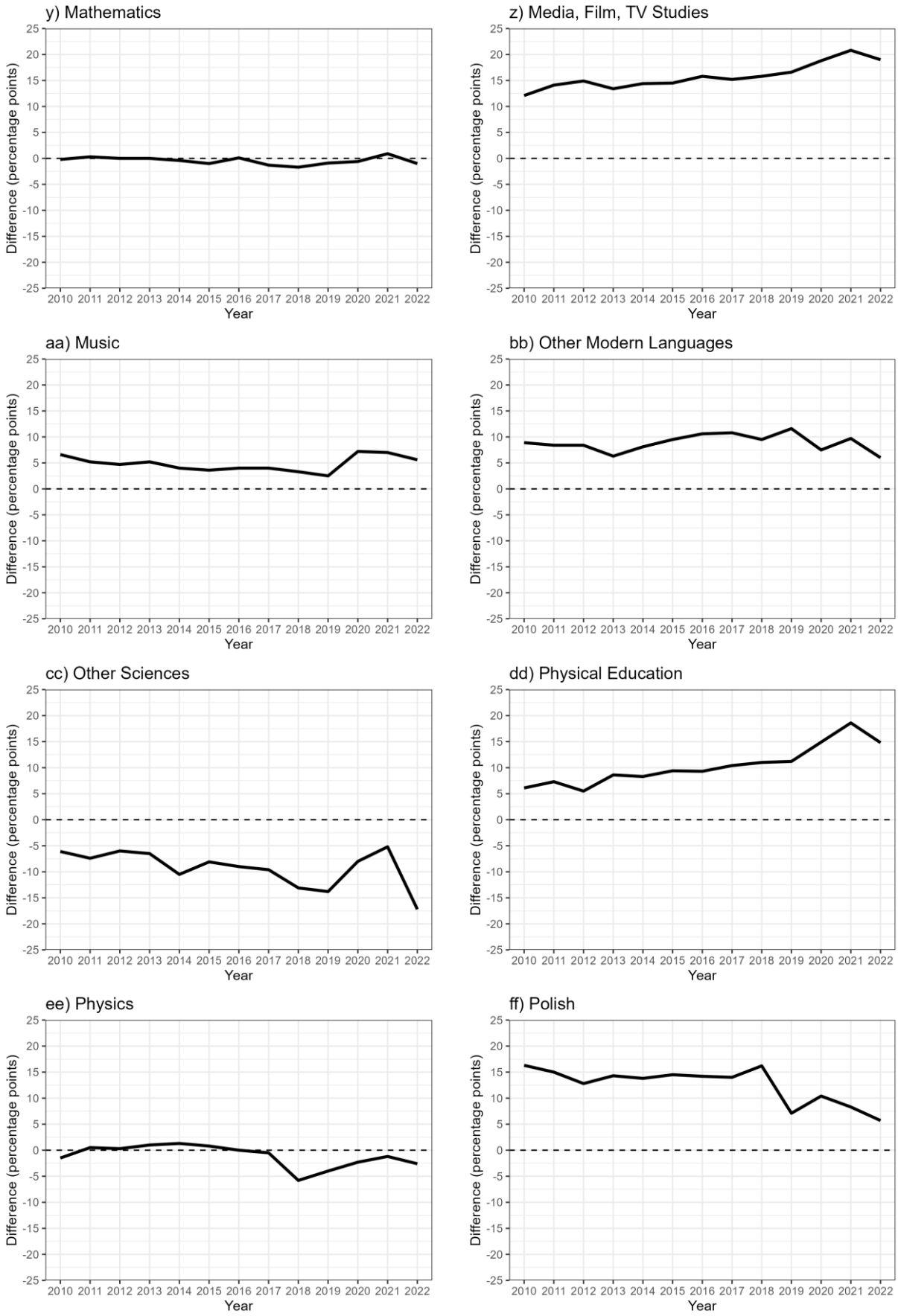

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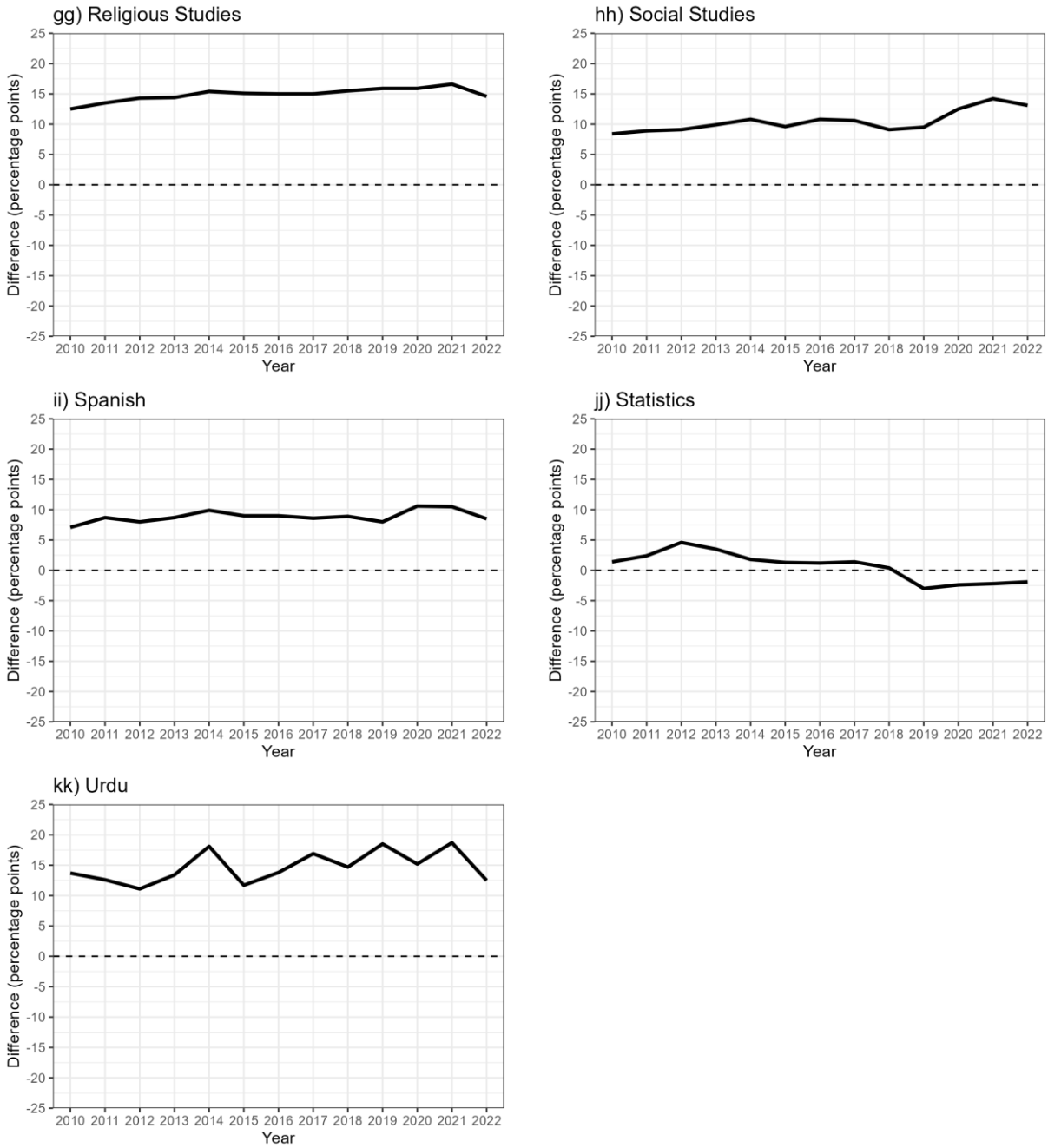


Figure 9. (continued)

Table 5. Summary statistics for differences between percentages of female and male students gaining grade A/7 or above in different GCSE subjects. Statistics are calculated across all years of available data (here, N = 13). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage. The table is sorted in order of mean difference, from the largest female-favoured difference to the largest male-favoured difference.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
All Subjects	28.1	20.6	7.5	25.0	17.4	6.2	36.3	26.9	9.4
Art and Design	30.4	14.0	16.4	27.9	12.5	14.5	37.5	16.1	21.4
Media, Film, TV Studies	26.6	10.8	15.8	22.6	8.7	12.1	37.7	16.9	20.8
Religious Studies	38.5	23.6	14.9	36.7	21.6	12.5	45.0	28.4	16.6
Urdu	42.3	27.7	14.7	36.3	23.5	11.1	55.0	36.3	18.7
D&T	27.2	14.2	13.0	23.2	11.5	11.3	39.1	21.6	17.5
Polish	79.3	66.7	12.5	63.2	57.5	5.7	83.2	75.6	16.3
Drama	30.9	18.5	12.4	26.3	15.1	9.4	47.1	28.0	19.1
English Literature	28.5	16.5	12.0	25.1	13.8	10.0	32.4	19.4	13.8
Classical Civilisation	48.7	36.8	11.9	41.2	28.3	6.7	71.9	59.8	15.2
English	24.8	13.9	10.9	21.5	11.7	9.3	33.0	19.5	13.5
Social Studies	23.4	12.9	10.5	20.0	10.0	8.4	35.8	21.6	14.2
Physical Education	30.6	20.2	10.4	24.2	14.8	5.5	52.0	33.4	18.6
Spanish	33.5	24.6	8.9	29.7	21.4	7.1	38.8	29.1	10.6
Geography	32.5	23.6	8.9	27.5	19.5	6.6	38.8	30.2	10.7
Other Modern Languages	66.7	57.8	8.9	56.8	50.8	6.0	80.8	71.1	11.6
History	32.8	24.2	8.6	27.9	20.7	6.7	37.3	28.0	10.5
French	29.1	21.2	7.8	25.8	18.0	5.0	37.2	27.0	10.2
German	29.9	22.4	7.4	25.5	18.5	6.0	42.3	33.4	9.4
Biology	50.3	43.1	7.2	45.4	37.5	4.4	59.9	53.1	10.1
Chinese	81.2	74.4	6.8	62.3	61.8	0.5	90.3	88.4	11.9
Computer Science	31.1	25.0	6.1	24.3	19.2	1.5	48.3	36.7	11.6
Business Studies	24.3	19.1	5.3	19.9	15.1	4.3	38.0	29.5	8.5
Music	37.4	32.5	4.8	32.1	28.1	2.5	53.2	46.2	7.2
Chemistry	49.3	44.5	4.7	44.4	38.9	1.4	56.5	53.0	7.1
Arabic	54.5	50.6	3.9	41.2	38.0	0.0	64.4	56.6	8.6
Latin	77.5	74.2	3.4	73.0	66.1	0.0	85.0	83.3	9.0
Combined Science	12.7	9.5	3.2	8.4	6.4	1.9	17.8	13.1	4.9
Dance	25.6	22.5	3.0	19.9	17.4	-0.7	42.7	33.1	9.6
Italian	63.1	60.7	2.4	51.0	55.5	1.8	71.5	69.3	5.2
Statistics	22.6	21.9	0.7	17.4	17.6	0.4	28.7	30.9	4.6
Classical Greek	88.2	87.9	0.2	83.1	81.0	-0.4	94.1	96.1	-7.1
Mathematics	20.9	21.3	-0.4	18.3	18.7	0.0	26.4	25.5	-1.7
Economics	33.5	34.4	-0.9	24.3	27.7	0.3	56.1	51.2	-5.3
Physics	45.8	46.9	-1.1	40.1	41.5	0.0	54.8	56.0	-5.8
Ancient History	35.8	41.6	-5.8	30.1	33.5	-1.7	43.2	54.2	-11.4
Other Sciences	26.8	36.0	-9.3	14.0	23.3	-5.2	54.4	59.6	-17.2

See footnotes 8 and 9 for subjects included in Other Modern Languages and Other Sciences.

Differences in percentages of students gaining a “standard pass” of C/4 or above are shown in Figure 10 and Table 6. Once again, many more subjects showed higher female percentages, with only Physics, Classical Greek, Economics and “Other Sciences” showing higher male percentages. Moreover, the observed mean differences for these four were relatively small, with Physics showing a gap of 0.0 percentage points, Greek and Economics showing gaps of 0.8 percentage points, and Other Sciences showing 3.0 percentage points. This contrasts with the often-much-larger female-favoured gaps, such as Media/Film/TV Studies (mean difference 19.1 percentage points), Art and Design (mean difference 18.0 percentage points), Design and Technology (mean difference 15.5 percentage points), and English (mean difference 13.9 percentage points). Even Maths, which showed a male-favoured gap at A/7, showed a 1.1 percentage point female-favoured gap here.

There was again a mix of temporal patterns (Figure 10). Some subjects, including Arabic, Dance, and Physical Education showed the sex gap to increase over time. Some, such as Geography, German, Latin, and Statistics, showed it to decrease slightly. Most, however, showed relatively stable patterns or fluctuations without an obvious directional shift. An effect of Covid on grades was also noticeable here, albeit less strongly. For instance, Art and Design, Drama, Design and Technology, and Media/Film/TV Studies showed large female-favoured gaps, which *reduced* in 2020 and 2021. “Other Sciences”, interestingly, showed the male-favoured gap to shift to a very slight female-favoured gap in 2020 and 2021, before returning to the largest male-favoured gap in the whole time series by 2022.

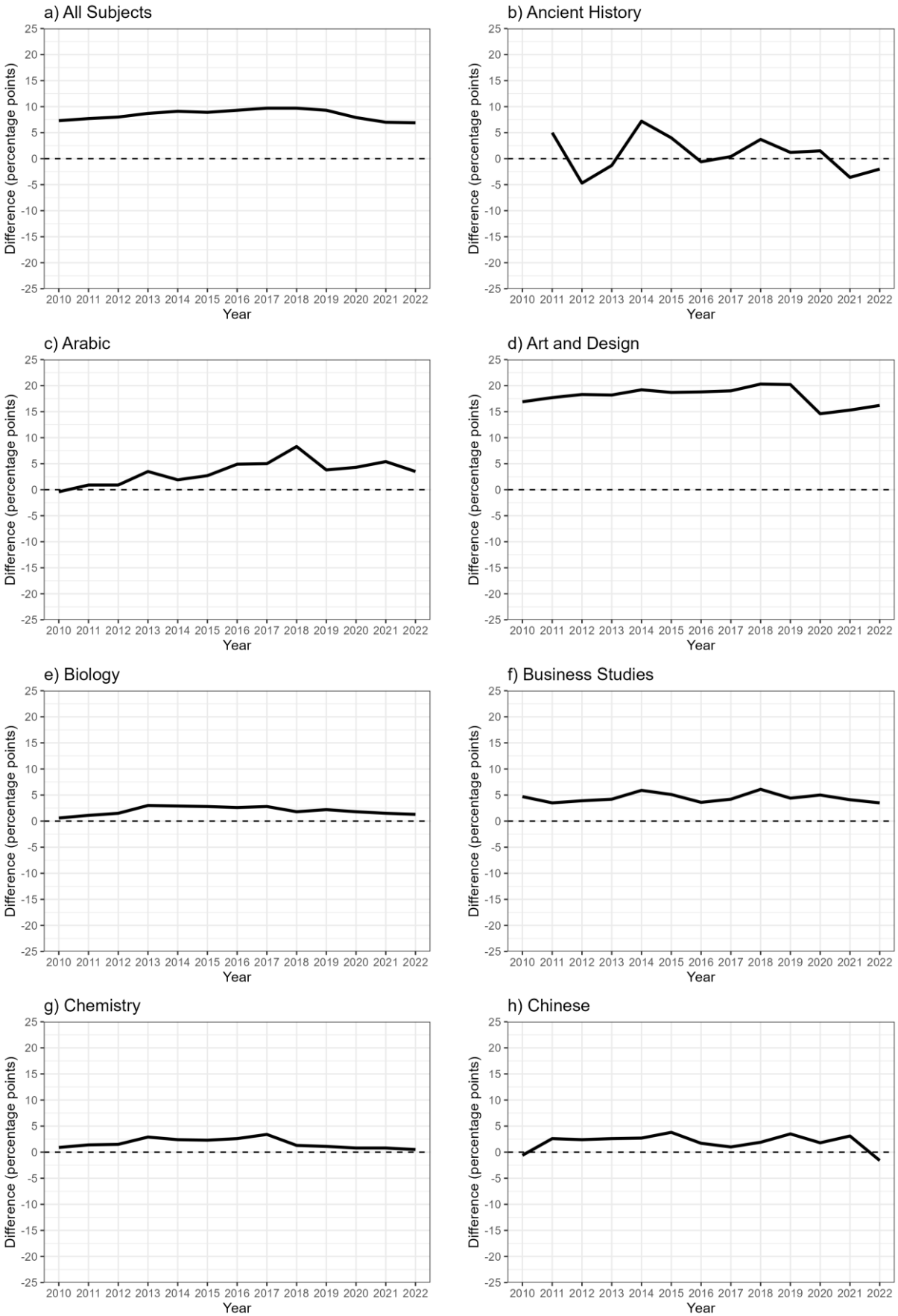
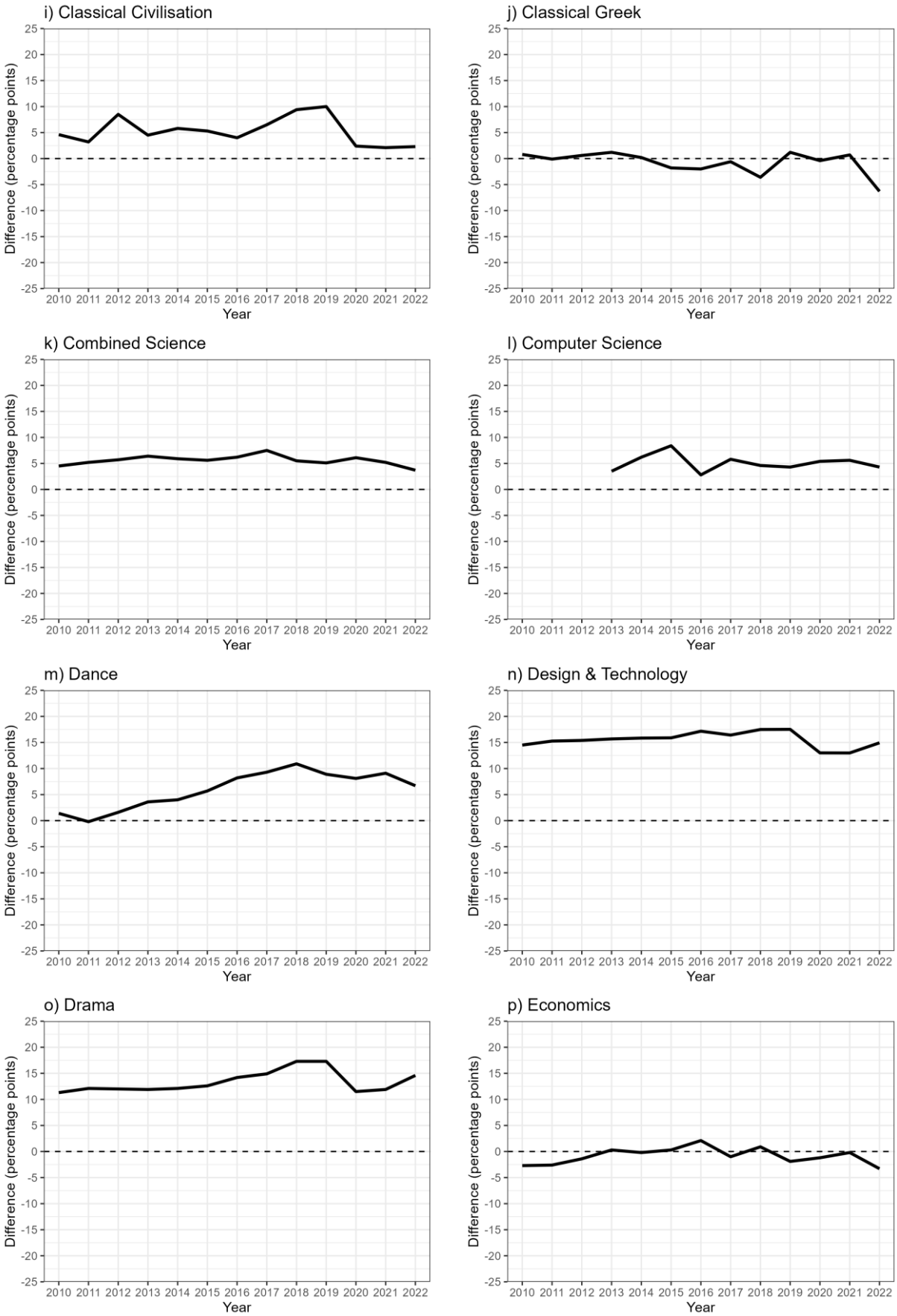


Figure 10. Differences between the percentages of female and male students gaining grade C/4 or better in different GCSE subjects. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.



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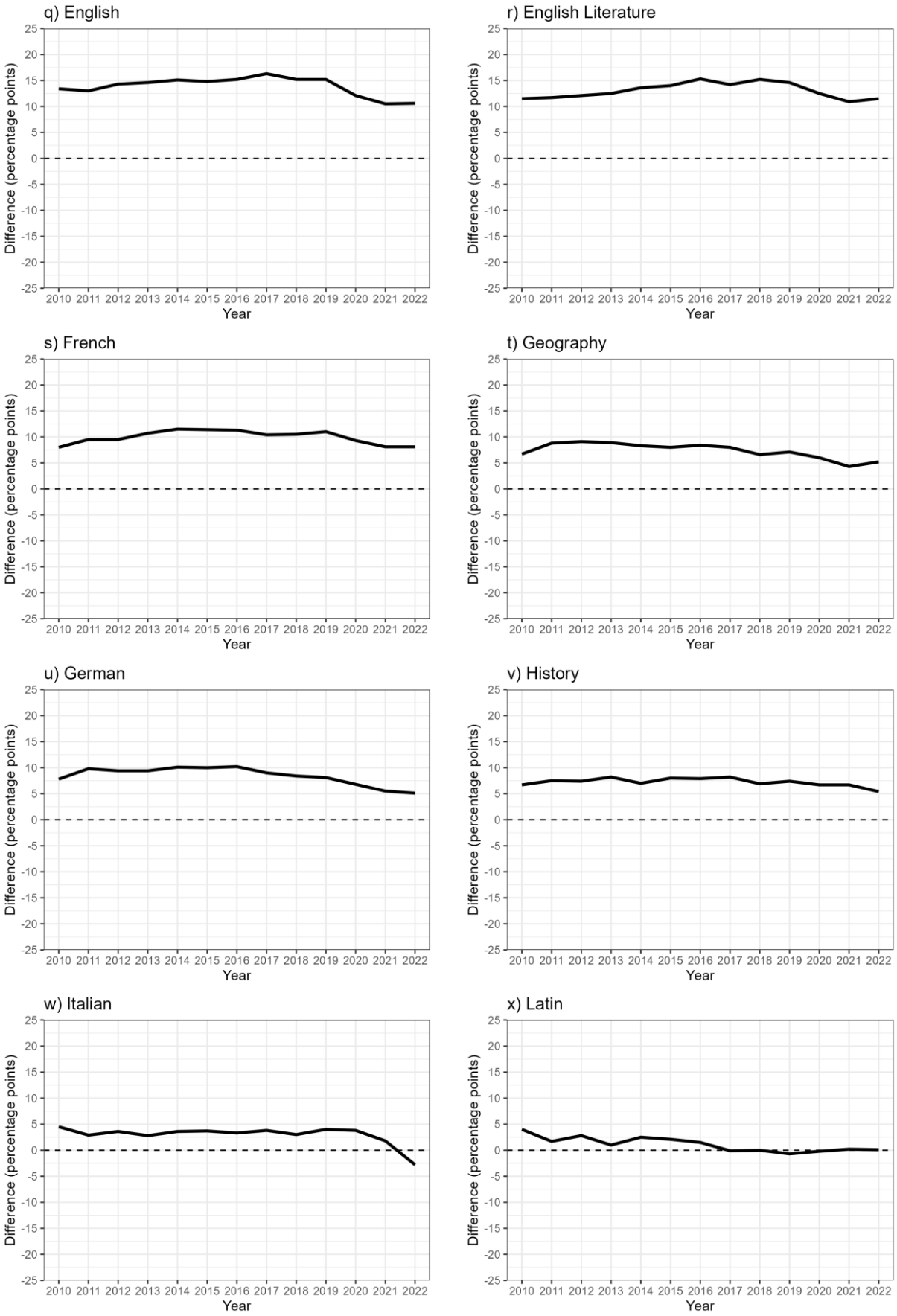

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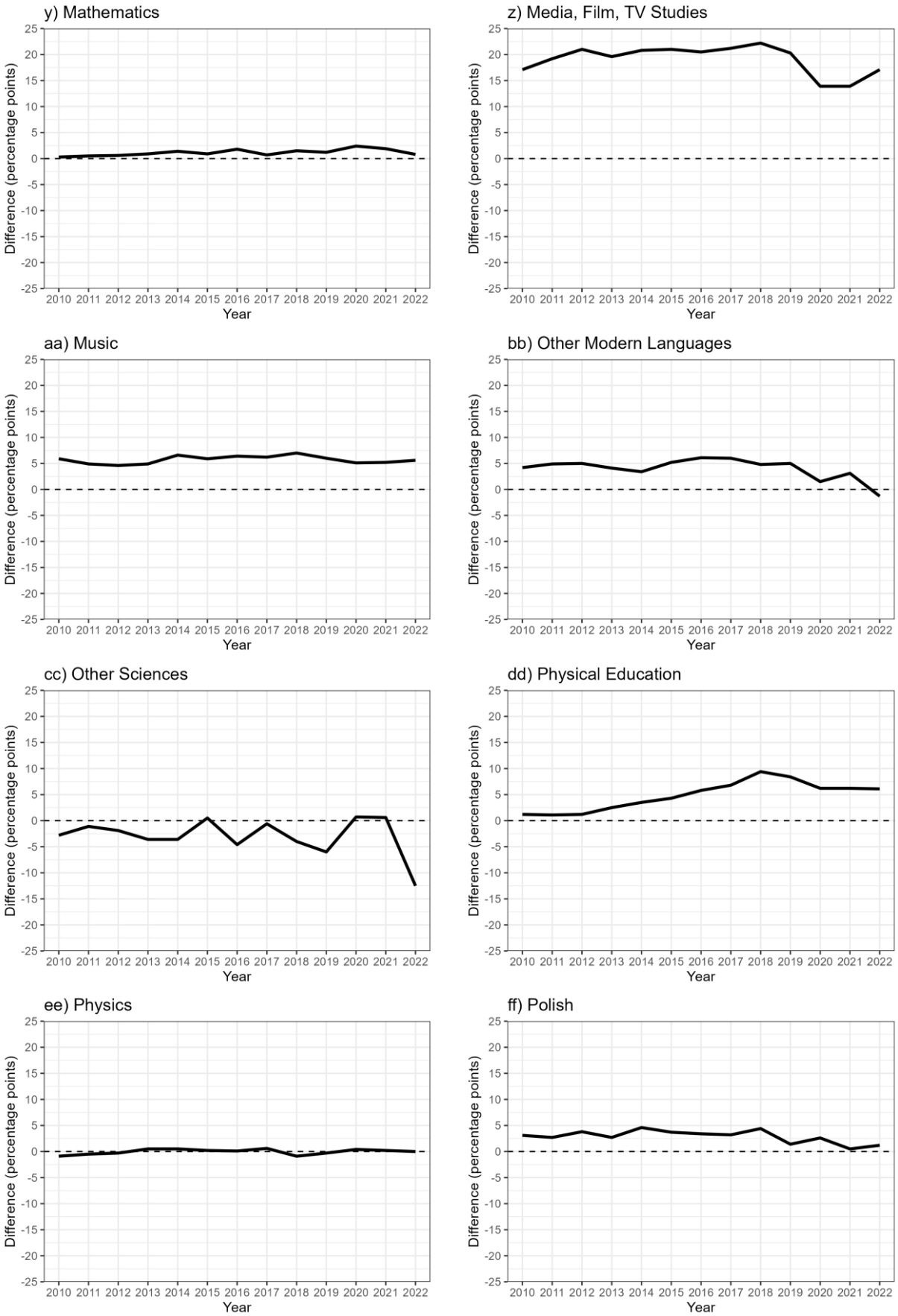

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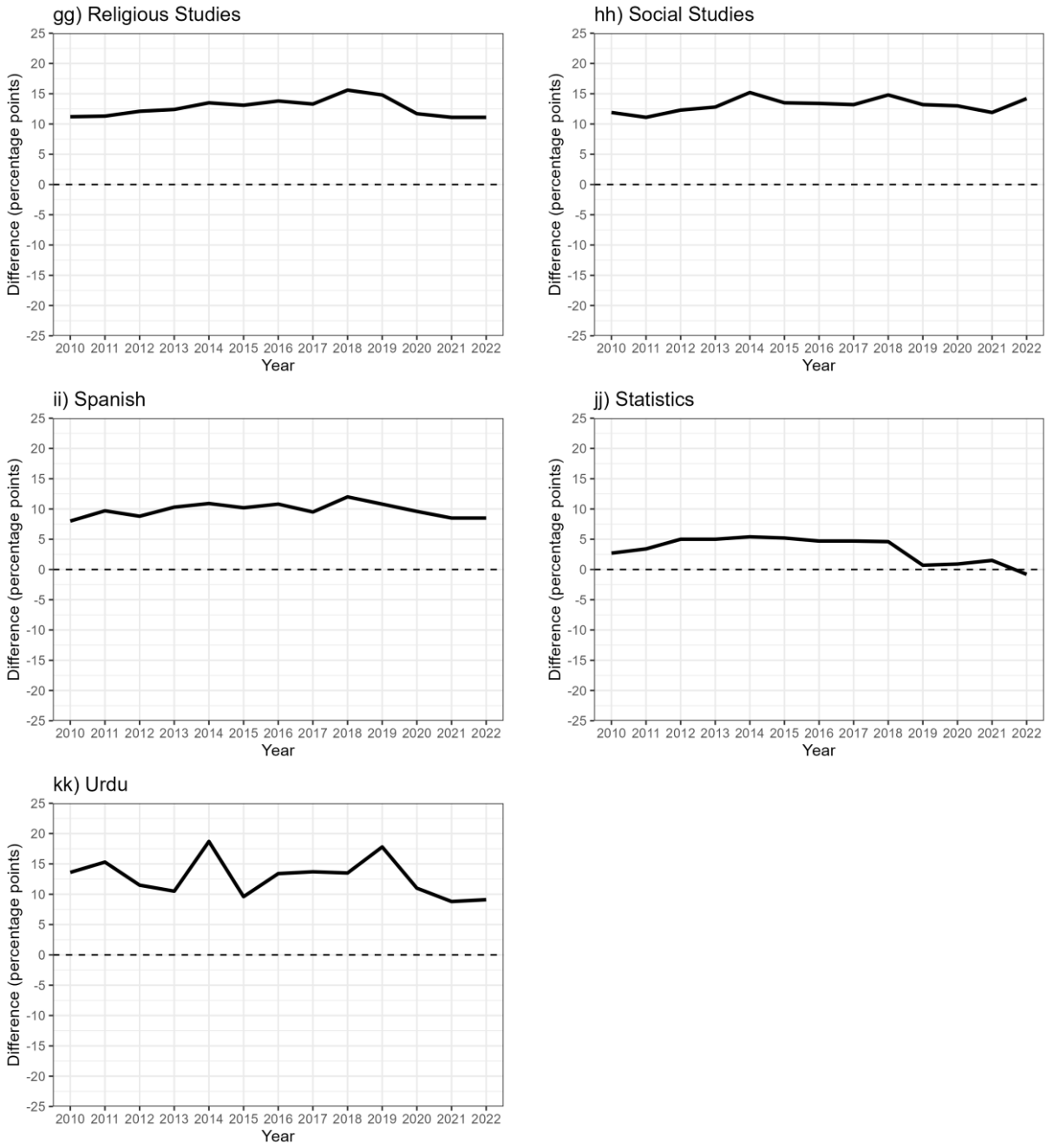


Figure 10. (continued)

Table 6. Summary statistics for differences between percentages of female and male students gaining grade C/4 or above in different GCSE subjects. Statistics are calculated across all years of available data (here, N = 13). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage. The table is sorted in order of mean difference, from the largest female-favoured difference to the largest male-favoured difference.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
All Subjects	76.8	68.4	8.4	73.8	64.1	6.9	83.7	76.7	9.7
Media, Film, TV Studies	78.6	59.6	19.1	75.0	55.0	13.9	87.9	74.0	22.2
Art and Design	83.9	65.9	18.0	81.7	61.8	14.6	90.8	76.2	20.3
D&T	73.1	57.6	15.5	68.4	52.0	13.0	86.2	73.2	17.5
English	80.0	66.2	13.9	76.5	62.2	10.5	86.0	75.4	16.3
Drama	81.2	67.9	13.4	77.5	63.3	11.3	90.7	79.2	17.3
Social Studies	70.9	57.8	13.1	68.3	53.5	11.1	81.8	69.9	15.2
English Literature	82.5	69.4	13.0	79.8	65.3	10.9	85.4	74.5	15.3
Urdu	81.8	69.0	12.8	75.0	63.5	8.8	92.2	81.2	18.7
Religious Studies	79.3	66.7	12.7	75.2	63.4	11.1	85.1	74.0	15.6
French	76.8	66.8	9.9	73.4	62.5	8.0	86.3	78.2	11.5
Spanish	77.9	68.1	9.8	74.2	63.0	8.0	86.6	78.1	12.0
German	81.2	72.8	8.4	78.5	68.4	5.1	90.1	84.6	10.2
Geography	73.4	66.0	7.3	68.1	60.7	4.3	79.0	74.7	9.1
History	72.4	65.2	7.2	66.9	59.5	5.4	79.2	72.5	8.2
Dance	71.1	65.1	5.9	60.7	60.5	-0.2	87.3	79.2	10.9
Music	80.9	75.2	5.7	77.0	70.6	4.6	91.1	86.0	7.0
Combined Science	65.8	60.2	5.6	57.5	52.0	3.7	72.1	66.9	7.5
Classical Civilisation	87.3	82.1	5.3	83.6	76.5	2.1	97.1	94.7	10.0
Computer Science	72.2	67.1	5.1	62.3	58.6	2.8	86.6	81.0	8.4
Physical Education	76.7	71.9	4.8	70.1	66.2	1.1	90.8	84.6	9.4
Business Studies	71.8	67.3	4.5	65.9	61.7	3.5	82.8	78.6	6.1
Other Modern Languages	90.7	86.7	4.0	70.7	72.0	-1.3	96.1	94.5	6.1
Arabic	80.3	76.9	3.4	68.0	64.5	-0.4	94.5	89.1	8.3
Statistics	74.9	71.6	3.3	50.2	51.0	0.7	82.6	81.1	5.4
Italian	90.1	87.1	2.9	76.3	79.1	1.8	93.9	91.2	4.5
Polish	93.4	90.5	2.9	71.1	69.9	0.5	96.6	94.5	4.6
Biology	93.3	91.4	2.0	91.2	89.3	0.6	95.9	94.1	3.0
Chinese	94.7	92.7	1.9	77.2	78.8	-0.6	98.0	96.1	3.8
Chemistry	93.0	91.3	1.7	90.7	88.5	0.5	96.1	95.3	3.4
Latin	95.1	94.0	1.1	92.1	91.0	0.0	98.2	98.3	4.0
Mathematics	71.9	70.8	1.1	64.8	64.5	0.3	78.6	76.7	2.4
Ancient History	75.5	74.6	0.9	69.7	66.1	0.4	83.0	86.6	7.2
Physics	92.7	92.8	0.0	90.5	90.8	0.0	96.3	95.9	-0.9
Classical Greek	96.4	97.2	-0.8	90.3	95.5	-0.1	99.2	99.5	-6.3
Economics	80.9	81.7	-0.8	76.6	76.3	-0.2	92.5	92.8	-3.3
Other Sciences	67.0	69.9	-3.0	53.6	57.2	0.5	91.5	90.9	-12.5

See footnotes 8 and 9 for subjects included in Other Modern Languages and Other Sciences.

The final metric of GCSE attainment was the achievement of *any* grade, i.e., a grade G/1 or better. Time series of sex gaps are shown in Figure 11 and summary statistics are shown in Table 7. Rates of gaining any grade were high, with most subjects showing over 99% of candidates receiving at least a G/1. Hence, we would anticipate differences between male and female candidates to be small. Indeed, this is what Figure 11 shows, with gaps for most subjects very close to 0 percentage points through the whole time span considered. However, some subjects did show gaps, which largely indicated slightly higher female attainment. Table 7 confirms this interpretation, with only four subjects showing (small) mean differences favouring males. These are Chinese, Economics, Classical Greek and Other Sciences. In each of these, however, Figure 11 shows that the mean is influenced by relatively large male-favoured gaps in 2022; if 2022 is excluded from the mean calculations, only Economics retains a male-favoured mean, with a gap of just 0.05 percentage points.

Across all three grade thresholds considered, there was a strong signal of higher female attainment. A small number of subjects showed small male-favoured gaps, but most showed female-favoured gaps that were, typically, relatively large. Of those that did show higher male attainment, there was relatively consistent pool of subjects, with “Other Sciences” always showing the largest male-favoured gap, and then Economics, Physics, Classical Greek and Ancient History typically showing smaller male-favoured gaps or no gap. Note, however, that Ancient History did not show this at the G/1 threshold, with one of the largest female-favoured gaps overall. Maths, as in EYFS and KS2, only showed higher male attainment at the higher grades, with equal attainment or higher female attainment when lower grade thresholds were considered. Of the subjects showing the largest female-favoured gaps, many were arts and creative subjects, with Art and Design, Drama, Media/Film/TV Studies and English typically among those showing the biggest differences.

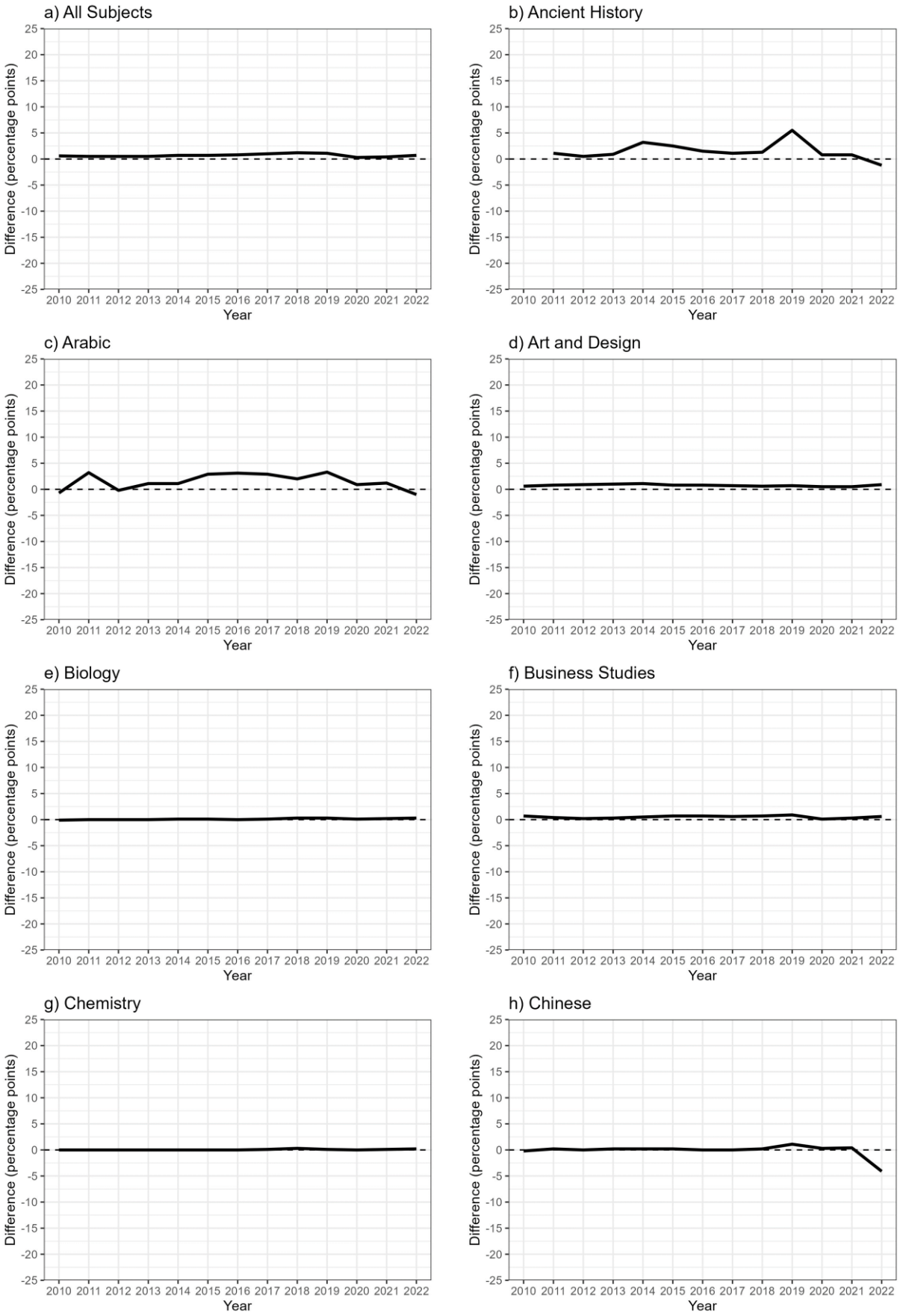
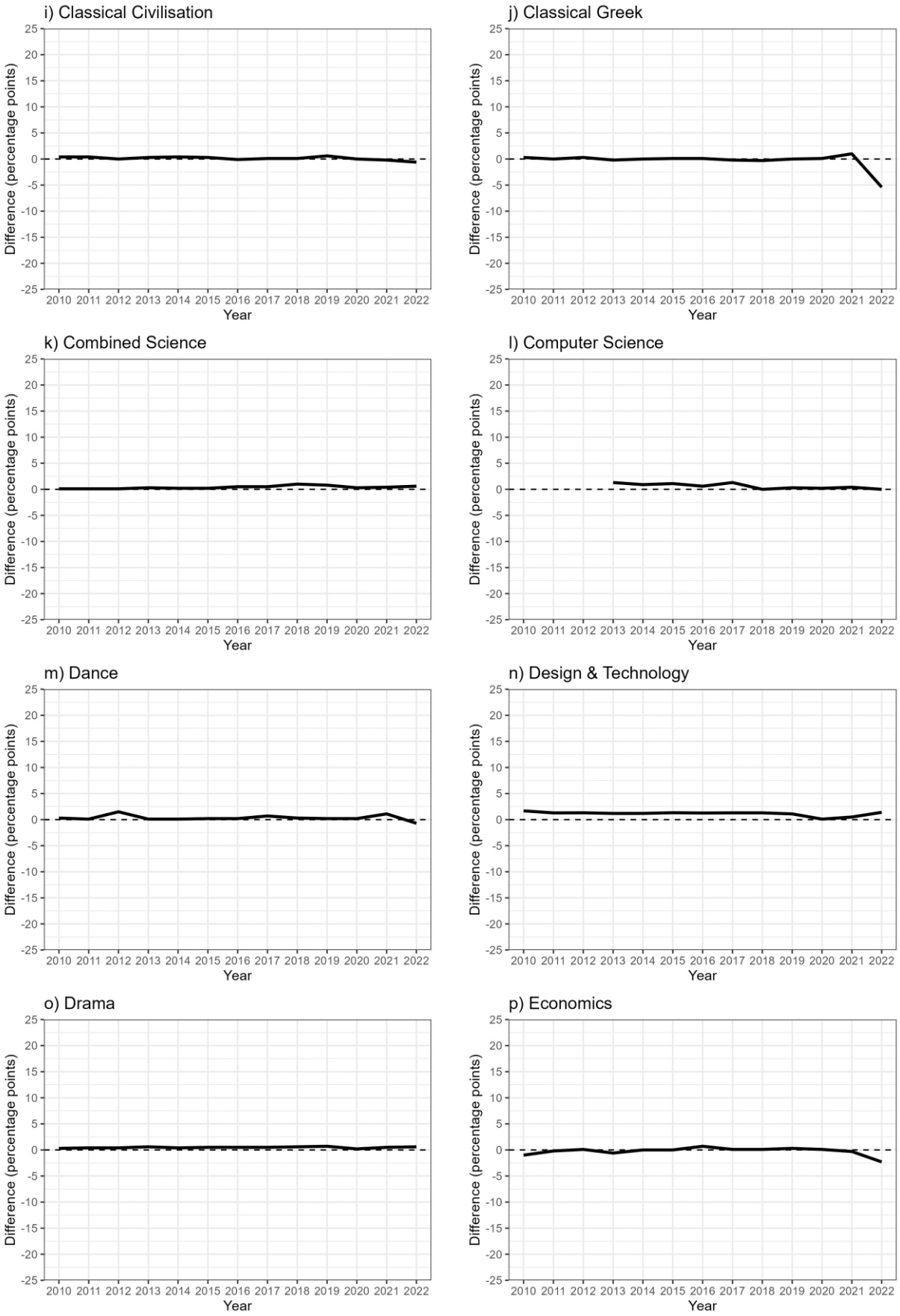


Figure 11. Differences between the percentages of female and male students gaining grade G/1 or better in different GCSE subjects. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.



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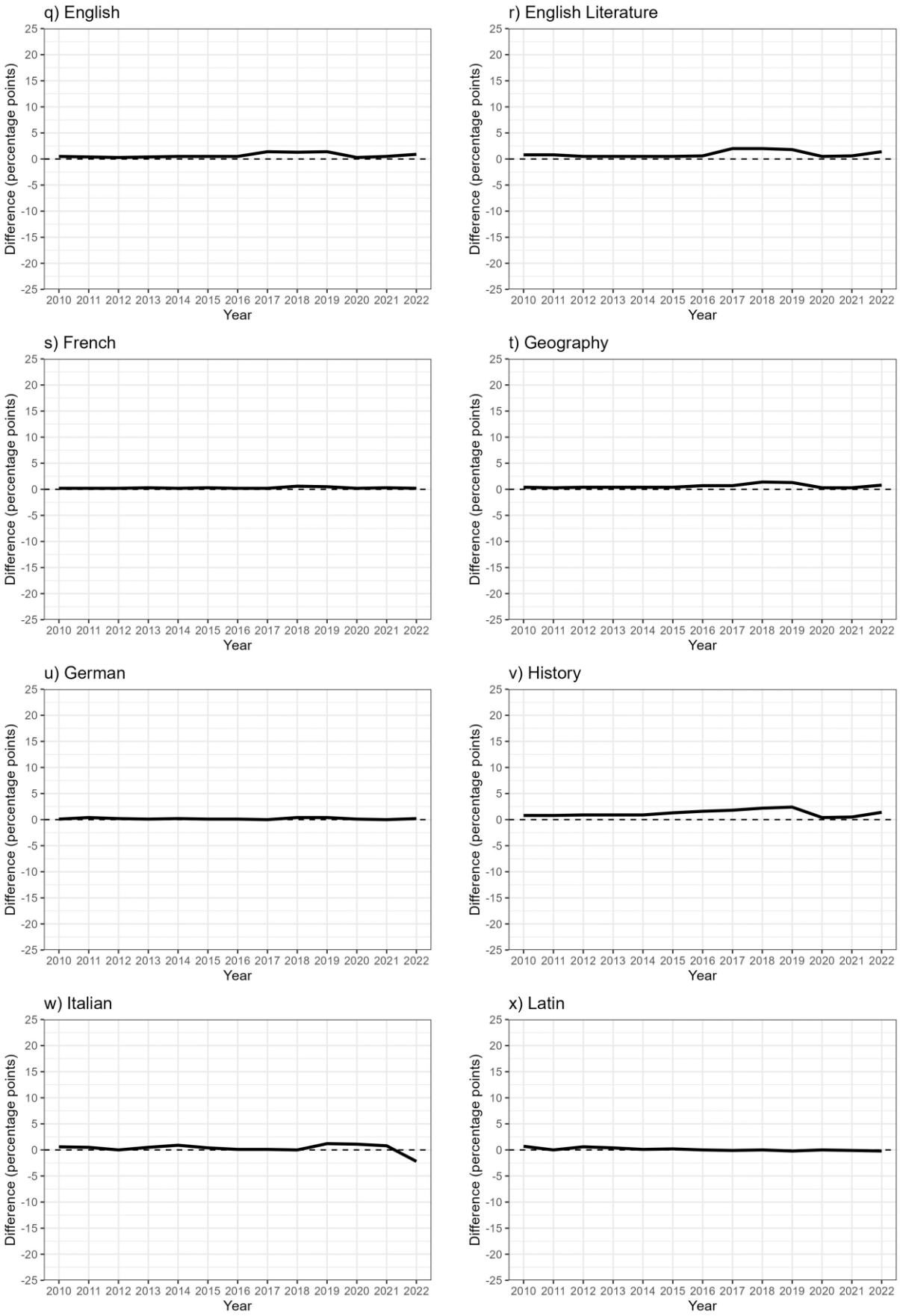

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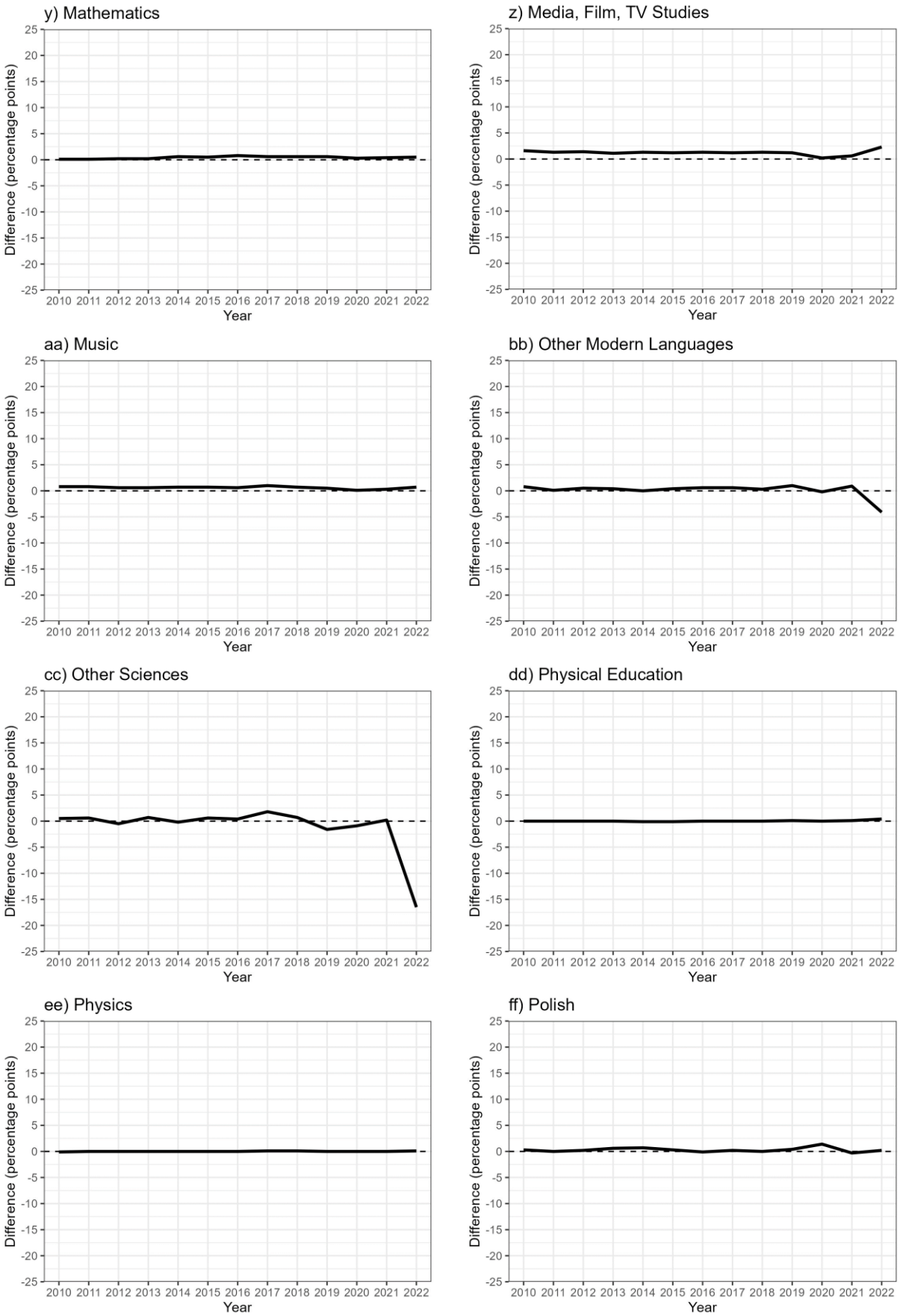

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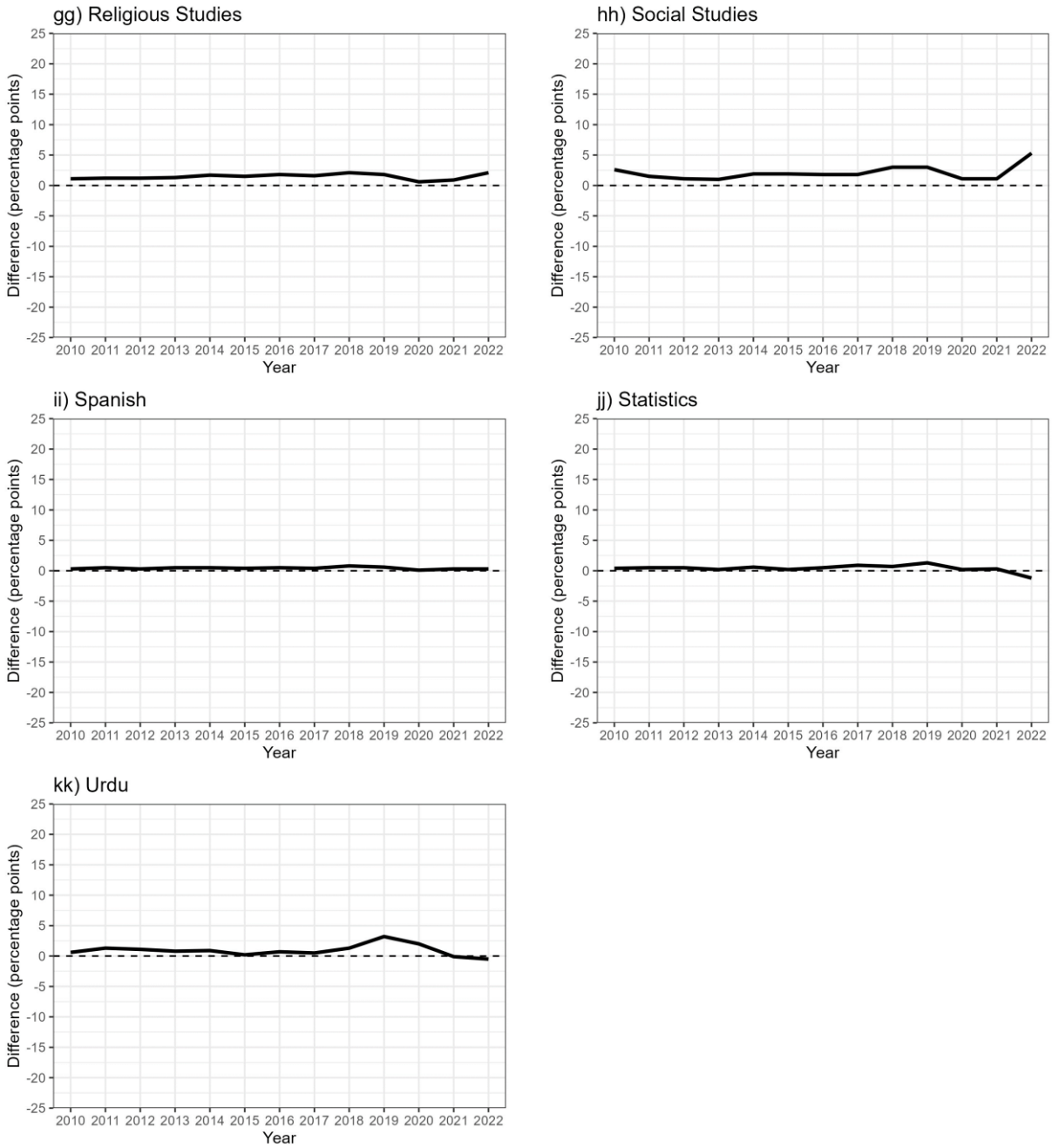


Figure 11. (continued)

Table 7. Summary statistics for differences between percentages of female and male students gaining grade G/1 or above in different GCSE subjects. Statistics are calculated across all years of available data (here, N = 13). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage. The table is sorted in order of mean difference, from the largest female-favoured difference to the largest male-favoured difference.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
All Subjects	98.8	98.1	0.7	96.5	95.8	0.3	99.6	99.3	1.2
Social Studies	97.8	95.7	2.1	91.4	86.1	1.0	99.4	98.3	5.3
Arabic	94.5	93.0	1.5	73.2	74.2	-0.2	98.8	97.6	3.3
Ancient History	98.0	96.5	1.5	92.3	88.7	0.5	100.0	98.9	5.5
Religious Studies	98.2	96.8	1.5	90.7	88.6	0.6	99.4	98.8	2.1
Media, Film, TV Studies	98.9	97.6	1.2	97.3	95.0	0.2	99.8	99.6	2.3
History	98.3	97.1	1.2	96.9	95.2	0.4	99.2	98.8	2.4
D&T	98.8	97.7	1.2	97.5	96.2	0.2	99.7	99.5	1.7
English Literature	98.8	97.8	1.0	94.9	93.5	0.5	99.4	98.9	2.0
Urdu	97.9	97.0	0.9	83.2	83.7	-0.1	99.5	99.2	3.2
Art and Design	99.2	98.5	0.8	97.4	96.5	0.5	99.7	99.2	1.1
English	99.3	98.6	0.7	97.9	97.0	0.3	99.7	99.4	1.4
Music	99.1	98.5	0.6	97.3	96.6	0.1	99.8	99.7	1.0
Computer Science	97.4	96.8	0.6	96.1	95.5	0.0	99.1	98.9	1.3
Geography	99.0	98.4	0.6	97.7	96.9	0.3	99.6	99.3	1.4
Business Studies	98.8	98.3	0.5	97.8	97.2	0.1	99.6	99.5	0.9
Drama	99.4	98.9	0.5	97.8	97.2	0.2	99.9	99.7	0.7
Spanish	99.2	98.8	0.4	96.8	96.5	0.1	99.7	99.6	0.8
Mathematics	97.8	97.4	0.4	95.1	94.5	0.1	99.5	99.2	0.8
Combined Science	99.0	98.6	0.4	97.5	96.9	0.1	99.6	99.3	1.0
Statistics	95.5	95.1	0.4	63.6	64.8	0.2	99.0	98.7	1.3
Dance	98.7	98.3	0.3	93.7	94.4	0.1	99.7	99.5	1.5
Italian	98.2	97.8	0.3	82.9	85.1	0.0	100.0	99.7	-2.2
Polish	95.9	95.6	0.3	72.0	71.8	0.0	99.5	99.4	1.4
French	99.3	99.1	0.3	96.7	96.5	0.2	99.8	99.6	0.6
German	99.4	99.3	0.2	97.5	97.3	0.0	99.8	99.8	0.4
Classical Civilisation	99.3	99.2	0.1	97.2	97.4	0.0	99.7	99.9	0.6
Biology	99.6	99.5	0.1	98.8	98.5	0.0	99.9	99.8	0.3
Latin	99.4	99.3	0.1	95.1	95.3	0.0	99.9	99.9	0.7
Other Modern Languages	96.9	96.8	0.1	72.5	76.6	0.0	99.5	99.2	-4.1
Chemistry	99.7	99.7	0.1	99.0	98.8	0.0	100.0	99.9	0.3
Physical Education	99.7	99.6	0.0	98.9	98.5	0.0	99.9	99.9	0.4
Physics	99.7	99.7	0.0	99.1	99.0	0.0	100.0	99.9	-0.1
Chinese	98.1	98.3	-0.1	80.4	84.5	0.0	99.9	99.9	-4.1
Economics	98.4	98.7	-0.2	95.5	97.3	0.0	99.9	99.8	-2.3
Classical Greek	99.2	99.6	-0.3	92.6	98.0	0.0	100.0	100.0	-5.4
Other Sciences	95.6	96.7	-1.1	70.6	87.1	-0.2	99.8	99.6	-16.5

See footnotes 8 and 9 for subjects included in Other Modern Languages and Other Sciences.

The above analyses considered subjects on an individual basis, but GCSE students take a range of subjects across their programme of study. If the appropriate combination of subjects, from a range set out by the Government, is taken, students can gain the English Baccalaureate (EBacc). The number of students entered for the appropriate subject combinations, and the percentage achieving at least a grade C/4 in all of their EBacc subjects, were also therefore assessed.

Time series of differences are shown in Figure 12 and summary statistics are shown in Table 8. Both statistics show a female-favoured gap which ranged in size from around 5 percentage points to over 10 percentage points. As may be expected, the percentages achieving grade C/4 or better in EBacc subjects were smaller than the percentages entered for EBacc subjects, but the gap was of similar magnitude in both measures. Hence, when aggregated across a range of GCSE subjects, female attainment remained higher than male attainment.

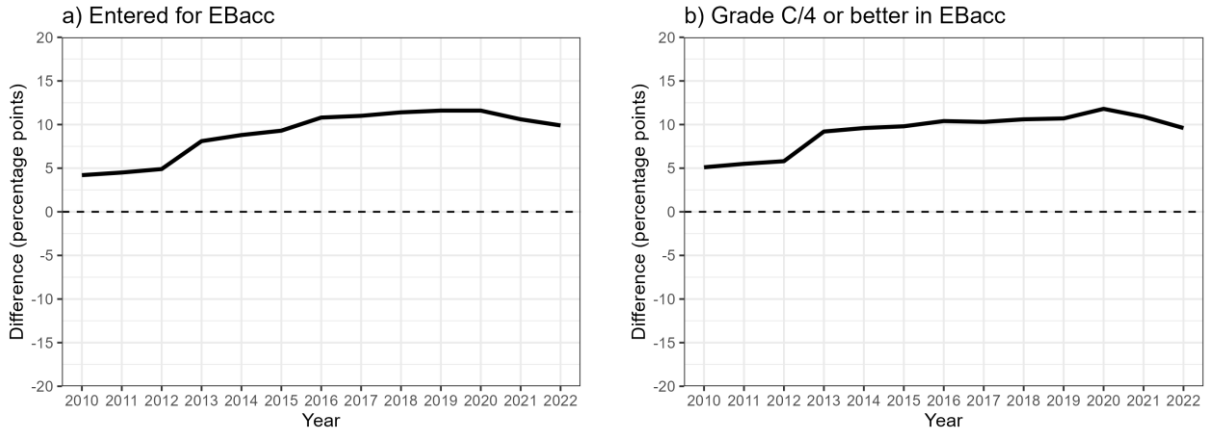


Figure 12. Differences between the percentages of female and male students entered for the EBacc, and the those achieving the EBacc. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

Table 8. Summary statistics for differences between percentages of female and male students being entered for the EBacc, and for those achieving the EBacc. Statistics are calculated across all years of available data (here, N = 13). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
Entered for EBacc	39.4	30.4	9.0	23.9	19.4	4.2	45.9	34.4	11.6
Grade C/4 or better in EBacc	27.9	18.7	9.2	17.7	12.6	5.1	35.9	24.2	11.8

Post-KS4 destinations

The decisions taken during KS4, and performance in KS4 assessments, can substantially impact young people's lives. After KS4, choices are no longer limited just to which subjects to study, but *what to do*. Hence, the destinations of young people leaving KS4 provide a further vital metric by which to understand sex gaps. Figure 13 shows headline post-KS4 destination metrics, and Table 9 shows associated summary statistics.

Panel a of Figure 13 shows the overall rate of moving on to sustained education, employment and apprenticeships; over all years more females than males were recorded as having progressed in this manner, with the gap increasing over the period. Within this category, education was by far the largest destination type (Table 9 indicates mean values of over 80% of students moving on to education) and, as shown in panel b of the figure, this also showed a female-favoured gap of around 3 to 4 percentage points. The *type* of education progressed to differed though, with FE (panel c) showing a growing, male-favoured gap of 2 to 5 percentage points, and sixth form (panel d) showing a growing, female-favoured gap of 5 to 9 percentage points. Conversely, higher percentages of males were recorded as having undertaken apprenticeships (2 percentage point gap), showing *no* sustained destination (0 to 1 percentage point gap), and with unknown destinations (<0.5 percentage point gap). Hence, there were substantial sex differences in post-KS4 destinations, with females much more likely to go on to education and, within that, to attend sixth forms, and males more likely to attend FE institutions or go into apprenticeships, work, or to have no sustained destination.

Table 9. Summary statistics for differences between percentages of female and male students progressing from KS4 to different destinations. Statistics are calculated across all years of available data (here, N = 11). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
Overall	93.3	92.2	1.1	89.5	88.8	0.7	94.9	93.7	1.6
Education	88.0	84.1	3.9	84.2	80.5	3.4	91.6	87.1	4.5
Further Education	32.7	36.2	-3.5	31.7	34.4	-1.7	34.0	38.3	-4.6
Sixth Form	54.5	47.2	7.3	51.4	45.4	5.6	56.8	48.5	8.9
Apprenticeship	3.1	5.1	-1.9	1.7	3.2	-1.5	3.7	5.9	-2.2
Work	2.1	3.1	-0.9	1.1	1.9	-0.6	2.8	3.6	-1.3
No sustained destination	5.7	6.4	-0.8	4.2	5.4	-0.4	8.6	9.0	-1.2
Unknown	1.1	1.3	-0.3	0.6	0.9	-0.2	2.0	2.3	-0.4

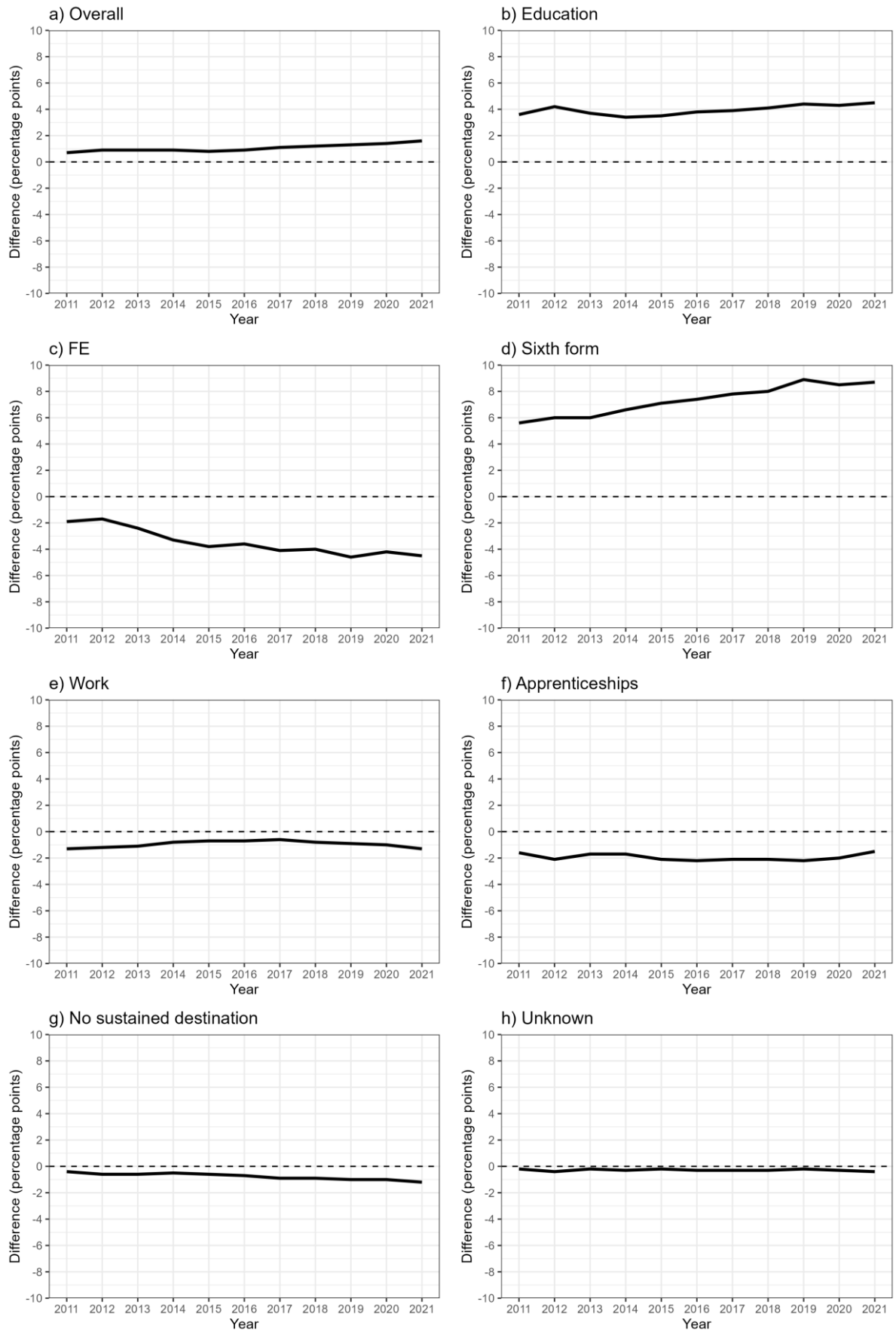


Figure 13. Differences between the percentages of female and male students progressing from KS4 to different destinations. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

A level subject uptake

Although the above results indicate a range of destinations after KS4, the main academic route, and the most common route to progress to HE, is to take A levels. Accordingly, there is substantial interest in subject choice and performance in A levels, and in the presence – and potential effects of – sex gaps at this crucial stage of education. As with GCSEs presented above, I first look at differences in entries, and then look at differences in performance.

Figure 14 shows the time series of differences in A level entries for different subjects, whilst Table 10 shows summary statistics across the years. A first point to note is that unlike GCSEs, there is a sex gap in overall entries (see panel a of Figure 14), with females accounting for 53.7 to 55.3 percent of entries, producing gaps of 7.5 to 10.7 percentage points. Accordingly, gaps seen in individual subjects must be interpreted carefully. A difference of zero percentage points, indicating exactly the same percentage of males and females took that subject, could be argued to *over*-represent male students *relative to the overall population of A level students*. Conversely, a difference of 7 to 10 percentage points in favour of females would represent students being drawn in proportion to their overall levels in the A levels population, but would still represent a gap of sorts. There is no "right" level by which to judge the gap, so this complexity must simply be considered when interpreting results. Note that in Figure 14, the reference line represents the gap across all subjects.

Some subjects showed large female-favoured gaps. The largest was Sociology, which showed a mean difference of 52.7 percentage points; other large gaps were seen in Art and Design (49.3 percentage points mean difference), Psychology (48.8 percentage points mean difference) and English (46.3 percentage points mean difference). Subject areas with female-favoured gaps were, as at GCSE, arts and creative subjects, languages, and social studies. Subjects with male-favoured gaps included Computing (79.6 percentage points mean difference), Physics (56.7 percentage points mean difference), and Further Maths (42.0 percentage points mean difference). Subject areas favoured by males typically related to mathematics, sciences, technology, and business/economics. Interestingly, History (7.4 percentage points mean difference) and Chemistry (1.4 percentage points mean difference) showed female-favoured gaps, but the gaps were smaller than that seen in overall entries so, in some respect, still saw more male entries than expected. In a notable contrast to GCSE entry patterns, very few subjects saw small gaps, reflecting the fact that no subjects are mandatory at A level, and perhaps, in turn, indicating that the complete free choice of subjects increases the size of observed sex gaps.

Figure 14 also shows that several subjects showed interesting changes in the size, and even direction, of gaps over the years considered. Biology, Chemistry and Physics provide interesting contrasts: Biology showed a female-favoured gap that increased over time; Chemistry showed a male-favoured gap that decreased, which, by 2022, reached the same level as the overall entries gap; Physics, meanwhile, remained strongly male-favoured with only a slight decrease in the size of the gap. Across all other subjects, more showed shifts toward females than shifts toward males. Accounting and Finance, Design and Technology, and, to a lesser degree, Maths and Further Maths, showed growing male-favoured gaps. Conversely, Drama, English, Geography, Government and Politics, History, Law, Music, "Other Science", "Other Social Studies", Physical Education, Religious Studies and Spanish all showed growth in female-favoured gaps or reduction in male-favoured gaps.

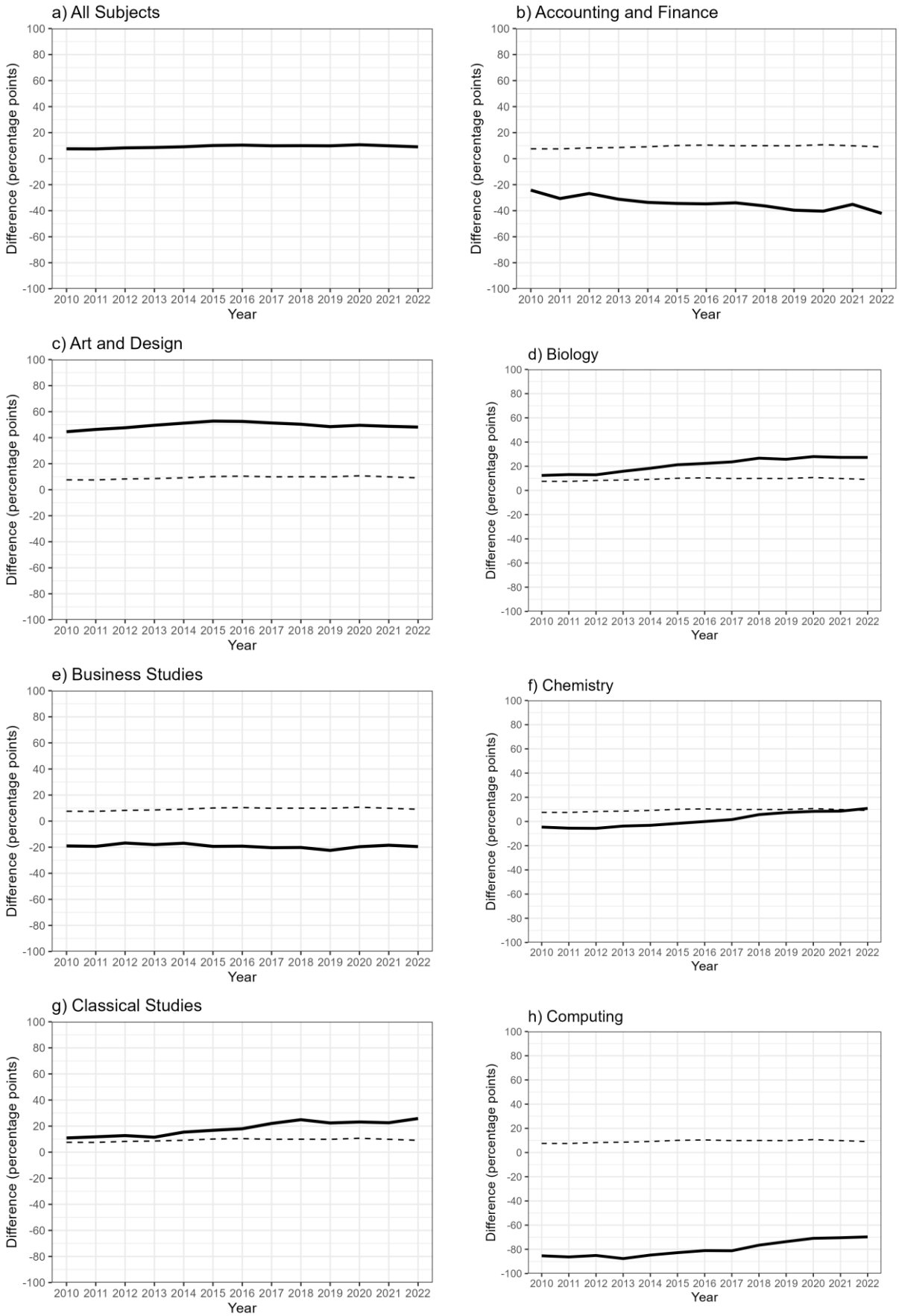


Figure 14. Differences between the percentages of female and male entries in different A level subjects. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage. The dashed line indicates the difference in total entries across all subjects (as in panel A).

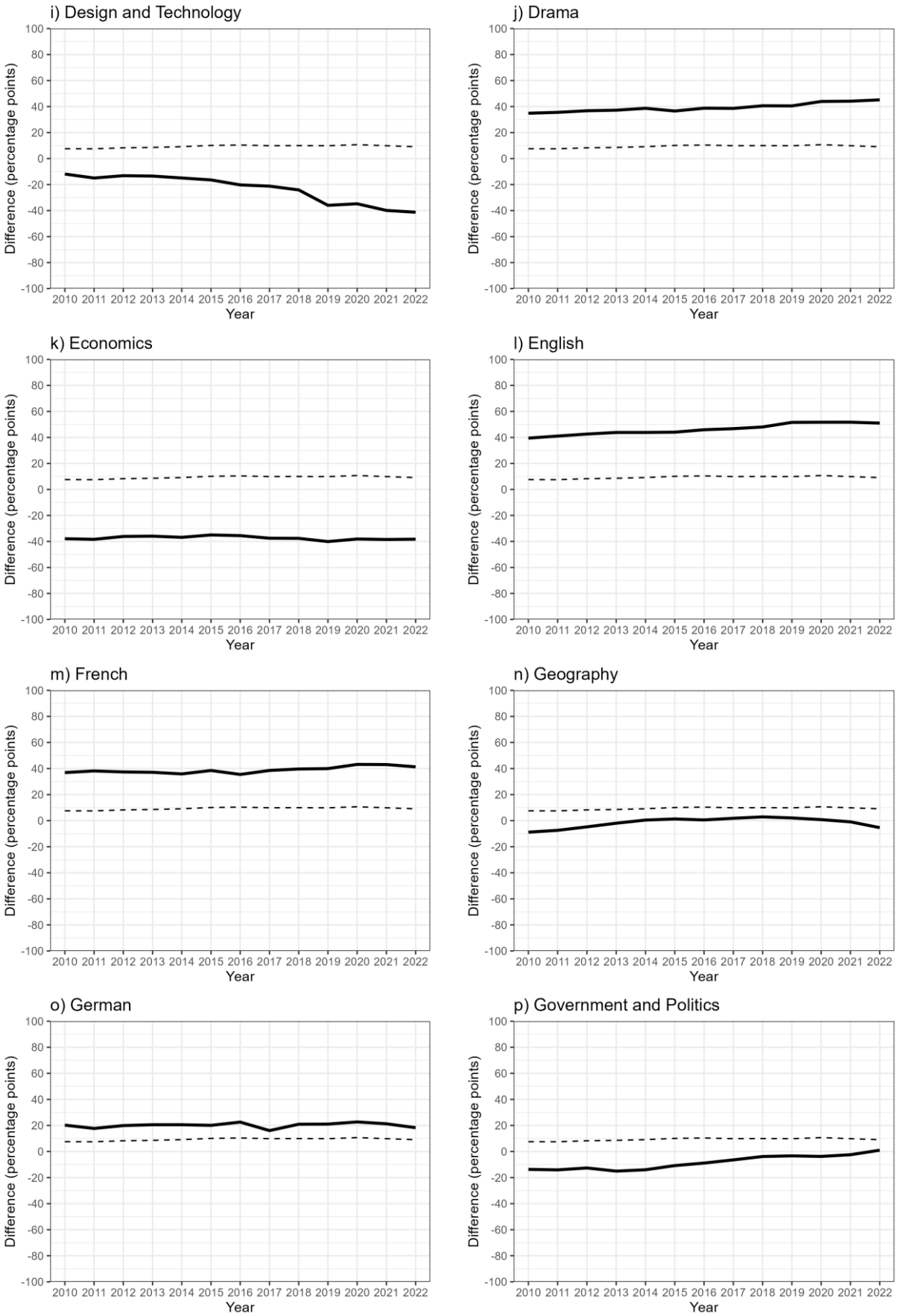
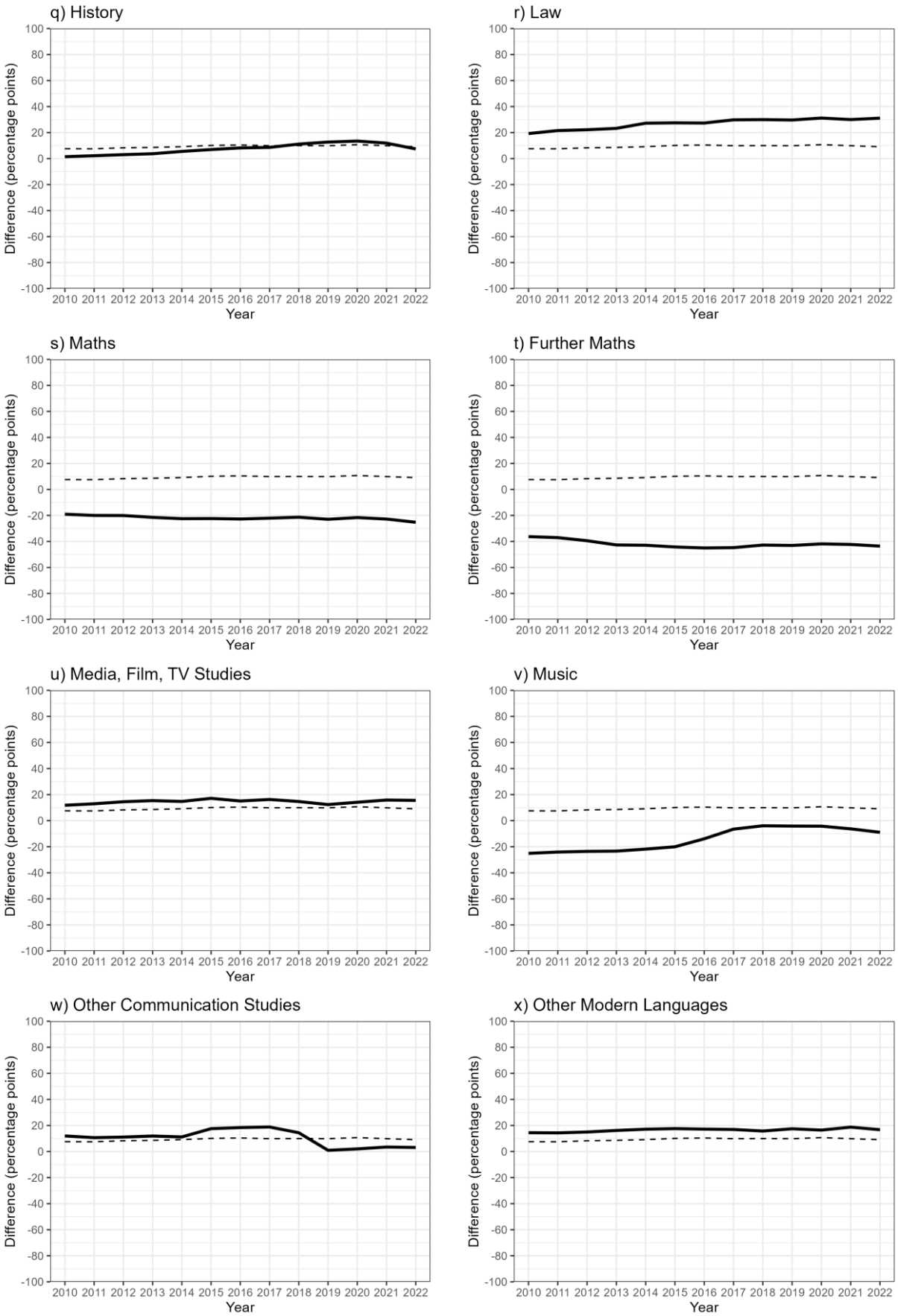


Figure 14. (continued)



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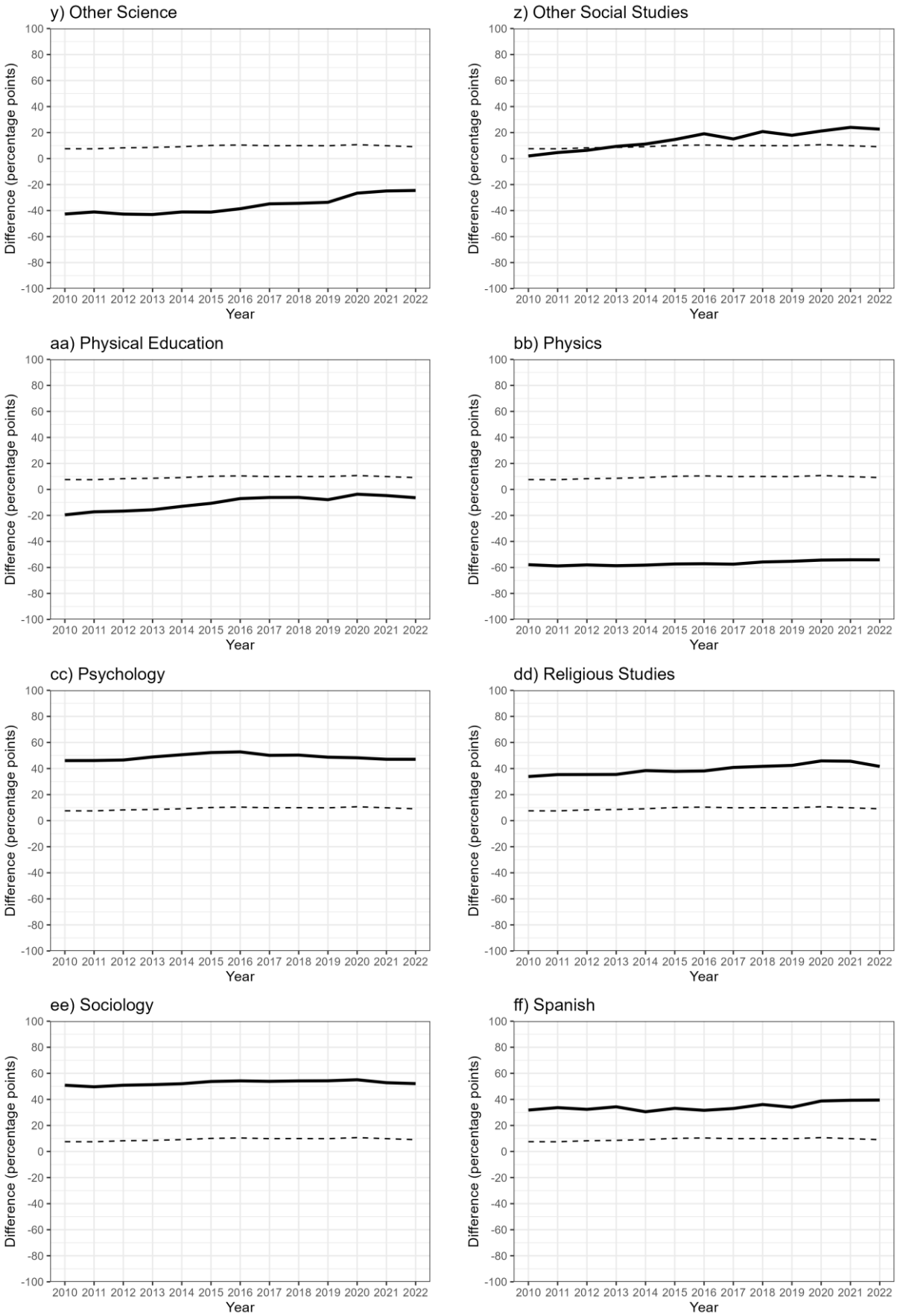


Figure 14. (continued)

Table 10. Summary statistics for differences between female and male students in A level entries. Statistics are calculated across all years of available data (here, N = 13). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage. The table is sorted in order of mean difference, from the largest female-favoured difference to the largest male-favoured difference. The dashed line indicates the position of the 'all subjects' difference.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
All Subjects	54.7	45.3	9.3	53.7	44.7	7.5	55.3	46.3	10.7
Sociology	76.3	23.7	52.7	74.8	22.5	49.7	77.5	25.2	55.1
Art and Design	74.7	25.3	49.3	72.3	23.6	44.6	76.4	27.7	52.7
Psychology	74.4	25.6	48.8	73.0	23.6	46.1	76.4	27.0	52.8
English	73.1	26.9	46.3	69.7	24.1	39.5	75.9	30.3	51.7
Religious Studies	69.7	30.3	39.4	66.9	27.1	33.9	72.9	33.1	45.8
Drama	69.7	30.3	39.3	67.4	27.4	34.9	72.6	32.6	45.2
French	69.4	30.6	38.8	67.7	28.4	35.5	71.6	32.3	43.2
Spanish	67.2	32.8	34.5	65.3	30.2	30.5	69.8	34.7	39.5
Law	63.5	36.5	26.9	59.6	34.4	19.2	65.6	40.4	31.2
Biology	60.6	39.4	21.1	56.2	36.0	12.4	64.0	43.8	28.0
German	60.1	39.9	20.2	58.0	38.7	16.1	61.3	42.0	22.7
Classical Studies	59.1	40.9	18.3	55.4	37.1	10.9	62.9	44.6	25.8
Other Modern Languages[10]	58.2	41.8	16.4	57.2	40.6	14.3	59.4	42.8	18.7
Media, Film, TV Studies	57.3	42.7	14.6	55.9	41.4	11.8	58.6	44.1	17.1
Other Social Studies[11]	57.3	42.7	14.5	51.0	38.0	2.0	62.0	49.0	24.0
Other Communication Studies[12]	55.2	44.8	10.4	50.5	40.6	0.9	59.4	49.5	18.8
History	53.7	46.3	7.4	50.7	43.3	1.4	56.7	49.3	13.5
Chemistry	50.7	49.3	1.4	47.2	44.6	0.0	55.4	52.8	10.8
Geography	49.3	50.7	-1.5	45.6	48.6	0.4	51.4	54.4	-8.8
Government and Politics	45.8	54.2	-8.3	42.5	49.5	1.0	50.5	57.5	-15.0
Physical Education	44.8	55.2	-10.4	40.2	51.8	-3.7	48.2	59.8	-19.6
Music	42.8	57.2	-14.3	37.5	52.0	-3.9	48.0	62.5	-25.1
Business Studies	40.4	59.6	-19.2	38.8	58.4	-16.8	41.6	61.2	-22.4
Maths	39.1	60.9	-21.9	37.4	59.5	-19.1	40.5	62.6	-25.2
Design and Technology	38.4	61.6	-23.3	29.4	55.9	-11.9	44.1	70.6	-41.3
Accounting and Finance	33.0	67.0	-34.1	29.0	62.1	-24.2	37.9	71.0	-42.1
Other Science[13]	32.0	68.0	-36.1	28.5	62.3	-24.5	37.7	71.5	-43.0
Economics	31.3	68.7	-37.4	30.0	67.5	-35.0	32.5	70.0	-40.1
Further Maths	29.0	71.0	-42.0	27.5	68.1	-36.3	31.9	72.5	-45.0
Physics	21.6	78.4	-56.7	20.6	77.1	-54.1	22.9	79.4	-58.8
Computing	10.2	89.8	-79.6	6.2	84.9	-69.7	15.1	93.8	-87.6

[10] Other Modern Languages includes Arabic, Bengali, Chinese, Dutch, Greek, Gujarati, Irish, Italian, Japanese, Modern Hebrew, Panjabi, Persian, Polish, Portuguese, Russian, Turkish, Urdu, and Welsh

[11] Other Social Studies includes Anthropology, Archaeology, Citizenship Studies, European Studies, Humanities, and Philosophy

[12] Other Communication Studies includes Film Studies, Expressive Arts & Performance Studies, Communication Studies and Creative Writing

[13] Other Science includes Electronics, Environmental Science, Geology, Science, Science and Technology in Society, and Science for Public Understanding

A level performance

Performance at A level is, at an individual level, indicated by lettered grades from A* to E, so here, key thresholds of “A or better” and “E or better” were examined to identify the presence of attainment gaps at high and low grades respectively. Unlike entries, interpretation of these gaps is relatively simple, as we can assume equal attainment of the sexes will be reflected in a difference of zero percentage points.

The size of “A or better” gaps over time are shown in Figure 15, and summary statistics over all years are shown in Table 11. A first point to note is that in only seven subjects male students showed relatively higher attainment at the top grades: German, Chemistry, French, Spanish, “Other Science” (see footnote 13), Maths, and “Other Social Studies” (see footnote 11). The mean gaps in all of these subjects were relatively small, ranging from 0.2 to 3.4 percentage points. Intriguingly, these subjects include modern languages with relatively large female-favoured gaps in entries, perhaps suggesting that the few males taking the subject are those likely to perform particularly well. Subjects with the largest female-favoured attainment gaps included Physical Education (mean gap 12.9 percentage points), Geography (mean gap 11.6 percentage points) and Psychology (mean gap 10.6 percentage points). Female-favoured attainment gaps were seen for male-dominated subjects, including Computing (mean gap 4.0 percentage points) and Physics (mean gap 4.1 percentage points); this appears likely to reflect the same process as described above, in which the relatively few females taking the subjects are those likely to perform particularly well.

Figure 15 shows there were few strong directional shifts in the size of “grade A or better” gaps. This apparent lack of longer-term trends is perhaps because one of the strongest patterns evident was the effect of Covid-related disruption in 2020 and 2021. In virtually every subject[14], these years without examinations showed increases in the size of the female-favoured gap (or reductions in a male-favoured gap), in some cases quite substantially. For example, in Design and Technology, Media/Film/TV Studies and “Other Communication Studies” (see footnote 12) the gaps jumped from around 5 to 15 percentage points. Physical Education showed an increase from 10 to over 20 percentage points. In Chemistry, French, Maths and “Other Science”, the jump was large enough to reverse direction of long-established gaps in favour of males. Hence, it is hard to see patterns without a focus on the years at the end of the time series, but some were still evident from 2010 to 2019. The overall rate of gaining A or better (panel A) gradually shifted from female-favoured to roughly equal; a similar shift toward males was seen in Biology, Chemistry, Economics, Maths, Music, “Other Social Studies”, Physics, and Religious Studies. Shifts toward higher female attainment were seen in Design and Technology, Drama, English, Spanish, and perhaps several more with smaller magnitudes of change. The reasons for these more gradual changes are unclear, but the shifts toward higher male attainment may reflect the growth in female entries described earlier: if more lower attaining female students are taking A levels, the proportion of females attaining the highest grades would decline even if it remained roughly constant in absolute terms.

[14] This contrasts with the similar effect seen in GCSE grades, which was visible in many, but not all, subjects.

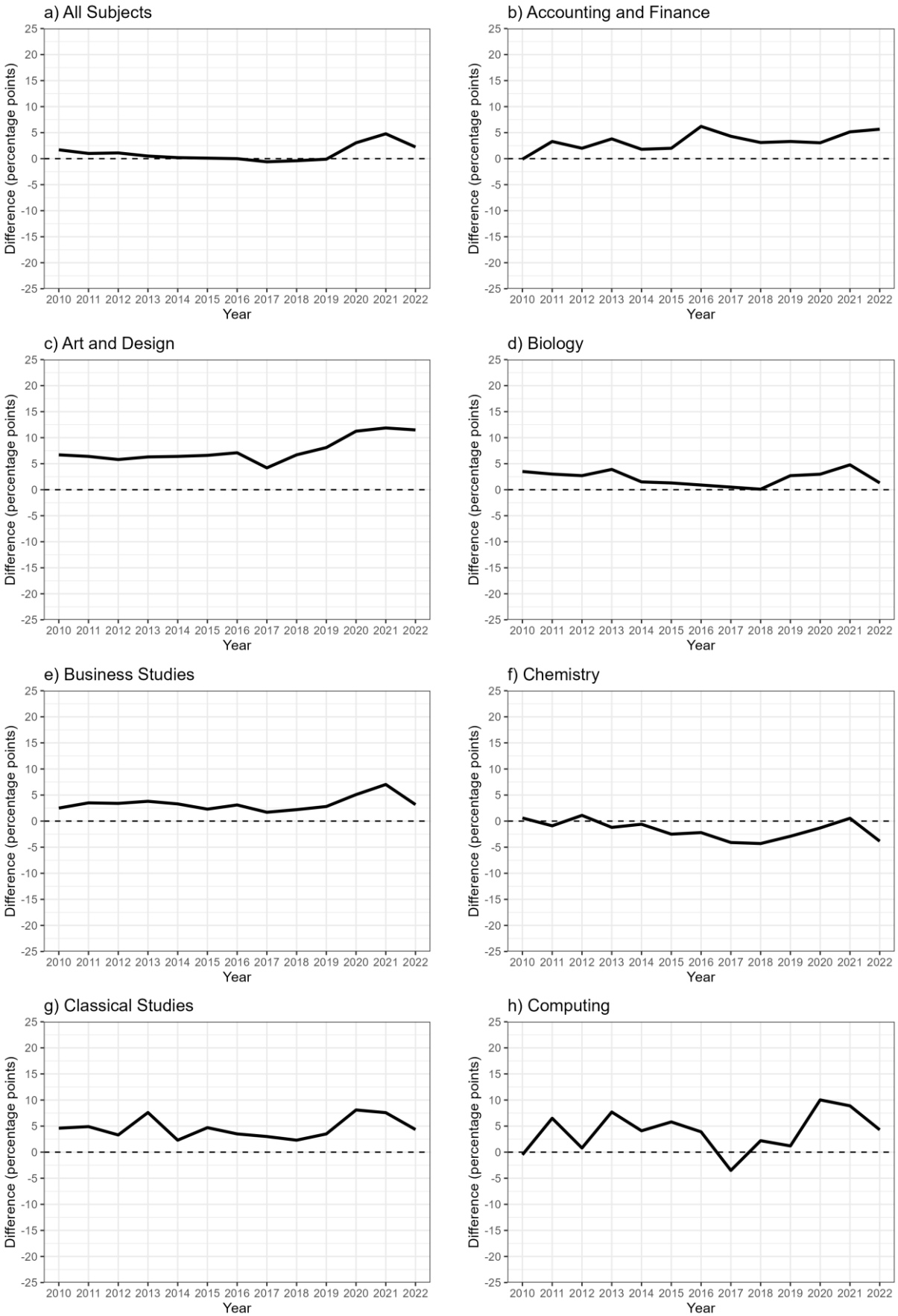
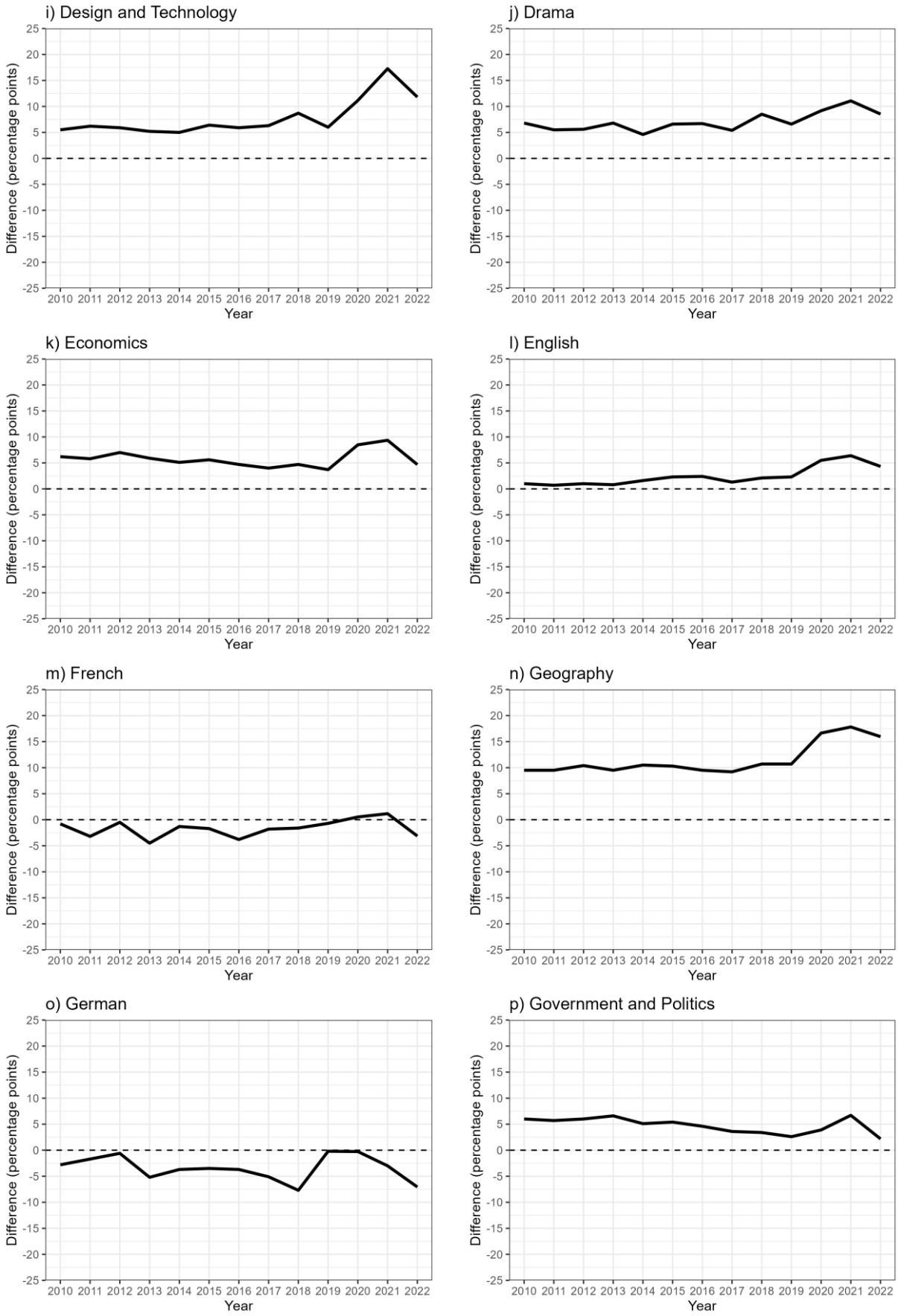


Figure 15. Differences between the percentages of female and male students gaining grade A or better in different A level subjects. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.



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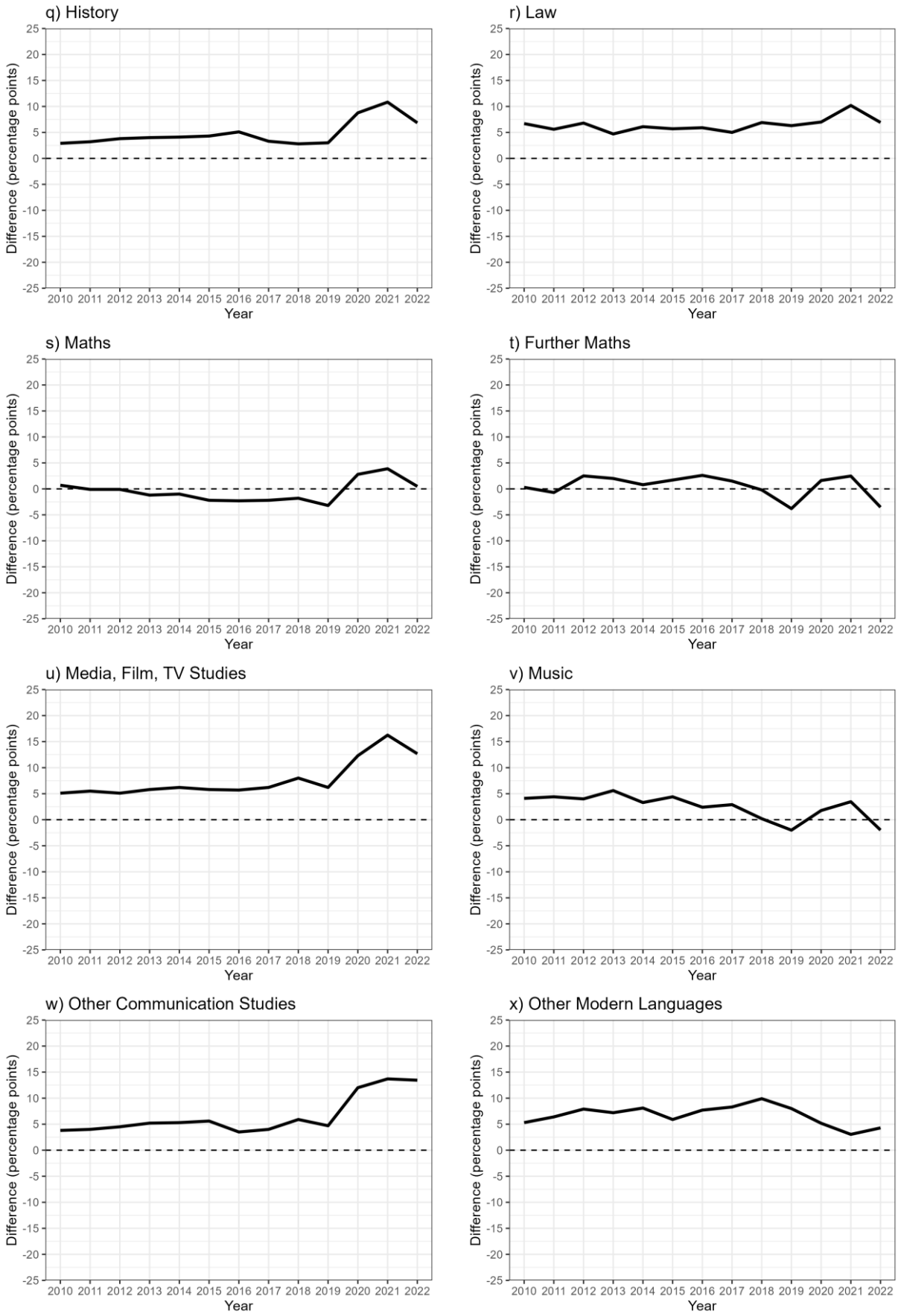

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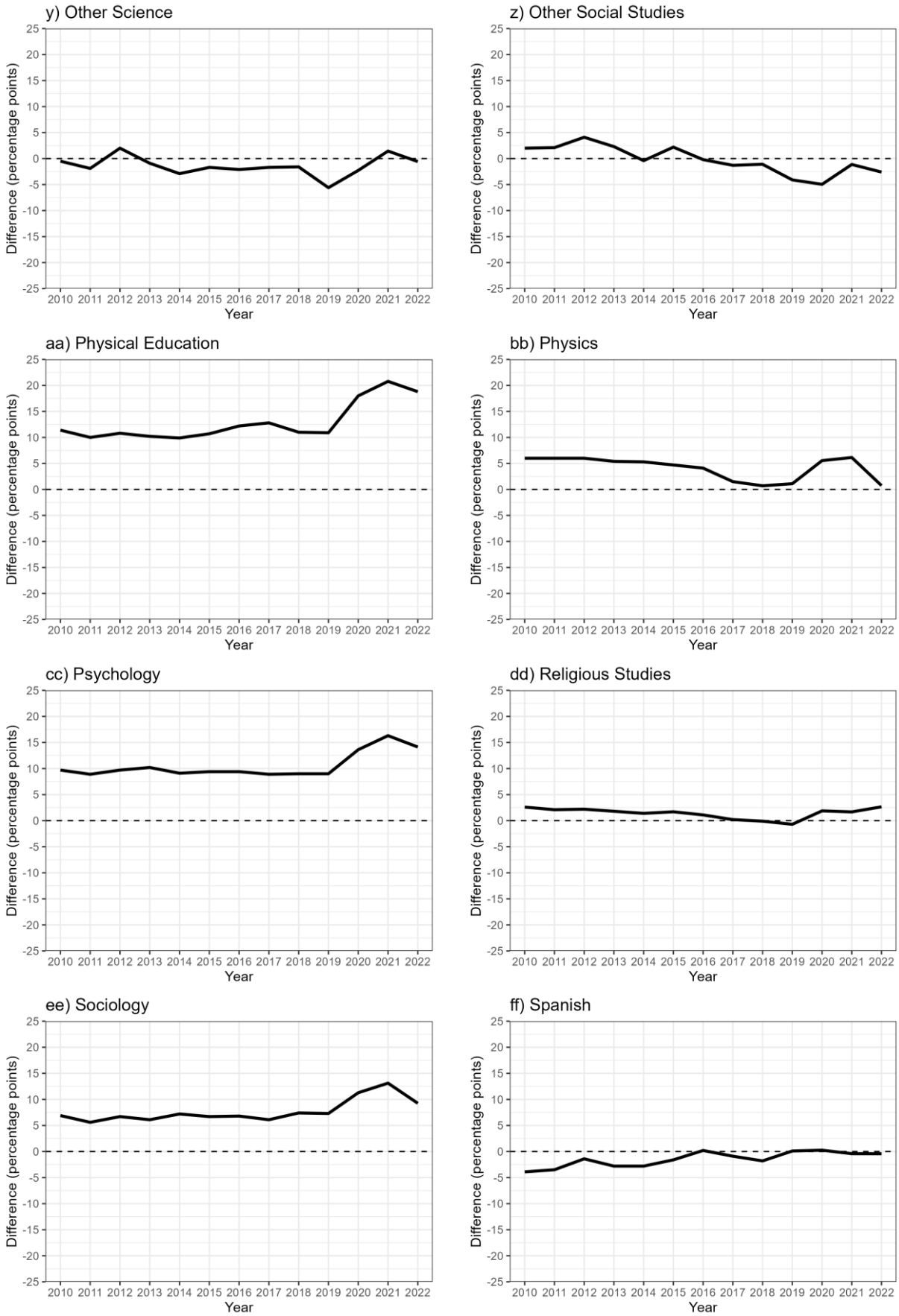


Figure 15. (continued)

Table 11. Summary statistics for differences between percentages of female and male students gaining grade A or above in different A level subjects. Statistics are calculated across all years of available data (here, N = 13). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage. The table is sorted in order of mean difference, from the largest female-favoured difference to the largest male-favoured difference.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
All Subjects	30.2	29.2	1.0	25.7	25.8	0.0	46.5	41.7	4.8
Physical Education	28.3	15.4	12.9	21.3	11.4	9.9	54.3	33.5	20.8
Geography	36.1	24.5	11.6	29.4	18.7	9.2	50.2	32.4	17.8
Psychology	24.0	13.4	10.6	19.3	10.0	8.9	41.3	25.0	16.3
Design and Technology	26.5	18.8	7.8	20.4	14.1	5.0	54.2	36.9	17.3
Media, Film, TV Studies	17.2	9.4	7.8	12.1	6.4	5.1	34.6	18.3	16.2
Sociology	23.0	15.3	7.7	19.8	12.9	5.6	35.1	22.0	13.1
Art and Design	33.8	26.2	7.6	29.1	21.9	4.2	49.5	37.7	11.9
Drama	25.1	18.0	7.1	16.8	11.4	4.6	51.5	40.5	11.1
Other Modern Languages	60.8	54.1	6.7	53.8	46.4	3.0	83.8	80.8	9.9
Other Communication Studies	19.5	12.9	6.6	13.9	8.6	3.5	39.1	25.4	13.7
Law	22.9	16.4	6.4	18.9	12.6	4.7	35.1	24.9	10.2
Economics	39.6	33.9	5.8	32.4	28.7	3.7	53.2	43.8	9.4
History	30.7	25.9	4.8	24.7	21.1	2.8	47.8	37.0	10.8
Government and Politics	35.4	30.7	4.8	28.2	25.6	2.2	49.8	43.1	6.7
Classical Studies	43.3	38.7	4.6	35.2	31.7	2.3	63.5	56.0	8.1
Physics	37.0	32.9	4.1	28.9	27.8	0.7	50.9	44.8	6.1
Computing	25.5	21.6	4.0	13.7	15.8	-0.5	51.7	42.8	10.0
Business Studies	20.3	17.0	3.4	16.1	13.1	1.7	35.8	28.8	7.0
Accounting and Finance	18.7	15.3	3.4	13.9	11.5	-0.1	32.3	27.1	6.2
Music	26.9	24.4	2.5	19.0	16.1	0.2	56.3	52.9	5.6
English	24.5	22.1	2.4	19.9	17.8	0.7	39.9	33.5	6.4
Biology	31.1	28.8	2.2	25.3	22.6	0.1	46.0	41.2	4.8
Religious Studies	28.7	27.3	1.4	21.7	22.4	-0.1	44.1	42.4	2.7
Further Maths	61.5	60.9	0.6	51.3	55.1	-0.2	76.9	74.4	-3.8
Other Social Studies	24.7	24.9	-0.2	16.2	18.8	-0.2	42.2	43.3	-5.0
Maths	44.9	45.4	-0.5	39.2	42.4	-0.1	57.1	53.2	3.9
Other Science	25.6	27.0	-1.4	17.6	23.2	-0.5	34.8	33.4	-5.6
Spanish	41.1	42.5	-1.5	35.4	35.3	0.1	63.1	63.5	-3.9
French	42.7	44.3	-1.6	36.8	37.5	-0.5	60.2	59.0	-4.5
Chemistry	34.5	36.1	-1.7	27.7	30.6	0.5	48.1	47.6	-4.3
German	43.5	47.0	-3.4	35.7	40.0	-0.2	66.3	69.3	-7.7

See footnotes 10, 11, 12, and 13 for subjects included in Other Modern Languages, Other Social Studies, Other Communication Studies and Other Science respectively.

The lowest grade awarded in A levels is E, so the next key threshold I considered was “E or better”; time series of gaps are shown in Figure 16 and summary statistics are presented in Table 12. The strongest pattern evident here was that in almost every subject, female students showed higher rates of attainment, with only “Other Science” showing a male-favoured mean gap, which was itself only 0.1 percentage points. French, Government and Politics, and Further Maths showed approximately equal attainment, with mean gaps of 0.0 percentage points and maximum gaps at or below 0.5 percentage points in either direction. All other subjects showed female-favoured gaps, typically by less than one percentage point. The largest gaps were seen in Psychology (mean gap 1.6 percentage points), Physical Education (mean gap 1.2 percentage points) and Law (1.1 percentage points).

Clear trends over time were hard to discern. Once again, some subjects showed an effect of Covid-related disruption, typically involving a reduction in the gap in 2020 and 2021, in practice indicating that fewer students failed outright in these years; particularly notable cases of this were seen in Design and Technology, Law, “Other Communication Studies”, Physical Education, Psychology and Sociology. Beyond this though, the main patterns appeared to be either relatively smooth and stable gaps, such as those in Biology, French, Geography, or Further Maths, or volatile fluctuations over a relatively stable trend, such as those in Accounting and Finance, Law, “Other Science” and “Other Social Studies”.

Overall, then, A level attainment gaps at both high and low grade thresholds showed females to typically perform better than males, sometimes by quite substantial margins. The subjects in which higher male performance was seen were, perhaps unexpectedly, often those with relatively small male entries, suggesting that the smaller group taking the subjects were those of higher ability in that subject area. The patterns seen here must also be considered in light of the changes in A level population: Figure 13 shows that more female students are going on to study in sixth forms from KS4, and Figure 14 shows slight growth in the female percentage of entries. Assuming there has been no underlying change in the ability distribution of female students leaving KS4, that would imply that the growth is being driven by slightly lower attaining students taking A levels. In turn, this would reduce the proportional attainment metrics used here, even if *absolute* levels of attainment remained static or even increased slightly. Hence, when evaluating A level attainment gaps, we must also acknowledge changes in the populations of students taking A levels.

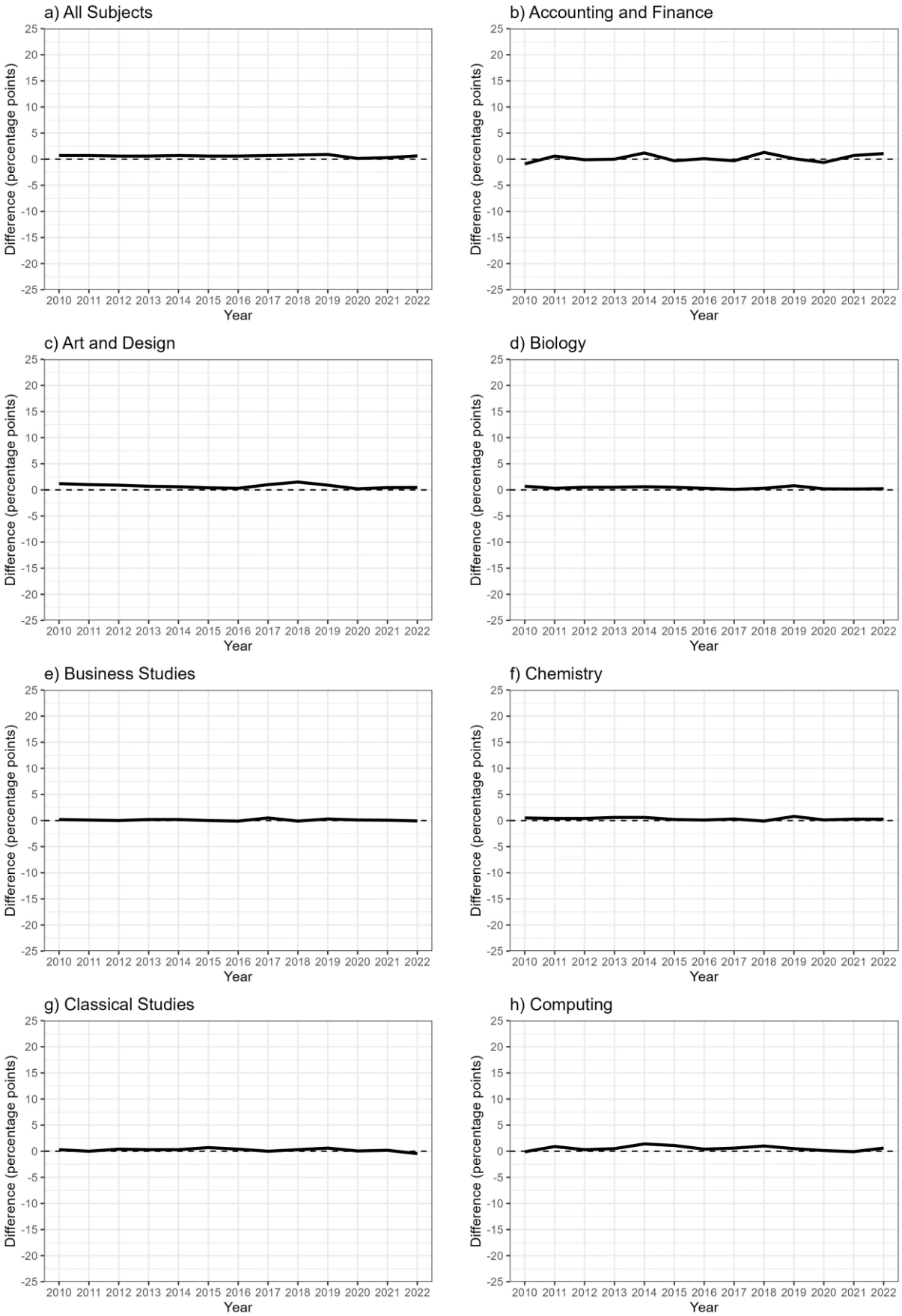


Figure 16. Differences between the percentages of female and male students gaining grade E or better in different A level subjects. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

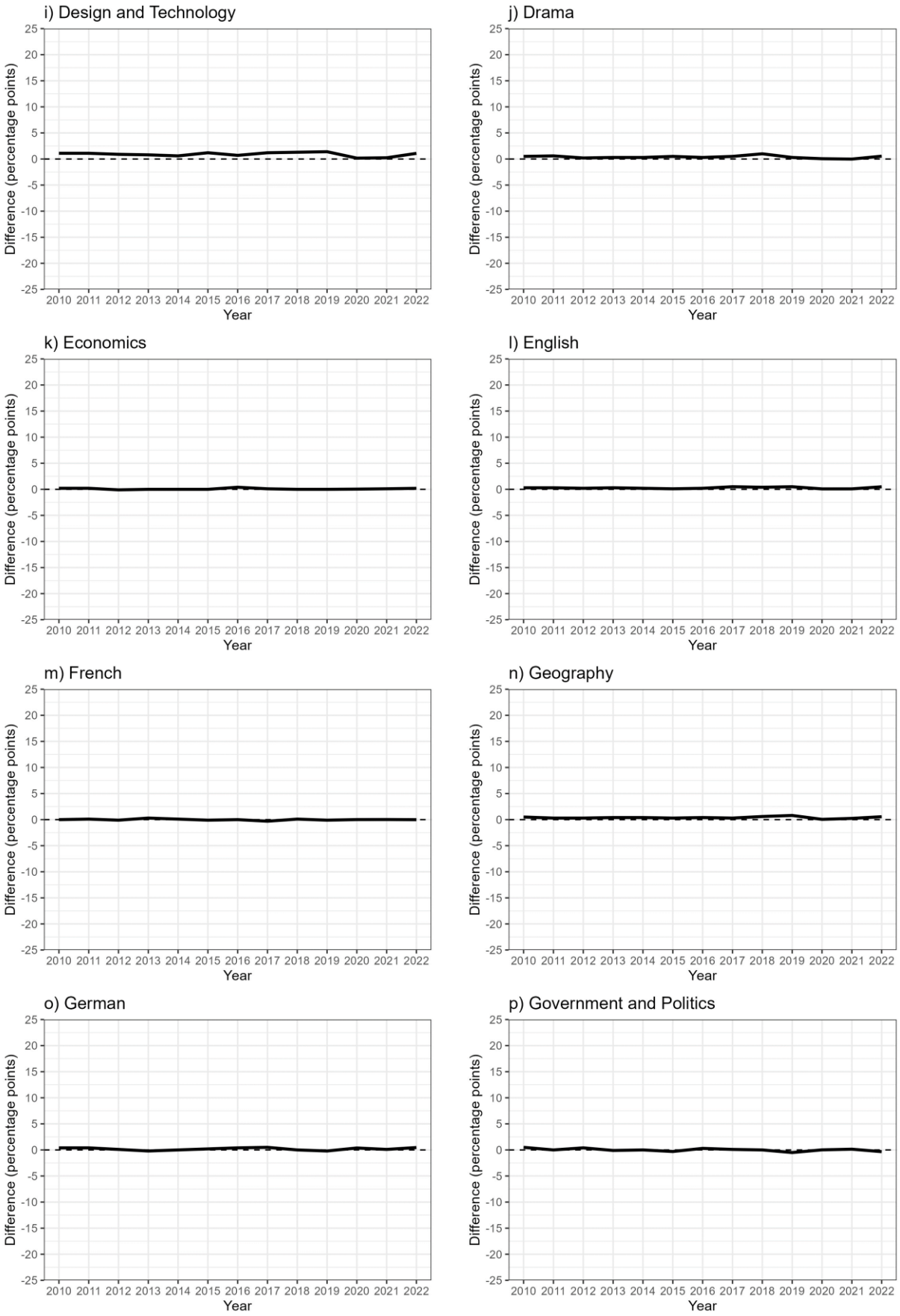
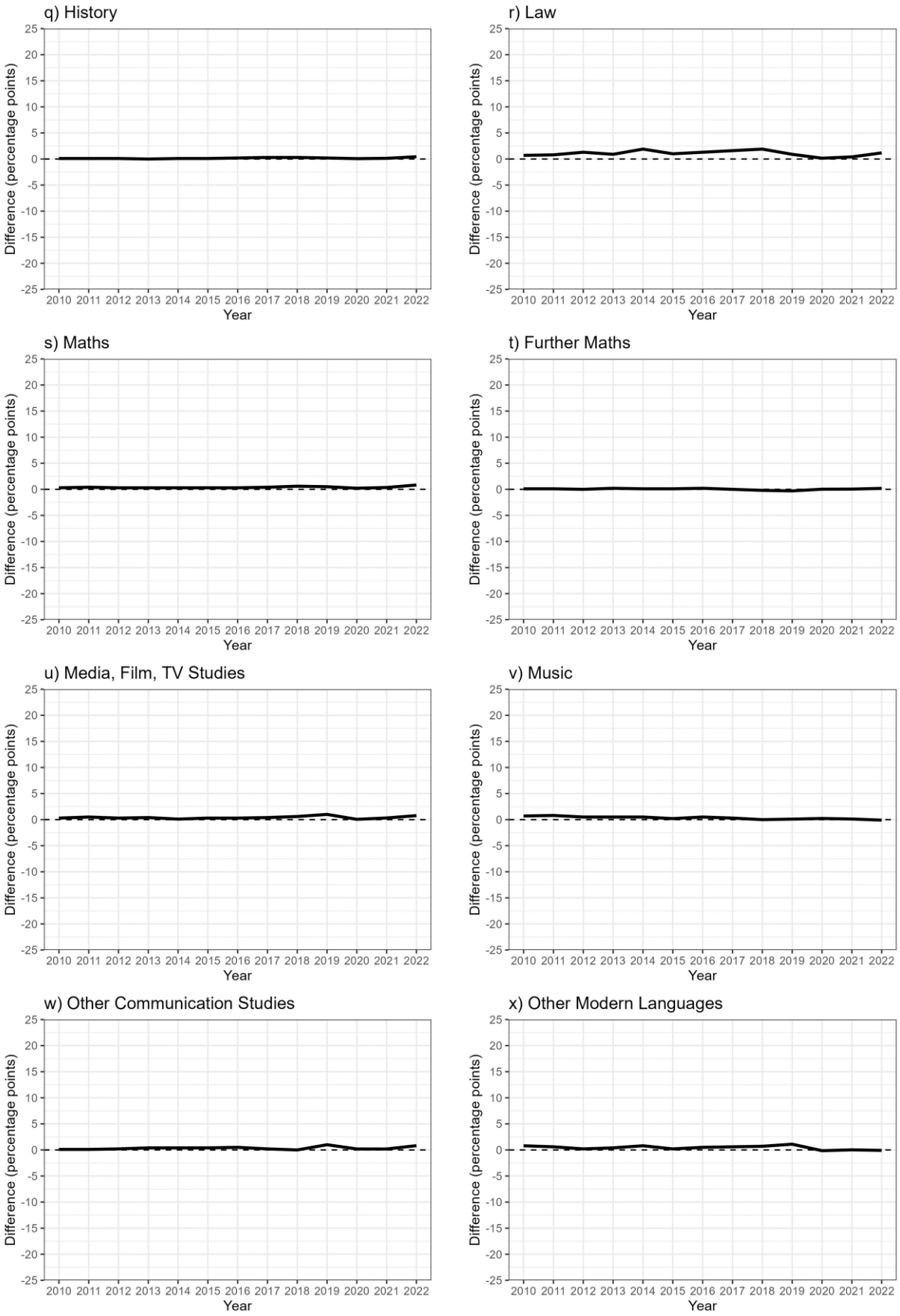


Figure 16. (continued)



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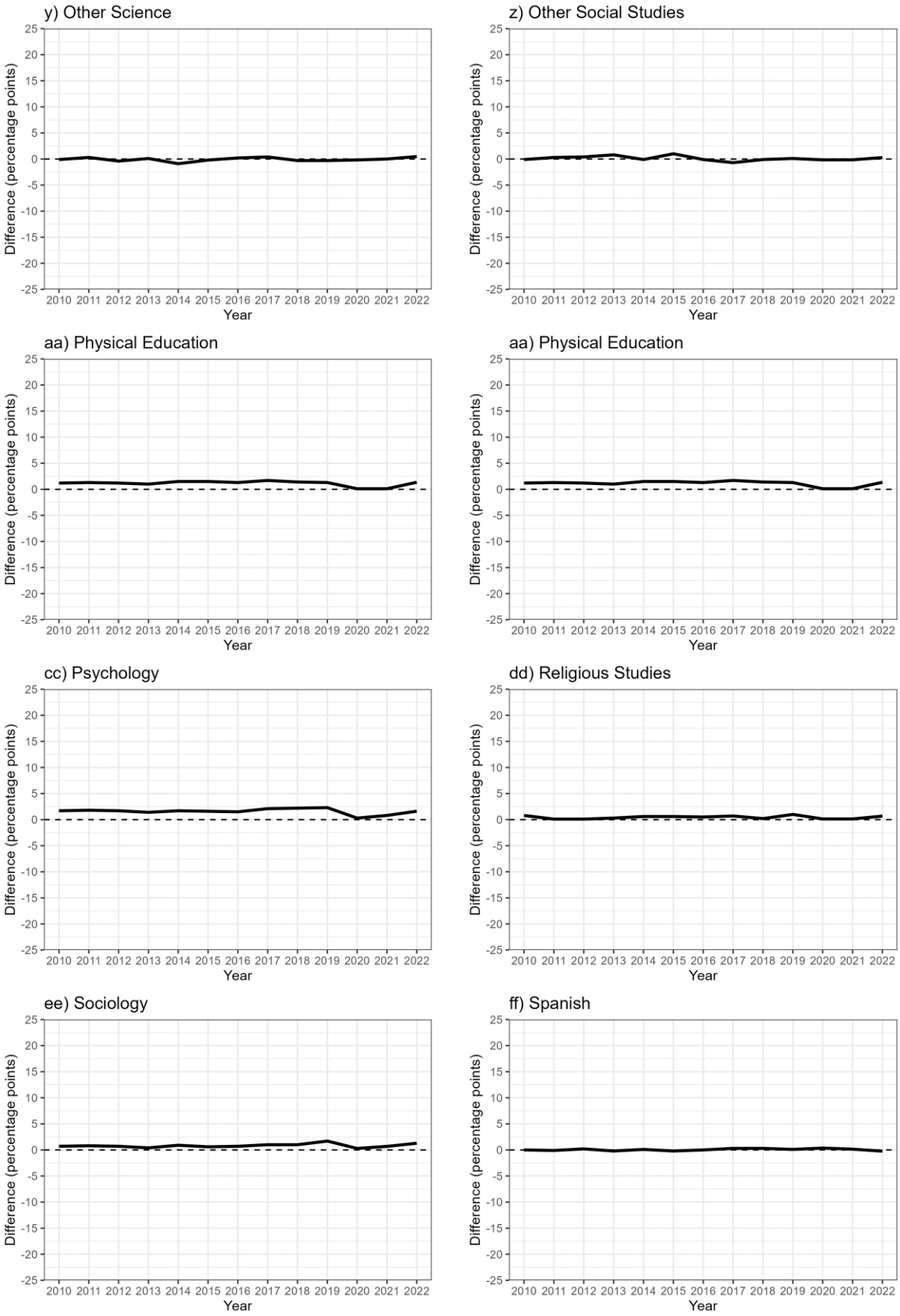

Figure 16. (continued)

Table 12. Summary statistics for differences between percentages of female and male students gaining grade E or above in different A level subjects. Statistics are calculated across all years of available data (here, N = 13). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage. The table is sorted in order of mean difference, from the largest female-favoured difference to the largest male-favoured difference.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
All Subjects	98.8	98.2	0.6	97.9	97.0	0.1	99.6	99.5	0.9
Psychology	98.4	96.8	1.6	97.5	95.3	0.3	99.5	99.2	2.3
Physical Education	98.9	97.8	1.2	97.7	96.3	0.1	99.9	99.8	1.7
Law	97.8	96.7	1.1	96.1	95.2	0.2	99.2	99.0	1.9
Design and Technology	98.9	98.0	0.9	97.9	96.5	0.2	99.8	99.6	1.4
Sociology	98.6	97.8	0.8	98.0	96.5	0.3	99.6	99.3	1.7
Art and Design	99.3	98.5	0.7	98.8	97.5	0.2	99.8	99.6	1.5
Computing	97.1	96.6	0.6	95.0	94.4	-0.1	99.6	99.5	1.4
Religious Studies	99.0	98.5	0.4	98.0	97.2	0.1	99.7	99.6	1.0
Other Modern Languages	98.6	98.2	0.4	97.7	96.9	0.0	99.2	98.7	1.1
Media, Film, TV Studies	99.5	99.1	0.4	99.2	98.5	0.1	99.8	99.7	1.0
Biology	98.1	97.7	0.4	96.3	95.5	0.1	99.5	99.4	0.8
Geography	99.4	99.0	0.4	99.0	98.2	0.1	99.8	99.8	0.8
Maths	98.7	98.3	0.4	97.3	96.8	0.2	99.7	99.4	0.8
Drama	99.6	99.2	0.4	99.4	98.5	0.0	99.9	99.9	1.0
Physics	97.8	97.4	0.4	95.0	95.4	0.1	99.5	99.3	0.9
Other Communication Studies	99.5	99.1	0.3	98.4	97.6	0.0	99.8	99.6	1.0
Chemistry	98.2	97.9	0.3	96.4	95.6	0.1	99.4	99.3	0.8
Music	99.0	98.7	0.3	98.1	97.9	0.0	99.9	99.7	0.8
English	99.5	99.3	0.3	99.2	98.8	0.1	99.8	99.7	0.5
Classical Studies	99.3	99.1	0.2	99.1	98.6	0.0	99.8	99.8	0.7
Accounting and Finance	96.4	96.2	0.2	93.8	93.7	0.0	99.0	99.2	1.3
German	99.5	99.3	0.2	99.0	99.0	0.0	100.0	99.9	0.5
History	99.4	99.3	0.2	99.0	98.7	0.0	99.8	99.8	0.4
Other Social Studies	97.7	97.6	0.1	96.3	96.2	-0.1	99.3	99.5	1.0
Business Studies	98.7	98.6	0.1	97.8	97.6	0.0	99.7	99.6	0.5
Economics	99.0	98.9	0.1	98.2	98.2	0.0	99.8	99.7	0.4
Spanish	99.4	99.3	0.1	99.0	98.9	0.0	99.8	99.8	0.4
Further Maths	99.1	99.1	0.0	97.9	98.2	0.0	99.8	99.8	-0.3
Government and Politics	98.8	98.8	0.0	97.6	98.1	0.0	99.7	99.7	0.5
French	99.4	99.4	0.0	98.7	98.8	0.0	99.8	99.8	0.3
Other Science	97.9	97.9	-0.1	96.5	96.8	0.0	99.4	99.6	-0.9

See footnotes 10, 11, 12, and 13 for subjects included in Other Modern Languages, Other Social Studies, Other Communication Studies and Other Science respectively.

Subject-by-subject analysis might not fully capture overall performance, as students typically take three A levels, and future options will be dictated by their performance across all of them. The Department for Education collates data on the percentage of students gaining three high grades, either three A/A* grades, or two As and a B or better. Time series of these percentages are shown in Figure 17 and summary statistics are shown in Table 13. Surprisingly, given the higher percentage of female students gaining high grades in individual subjects, the combined metrics seemed to indicate better male performance. When considering attainment of three A/A* grades, the gap was in favour of males, and growing over time, until 2020/21, when it rapidly shifted to female-favoured. At AAB or better, the gap started at around one percentage point in favour of females, but changed to around two percentage points in favour of males, before again showing a big shift back toward females in the years without examinations. Indeed, considering only the years before 2020, the mean difference is 0.3 percentage points in favour of males. These patterns could reflect something similar to that described above, with the shift toward males being driven by increasing numbers of lower-attaining female students taking A levels. Equally, it could reflect male students focusing on the subjects in which they have best chance of attaining high grades, or taking highly related subject combinations. Either way though, it appears that attainment at an individual subject level may not tell exactly the same story as considering attainment across the combinations of subjects taken.

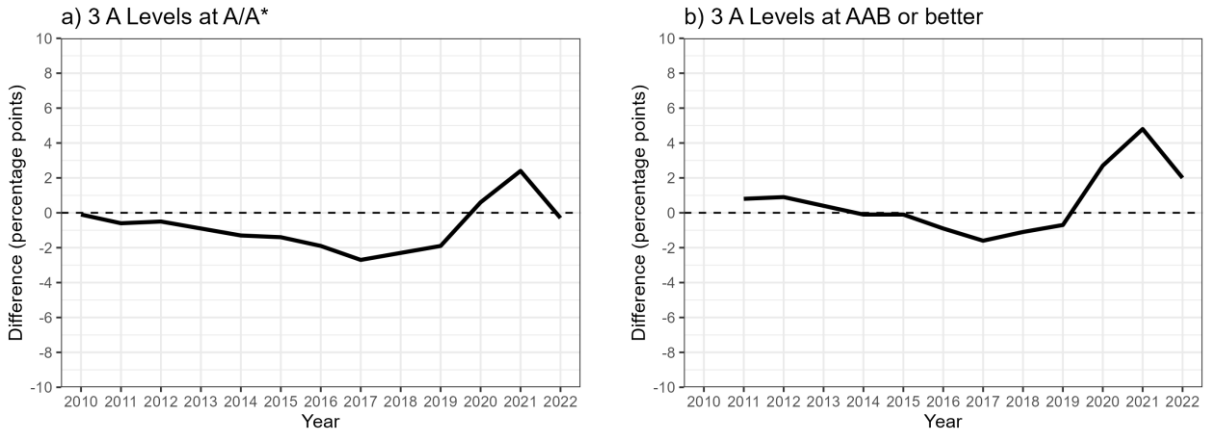

Figure 17. Differences between the percentages of female and male students gaining three high A level grades. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

Table 13. Summary statistics for differences between percentages of female and male students gaining three high A level grades. Statistics are calculated across all years of available data (here, N = 13). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
Three at A or A*	15.2	16.0	-0.8	11.1	12.5	-0.1	30.2	27.8	-2.7
Three at AAB or better	25.1	24.5	0.6	19.1	19.2	-0.1	43.8	39.0	4.8

Participation at ages 16-18

Although post-KS4 destinations have already been assessed, it is also possible to assess differences in participation in education and training for young people aged 16-18, derived from labour market data. Data for these measures extends much earlier than those for destinations, providing more context to temporal trends. Results for these analyses are shown in Figure 18 and Table 14.

The first category, “education and training”, showed a mean gap of 1.6 percentage points in favour of females, with the time series indicating a shift from a male-favoured gap in the mid 1990s. Notably, the gap reached a peak of 3.8 percentage points in 2020. The next category considered was being in employment (i.e., *not* considering part-time jobs alongside education, but considering cases where the main activity was employment). In this case, there was a mean gap of 0.8 percentage points in favour of males, but the time series showed fluctuations and shifts, with the earlier period seemingly showing a stable male-favoured gap, and the later period fluctuating between male-favoured and female-favoured gaps. The final category was Not in Education, Employment or Training (NEET), which showed a mean gap of 0.8 percentage points higher for males, but which actually showed a shift from around 2 percentage points higher for females in the mid 1990s to around 2.5 percentage points higher for males by the late 2010s and early 2020s. Hence, these patterns reinforce earlier analysis showing a growing difference between males and females in routes taken between ages 16 and 18.

Table 14. Summary statistics for differences between percentages of females and males aged 16-18 in different participation categories. Statistics are calculated across all years of available data (here, N = 28). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
All education and training	81.6	80.0	1.6	76.4	74.3	-0.2	88.3	85.9	3.8
In employment only	10.3	11.1	-0.8	5.8	7.0	0.2	14.4	16.1	-2.6
NEET	8.1	8.9	-0.8	5.0	6.9	-0.2	10.9	10.9	-3.0

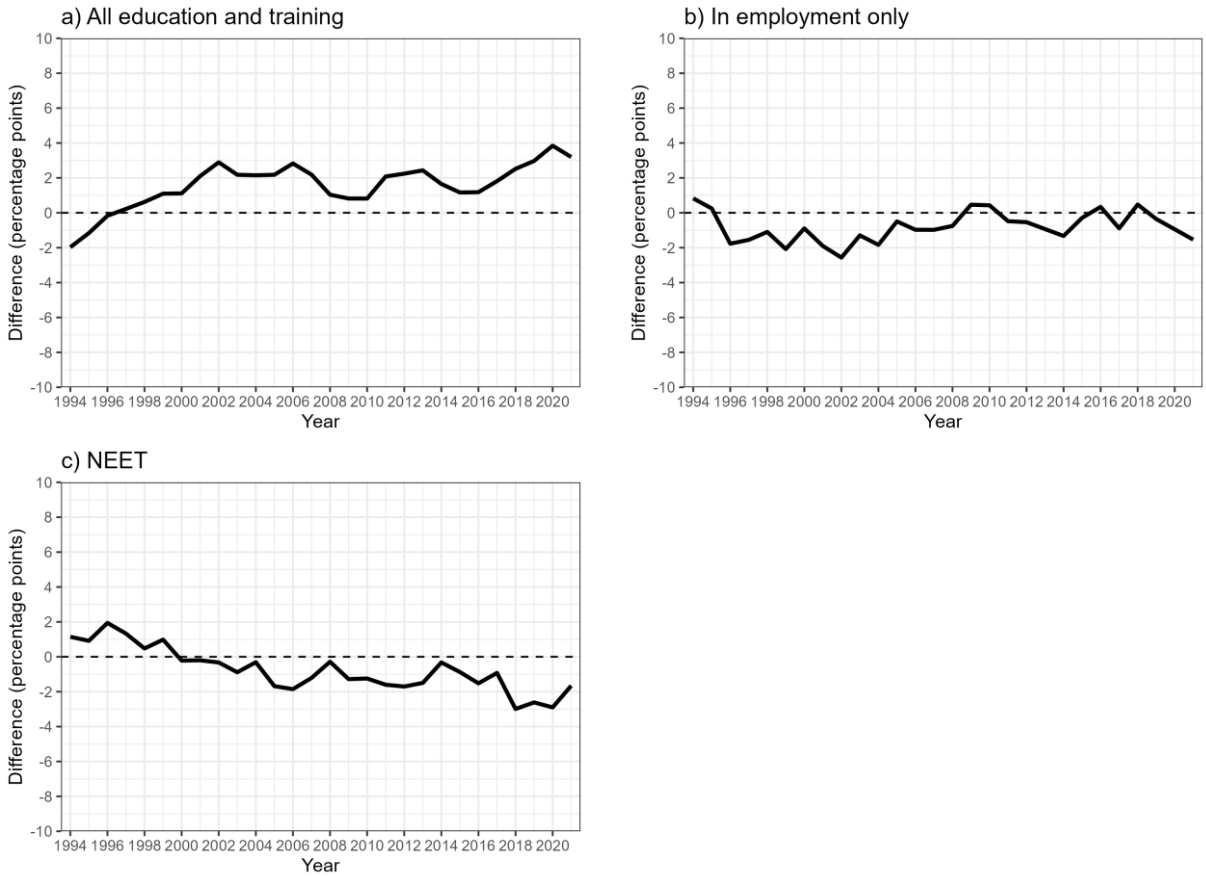

Figure 18. Differences between the percentages of females and males aged 16-18 in different participation categories. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

Post-KS5 destinations

Progression after the age 16-18 period is a particularly important point at which to evaluate differences, as this is the end of mandatory education: this is the stage at which young people will often go into HE or into work. Crucially, then, this is a stage at which sex gaps in subject choice and attainment can manifest real-life impacts. Analysis of post-KS5 destinations is shown in Figure 19 and Table 15. It should be noted that figures here refer only to students taking Level 3 qualifications at state-funded schools and colleges, thus do not include those students taking lower-level qualifications or at independent schools.

Once again, the overall progression rate is the first to look at: here, the mean gap was 3.1 percentage points in favour of females (compared to only 1.1 percentage points for post-KS4 destinations), with the gap growing slightly over the period. The largest sub-category was Education, which again showed a female-favoured gap (mean gap 3.9 percentage points) and which grew from 1.8 to 5.7 percentage points over the period. Within Education, the biggest category was HE, which again showed a female-favoured gap (mean 3.5 percentage points) that grew from 0.9 to 5.9 percentage points. Intriguingly, FE, which post-KS4 showed a male-favoured gap, showed a small female-favoured gap here (mean 0.8 percentage points). Interestingly though, the gap for FE decreased over the period, reaching zero percentage points by 2022. Work showed a similar pattern to FE, with a female-favoured gap overall (mean 1.4 percentage points), which changed from around 2 percentage points higher for females in 2011 to 0.6 percentage points higher for males in 2022. These shifts in FE and Work may reflect, then, a greater proportion of females going into HE rather than taking these other routes. The remaining categories showed male-favoured gaps that increased very slightly over the period: apprenticeships had a mean gap of 2.2 percentage points, no sustained destination showed a mean gap of 2.0 percentage points, and unknown destination showed a mean gap of 1.1 percentage points. Hence, as at KS4, these destinations remained more likely for males than females.

Table 15. Summary statistics for differences between percentages of female and male students progressing from KS5 to different destinations. Statistics are calculated across all years of available data (here, N = 11). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
Overall	89.4	86.4	3.1	87.5	83.9	2.3	90.9	88.0	3.6
Education	62.1	58.3	3.9	59.8	54.5	1.8	64.5	62.1	5.7
Further Education	8.3	7.5	0.8	5.2	4.3	0.0	10.9	10.0	1.6
Higher Education	51.4	48.0	3.5	48.3	46.3	0.9	55.1	51.7	5.9
Work	22.7	21.4	1.4	19.6	19.4	-0.6	24.1	22.9	2.8
Apprenticeships	4.6	6.7	-2.2	2.9	4.5	-1.6	5.8	8.6	-2.9
No sustained destination	7.9	9.8	-2.0	6.5	8.2	-1.7	9.4	11.5	-2.2
Unknown	2.7	3.8	-1.1	2.0	2.6	-0.5	3.2	4.6	-1.6

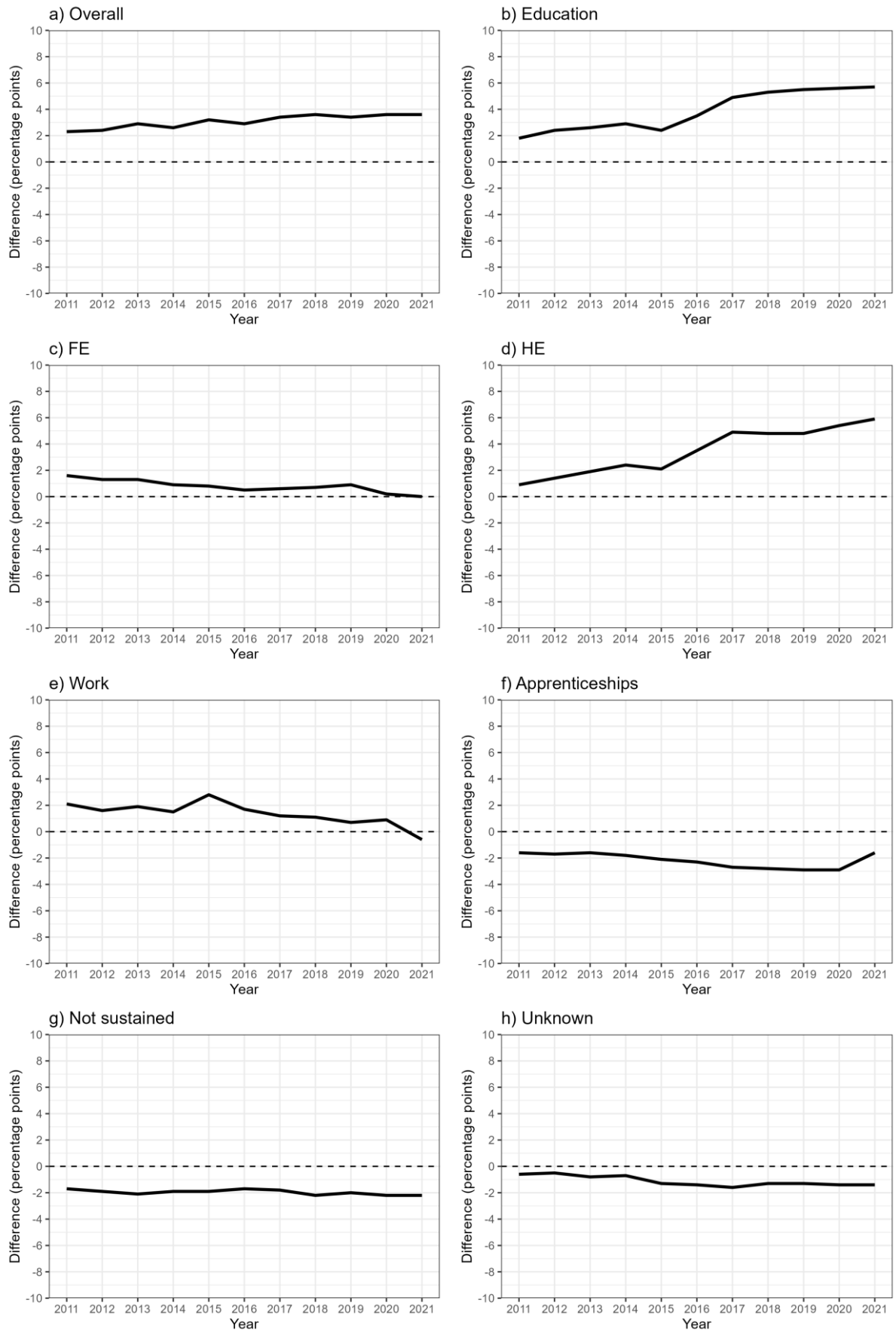

Figure 19. Differences between the percentages of female and male students progressing from KS5 to different destinations. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

Higher Education applications

As indicated above, Higher Education (HE) is now the route taken by around half of young people. Here, I therefore investigate differences in applications to HE, using data from the company that operates the HE application process. For this, I consider two groups of HE institutions: first, all UK institutions, and second, those with an entry tariff in the top third of institutions (i.e., those for the highest attaining students).

Figure 20 and Table 16 show results for all UK institutions. Three panels in Figure 20 show very similar patterns: the total number of applicants, the total number of applications, and the total number of placed applicants (i.e., those taking up a place in an HE institution) all show female-favoured mean gaps of between 12.2 and 12.6 percentage points, and all show slight growth from around 10 to 11 percentage points in 2010 to around 14 percentage points in 2020. To aid interpretation of these figures, it should be noted that data from the census of England and Wales shows that in 2011, of those aged 15-19, 51.1% were male and 48.9% were female; in 2021, the equivalent figures are 51.3% and 48.7%[15]. Accordingly, if HE applications were in proportion to the overall population of 18-year-olds, we might expect gaps of 1 to 2 percentage points in favour of males, rather than the >10 percentage point gaps in favour of females.

A similar pattern is seen for offers, which again show a female-favoured gap that grows over time, from 6.7 to 12.2 percentage points. Hence, the gap in offers is *smaller* than the gap in applicants and applications. If every applicant received an offer, we would expect the gap to be the same size as those for applicants and applications, but the fact it is smaller might indicate that a greater proportion of female applications receive no offer. This is perhaps confirmed by looking at the rate of offers per application, which is, throughout the whole time period, marginally higher for males (mean gap 0.045 offers per application). However, over time the gap in offers per application decreases slightly, reaching from around 0.06 in the early 2010s to 0.026 in 2020.

Table 16. Summary statistics for differences in HE applications between 18-year old females and males, for all UK HE institutions. Statistics are calculated across all years of available data (here, N = 13). A positive value indicates a greater female percentage or rate and a negative value indicates a greater male percentage or rate

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
June deadline applicants (%)	56.3	43.7	12.5	55.5	43.0	11.0	57.0	44.5	13.9
June deadline applications (%)	56.3	43.7	12.6	55.4	43.1	10.8	56.9	44.6	13.8
Offers (%)	54.8	45.2	9.6	53.3	43.9	6.7	56.1	46.7	12.2
Offers per application (rate)	0.735	0.780	-0.045	0.652	0.711	-0.026	0.785	0.811	-0.062
Placed applicants (%)	56.1	43.9	12.2	55.0	42.8	10.0	57.2	45.0	14.4

[15] Data acquired from https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/populationandhouseholdestimatesenglandandwales/census2021

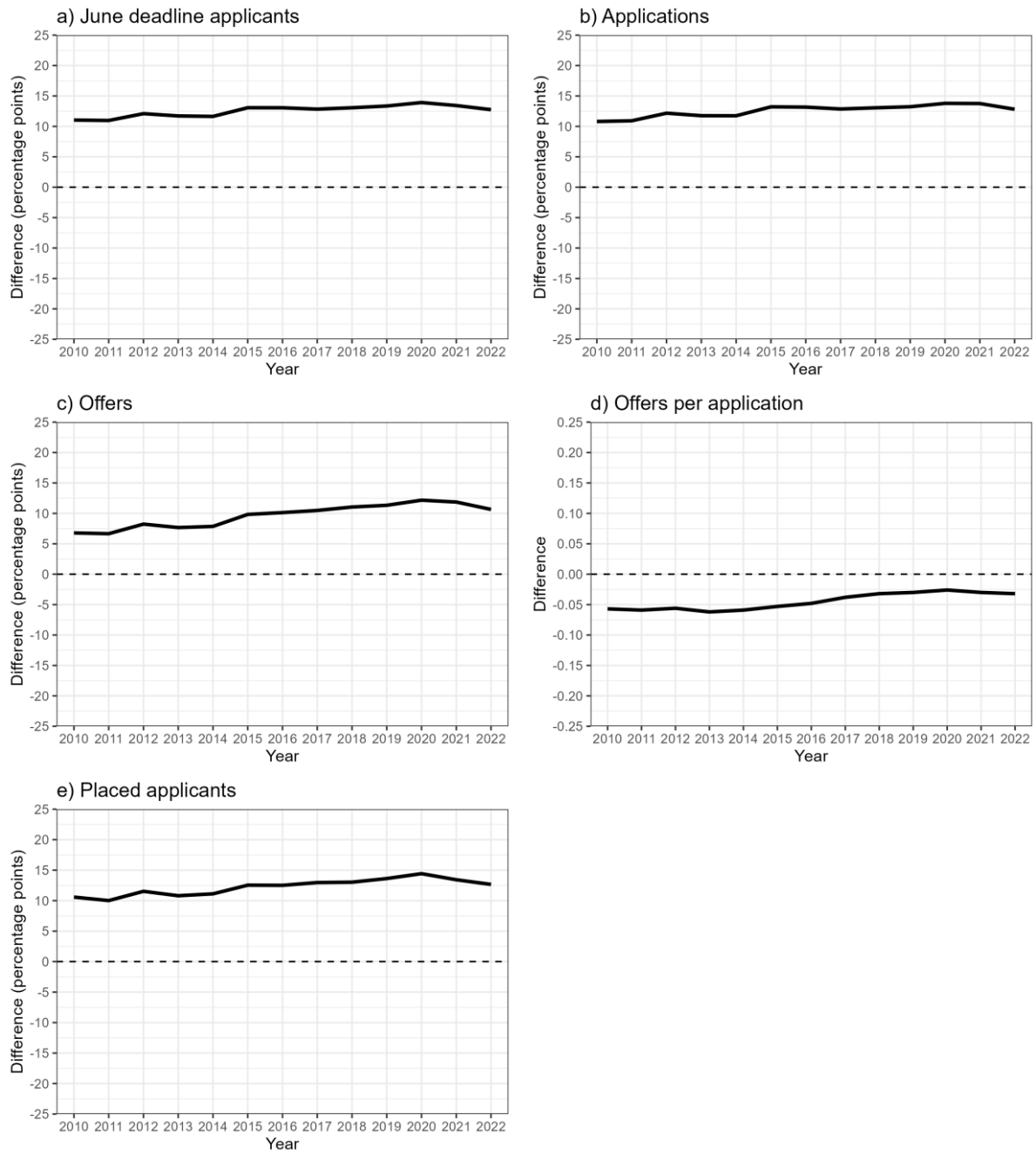

Figure 20. Differences in HE applications between 18-year old females and males, for all UK HE institutions. A positive value indicates a greater female percentage or rate and a negative value indicates a greater male percentage or rate.

Results for higher-tariff institutions are shown in Figure 21 and Table 17. Broadly, the patterns were the same as those identified across all UK institutions, but with some key differences to note. First, the size of the gaps was smaller. The mean gap in applicant numbers was 11.3 percentage points in favour of females (compared to 12.5 across all UK institutions), while that in placed applicants was 10.1 percentage points (compared to 12.2); the gap in number of applications reduced even more, to 8.1 percentage points (compared to 12.6). Despite the slightly smaller gaps though, all continued to show higher rates of HE application from females, with the gap growing over the period concerned. Interestingly, the mean gap in number of offers reduced to 8.0%, which in turn led to the offers per application metric difference reducing to just 0.002. That is, the gap in offers here appears to be driven entirely by the gap in applications, with no major difference in success rates.

The difference between institution types is not the main finding here: the main result is that there is a relatively large gap between males and females in HE applications, with more applicants, applications and offers. When considering application success rates though, males appeared slightly *more* successful. However, the differences all reduced in magnitude when considering the higher tariff institutions, suggesting that some of the large UK-scale differences are driven by female applications to medium- and lower-tariff institutions. The other key pattern to note, across both institution groups, is the shift toward larger female-favoured gaps (or smaller male-favoured gaps), mirroring increases in progression to education seen at earlier stages.

Table 17. Summary statistics for differences in HE applications between 18-year old females and males, for institutions with high entry tariffs. Statistics are calculated across all years of available data (here, N = 13). A positive value indicates a greater female percentage or rate and a negative value indicates a greater male percentage or rate.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
June deadline applicants (%)	55.7	44.3	11.3	54.5	43.2	9.0	56.8	45.5	13.7
June deadline applications (%)	54.1	45.9	8.1	52.7	44.5	5.3	55.5	47.3	11.0
Offers (%)	54.0	46.0	8.0	51.9	44.1	3.9	55.9	48.1	11.8
Offers per application (rate)	0.694	0.695	-0.002	0.612	0.608	0.000	0.745	0.736	-0.019
Placed applicants (%)	55.0	45.0	10.1	53.3	43.4	6.7	56.6	46.7	13.1

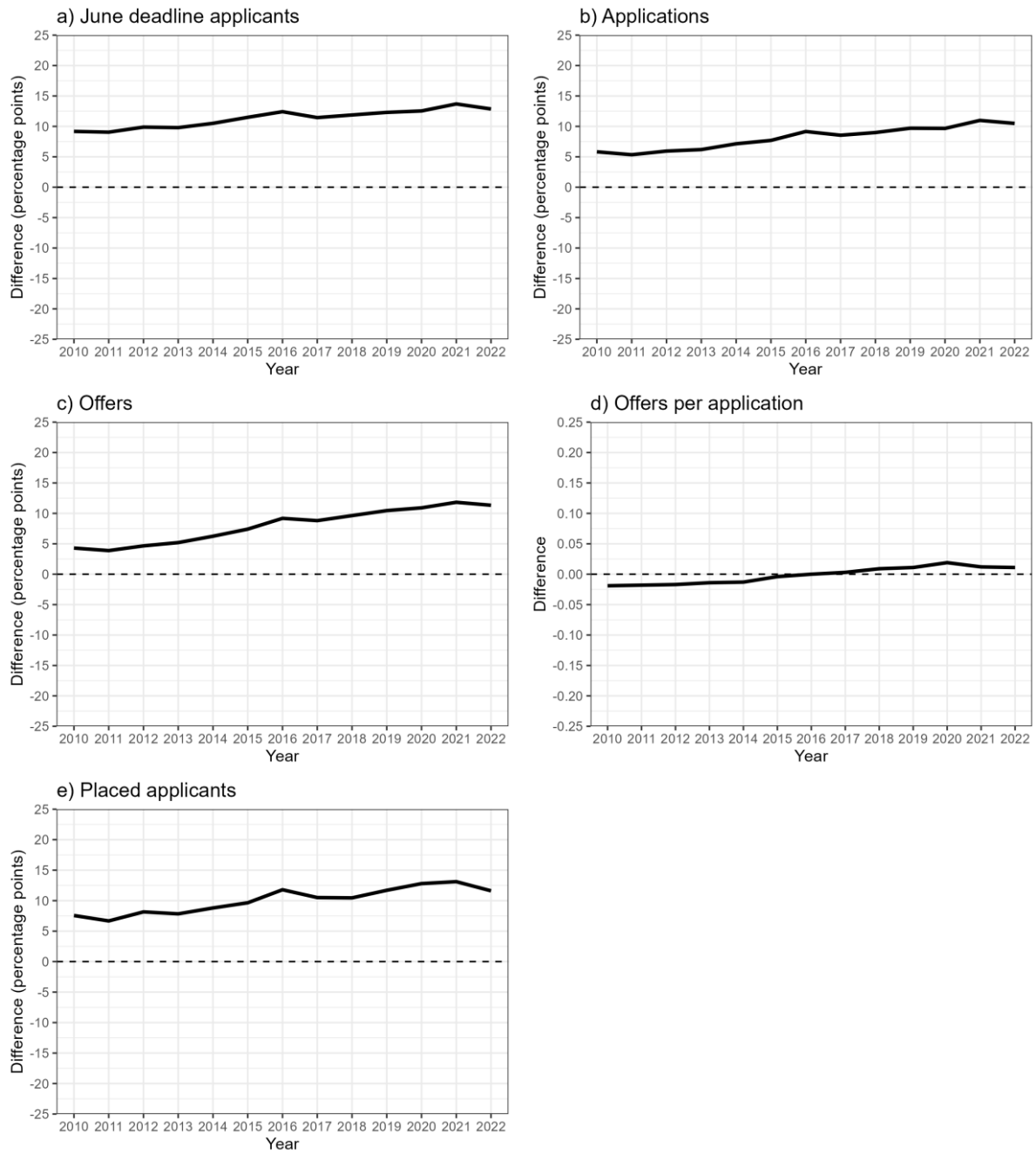

Figure 21. Differences in HE applications between 18-year old females and males, for institutions with high entry tariffs. A positive value indicates a greater female percentage or rate and a negative value indicates a greater male percentage or rate.

Higher Education subject choice

The final types of data considered were those relating to studying in HE, i.e., subject choice and performance in degree courses. I consider subject choice first, with time series of HE enrolments in different subject areas shown in Figure 22 and summary statistics across the years presented in Table 18. Interpretation here is similar to that for A levels, with a difference in total enrolments (panel a of Figure 22) leading to other subjects being assessed relative to this baseline, rather than the baseline of exactly equal enrolments and a difference of zero percentage points.

Results indicated that most subject groups showed relatively large gaps, in varying directions. The largest female-favoured gaps were seen for Education and Teaching (72.8 percentage point mean difference), Psychology (62.8 percentage point mean difference), Veterinary Sciences (62.2 percentage point mean difference) and “Subjects Allied to Medicine” (61.5 percentage point mean difference). The largest male-favoured gaps were seen for Computing (68.5 percentage point mean difference) and Engineering and Technology (60.7 percentage point mean difference). The direction of gaps matched those seen at earlier stages, with male-favoured gaps for maths, computing, engineering, physical sciences and business, and female-favoured gaps for psychology, social sciences, languages, and arts/creative subjects. Two groups showed female-favoured gaps that were less than would be expected from overall enrolments: Geography, Earth and Environmental Studies had a mean gap of 4.2 percentage points in favour of females (compared to 11.6 across all enrolments), and Historical, Philosophical and Religious Studies showed a mean gap of 9.9 percentage points, coming closest across all groups to the overall gap size.

There were few clear patterns in temporal trends, and detection of such patterns was complicated by the reclassification of subject groupings in 2019, making comparisons before and after this point more difficult. However, some notable patterns included growing female-favoured gaps in Medicine and Dentistry, Social Sciences, and Veterinary Sciences, and shrinking male-favoured gaps in Computing and Physical Sciences. Hence, there were some apparent changes in subject choices over this period, with most reflecting increased female uptake.

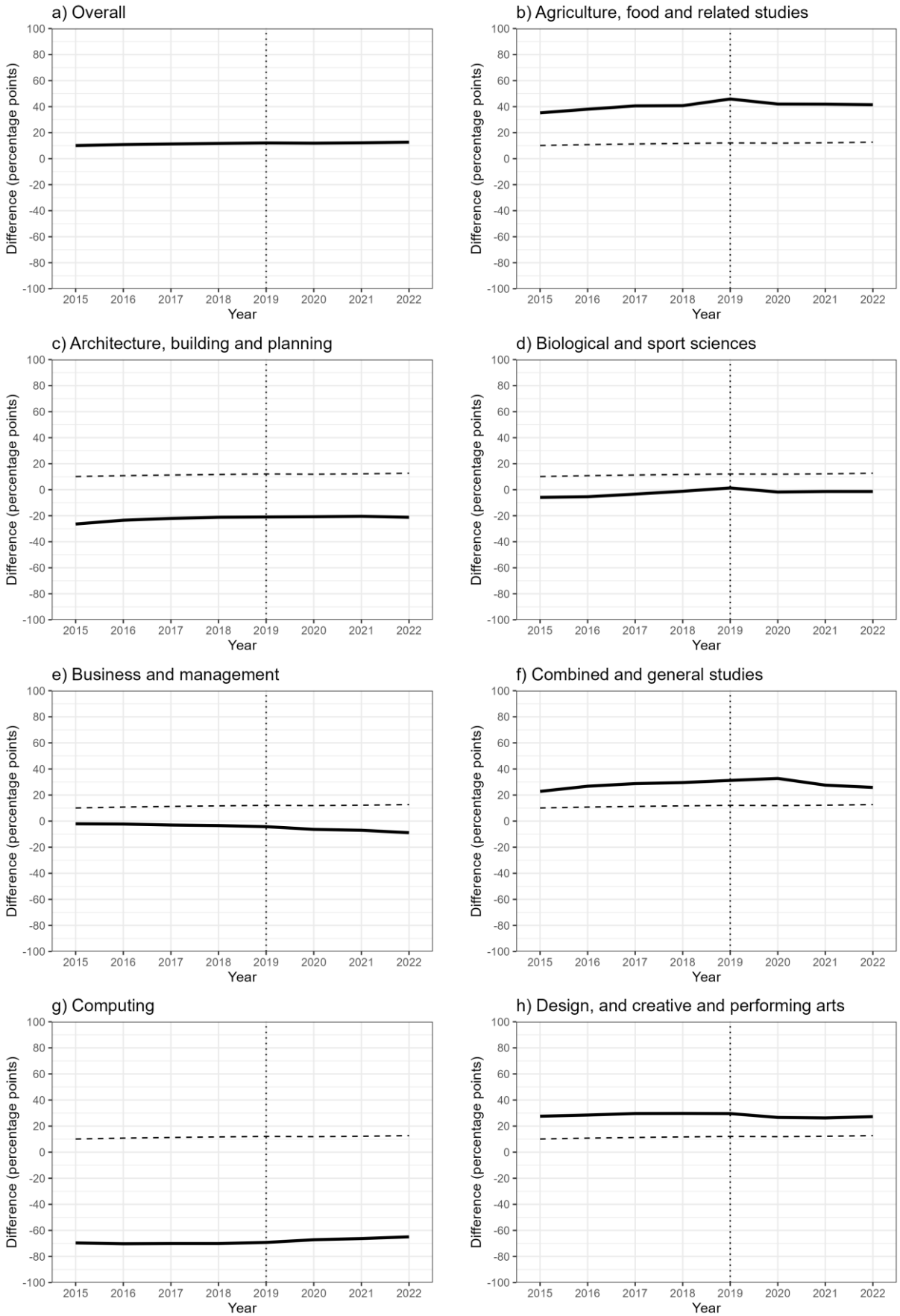

Figure 22. Differences between the percentages of female and male enrolments in different HE subject groups. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage. The dashed line indicates the difference in enrolments across all subjects (as in panel A). The dotted vertical line indicates the year in which subject classifications changed.

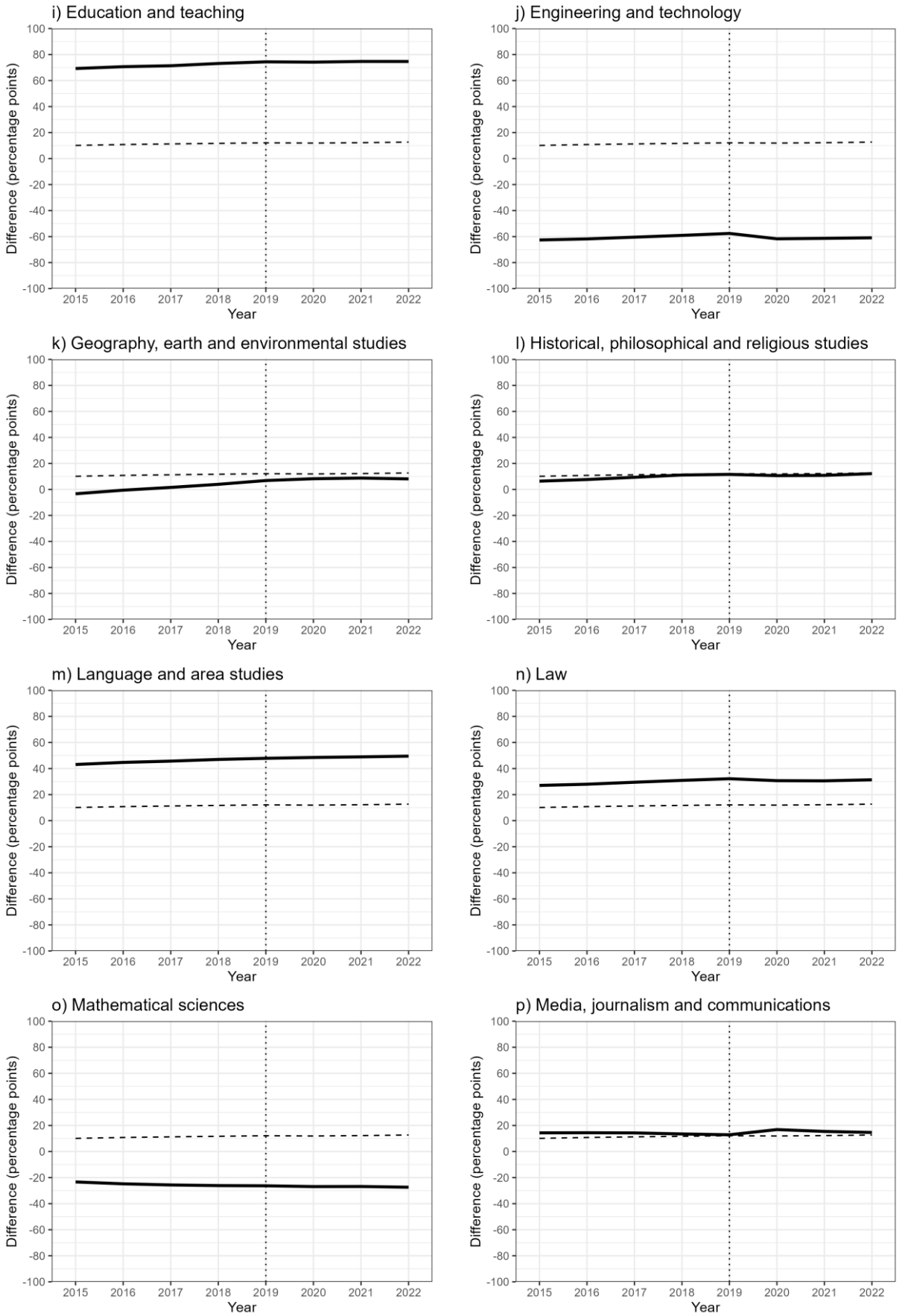

Figure 22 (continued).

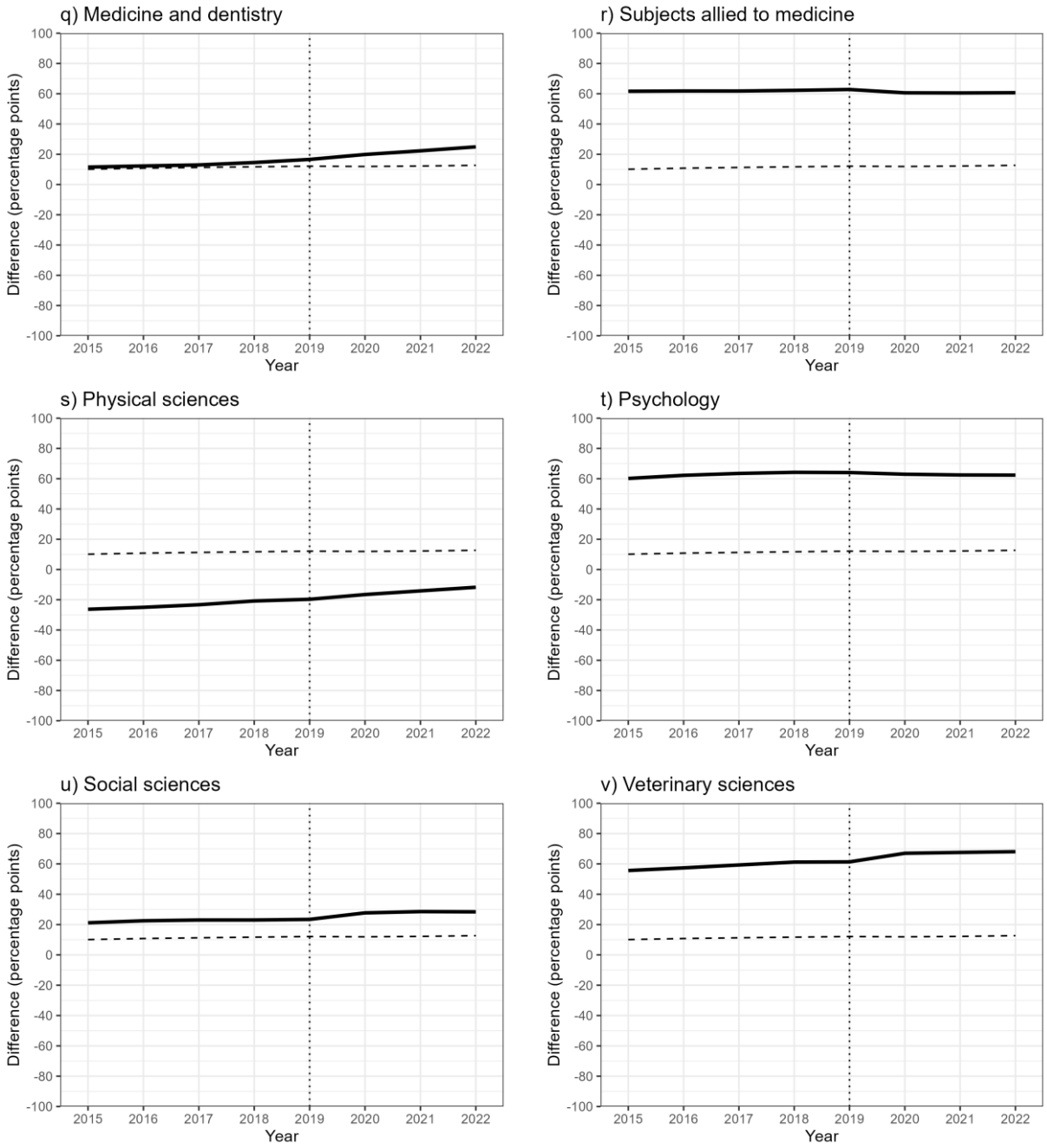

Figure 22 (continued).

Table 18. Summary statistics for differences between female and male students in HE enrolments. Statistics are calculated across all years of available data (here, N = 8). A positive difference value indicates a greater female percentage and a negative value indicates a greater male percentage. The table is sorted in order of mean difference, from the largest female-favoured difference to the largest male-favoured difference. The dashed line indicates the position of the 'total' difference.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
Total	55.8	44.2	11.6	55.1	43.7	10.1	56.3	44.9	12.7
Education and teaching	86.4	13.6	72.8	84.6	12.6	69.3	87.4	15.4	74.7
Psychology	81.4	18.6	62.8	80.1	17.9	60.2	82.1	19.9	64.2
Veterinary sciences	81.1	18.9	62.2	77.8	16.0	55.6	84.0	22.2	68.1
Subjects allied to medicine	80.8	19.2	61.5	80.3	18.6	60.5	81.4	19.7	62.8
Language and area studies	73.5	26.5	46.9	71.5	25.2	43.1	74.8	28.5	49.5
Agriculture, food and related studies	70.4	29.6	40.7	67.6	27.1	35.2	72.9	32.4	45.9
Law	65.0	35.0	30.0	63.5	33.9	27.0	66.1	36.5	32.2
Combined and general studies	64.1	35.9	28.2	61.4	33.6	22.8	66.4	38.6	32.7
Design, and creative and perf. arts	64.1	35.9	28.1	63.1	35.1	26.2	64.9	36.9	29.7
Social sciences	62.4	37.6	24.7	60.6	35.7	21.2	64.3	39.4	28.5
Medicine and dentistry	58.4	41.6	16.9	55.8	37.6	11.5	62.4	44.2	24.9
Media, journalism and communications	57.3	42.7	14.5	56.4	41.6	12.8	58.4	43.6	16.8
Historical, philos. and religious studies	55.0	45.0	9.9	53.2	43.9	6.4	56.1	46.8	12.2
Geography, earth and env. studies	52.1	47.9	4.2	48.3	45.6	-0.6	54.4	51.7	8.7
Biological and sport sciences	48.8	51.2	-2.4	47.1	49.3	-1.2	50.7	52.9	-5.9
Business and management	47.7	52.3	-4.6	45.6	51.0	-2.1	49.0	54.4	-8.9
Physical sciences	40.2	59.8	-19.7	36.9	55.9	-11.8	44.1	63.1	-26.3
Architecture, building and planning	39.0	61.0	-22.1	36.8	60.2	-20.5	39.8	63.2	-26.4
Mathematical sciences	37.0	63.0	-25.9	36.3	61.7	-23.3	38.3	63.7	-27.4
Engineering and technology	19.7	80.3	-60.7	18.7	78.8	-57.6	21.2	81.3	-62.6
Computing	15.8	84.2	-68.5	14.9	82.5	-64.9	17.5	85.1	-70.3

Higher Education degree classifications

The final area considered was performance in undergraduate degrees: results for this are shown in Table 19 and Figure 23. Subject-level breakdowns were not available here, so results reflect degree classifications awarded over all subjects. Note also that unlike earlier analyses, data on degree classifications was not reported cumulatively, so values correspond to the percentages obtaining the actual classification, *not* that classification or better.

The highest degree classification is a first class honours: this showed a mean female-favoured gap of 1.5 percentage points, but with Figure 23 showing how this grew from 0.2 percentage points in favour of males in 2015, to 3.0 percentage points in favour of females by 2022. After this, upper second class honours also showed a female-favoured mean gap of 3.0 percentage points, but with this reducing from 5.1 percentage points in 2015 to as low as 0.7 percentage points in 2021. Together, these patterns may reflect female students gaining more first class degrees instead of upper second class degrees. Conversely, lower second class (3.4 percentage point mean gap) and third class degrees (1.3 percentage point mean gap) showed male-favoured gaps that were more stable over time (although the third class degree gap did reduce slightly). Only Unclassified degrees showed virtually no gap. Hence, the attainment gaps seen at every other stage of education examined were also seen in undergraduate degree classifications, with female students gaining, proportionally, a greater share of the top classifications and a smaller share of the lower classifications.

Table 19. Summary statistics for differences in HE degree classifications between male and female students. Statistics are calculated across all years of available data (here, N = 8). A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

Subject	Mean			Minimum			Maximum		
	F	M	Diff	F	M	Diff	F	M	Diff
First class honours	28.5	26.9	1.5	21.0	21.3	-0.2	36.7	33.9	3.0
Upper second class honours	47.7	44.8	3.0	44.9	44.0	0.7	50.1	45.4	5.1
Lower second class honours	15.9	19.3	-3.4	11.9	14.9	-2.8	19.7	23.0	-3.8
Third class honours	2.8	4.1	-1.3	1.9	2.7	-0.7	3.5	5.2	-1.7
Unclassified	5.0	4.9	0.2	4.5	4.3	0.1	5.7	5.6	0.3

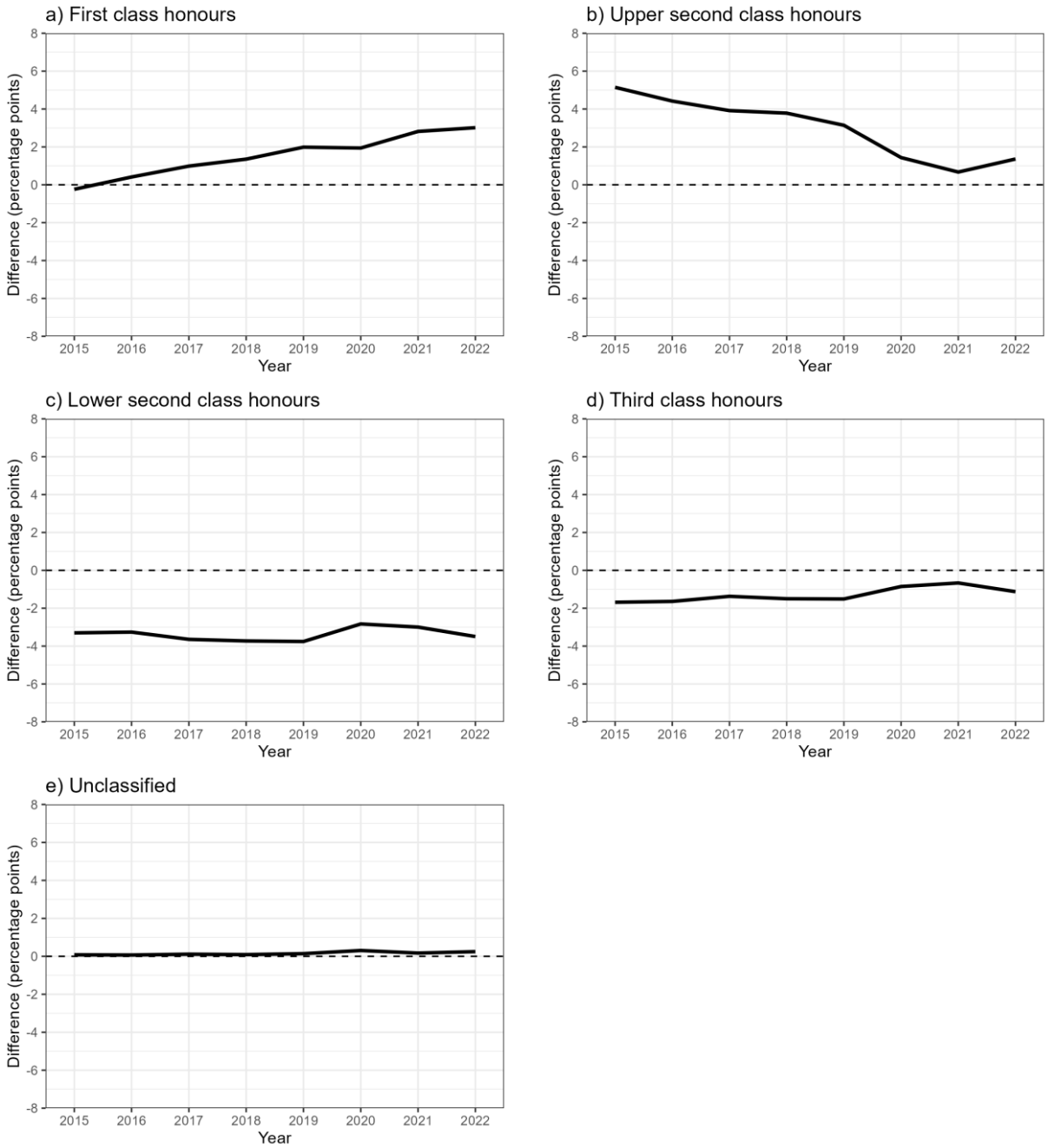

Figure 23. Differences between the percentages of female and male students gaining different degree classifications. A positive value indicates a greater female percentage and a negative value indicates a greater male percentage.

Discussion

This research aimed to compile evidence from publicly available data of the presence, persistence and magnitude of educational gaps between males and females. The purpose was to document patterns, rather than attempt to explain them. Therefore, in this section I seek to take a view across the patterns identified in the results above to highlight emergent findings.

The presence and persistence of differences

Perhaps the most striking pattern from the analysis was that sex gaps were present from the earliest stages of education to the latest. Teacher assessments carried out during EYFS showed higher percentages of females meeting expectations, while female undergraduates attained higher percentages of first-class degrees. Between these two end-points of the education system, gaps persisted in the same direction. Hence, sex gaps were not only *present*, but also highly *persistent*. Given the highly variable nature of metrics examined here, from teacher assessments of developmental areas to performance in standardised tests, it is not possible to meaningfully compare the magnitude of the gaps over time, but the continued presence of the gaps is notable in itself, and suggests a continuation of the gaps identified and reported previously (e.g., Arnot & Phipps, 2003; Cavaglia et al., 2021; Machin & McNally, 2005).

In interpreting the persistence of gaps, we must be mindful of the changing nature of the assessments over the course of a young person's education. In EYFS and KS1, progress against learning and development goals is entirely teacher-assessed, with externally set written tests introduced in KS2 and becoming the main form of assessment by GCSE and A level; in HE, assessment methods differ between courses and universities. The fact that gaps are seen under all of these assessment methods, could be seen as showing the patterns to be robust. Conversely, the fact that the earliest gaps are based on teacher assessment, which are known to favour female students (e.g., Angelo & Reis, 2021; Protivinsky & Munich, 2018), could indicate that early differences in perception sow the seeds of different educational experiences, in turn *leading to* the differences seen in later external tests (e.g., Protivinsky & Munich, 2018; Terrier, 2020). Indeed, one line of evidence in support of this latter interpretation is the way that female-favoured attainment gaps *increased* during Covid-affected years, whilst male-favoured gaps *decreased*: the shift to teacher assessment directly influenced the size, and even direction, of the observed gaps. Hence, the interaction between method of assessment and the presence – and in turn the persistence – of gaps should be considered when interpreting results.

The direction of gaps

A remarkably consistent pattern was that, as expected, attainment gaps almost always showed higher female attainment. Even in EYFS and KS1, where the assessments measure development or progress rather than attainment, higher percentages of females were found to meet or exceed expectations. Such differences did not appear to diminish with time spent in education: by the time undergraduate degrees are awarded, 16-17 years after EYFS and KS1, a greater percentage of female students achieved first class degrees. This therefore reinforces a pattern of higher female attainment, seen in studies from around the world and over many years (e.g., Cavaglia et al., 2021; Encinas-Martín & Cherian, 2023; Evans et al., 2021).

Perhaps the best stage to assess the direction of gaps reflecting true attainment is at GCSE, where participation in general education is still compulsory, and results are intended to reflect

the culmination of two years of work across a range of subjects. Considering mean differences over the years analysed, only five subjects showed a male-favoured gap overall: Maths, Economics, Physics, Ancient History and the 'Other Sciences' group. Moreover, the magnitude of the male-favoured gaps was often smaller than many of the female-favoured gaps. Hence, across nearly all subjects, female students obtained higher grades than males, with the pattern seen both at high levels of attainment (grade A/7 or above) and moderate levels of attainment (grade C/4 or above). Even at the lowest attainment levels, i.e., gaining *any* GCSE grade, female students showed higher attainment, albeit the differences were often much smaller at only a fraction of 1 percentage point in most cases.

At A level, filtering of the population has occurred, such that only relatively high attainers are represented. Under such circumstances it might have been reasonable to expect reduced attainment gaps, but that did not happen: instead, female-favoured gaps continued to be seen at both high and low attainment levels. Interestingly, however, the subjects showing male-favoured gaps included several of those taken by relatively *few* males, notably Modern Foreign Languages. This suggests that at this stage, the relatively few males taking these subjects are relatively high attainers, such that the cohort-level attainment increases. Intriguingly, when considering attainment across the three A level subjects taken, a higher percentage of males achieved three A or A* grades, which may reflect the filtering out of lower attainers, or may reflect some effect of subject choice, with male students choosing just those subjects they are likely to perform well in. The main finding, however, is that even after accounting for differential progression to A level, female students still, on average, achieved higher grades than males in most subjects.

One subject that showed a different pattern across all age groups was Maths. From EYFS assessments to A level grades, attainment at the highest levels showed gaps in favour of males. This was not seen at lower or moderate attainment levels, where the gap was still female-favoured (or, at KS2, roughly equal). Nevertheless, whether the "exceeding expectations" level at EYFS, or A/A* grades at A level, higher percentages of males were seen to achieve these standards. Hence, once again following the patterns established in existing literature (e.g., Bahar, 2021; Encinas-Martín & Cherian, 2023), Maths behaved differently from every other subject or area of learning assessed.

Differences in subject choice

From GCSE onwards, students can choose the subjects they study, opening up another front of possible sex differences. And, here, substantial differences were found in the subjects chosen by male and female students. At GCSE, subjects with larger percentages of female students were primarily arts, social sciences and languages, while those with larger percentages of male students were primarily sciences, technology, classical subjects, and business. And moving beyond GCSE, these patterns were largely repeated at A level and even undergraduate level, albeit with some variation at these later stages. For example, at A level, Music showed a greater percentage of male students, while in HE, Medicine and Dentistry showed a greater percentage of female students. Nevertheless, overall, the differences largely aligned with 'traditional' subject groupings, and patterns seen in previous analyses were largely repeated here (e.g., Francis, 2000; Whitehead, 1996).

The size of the gaps was also notable here. At GCSE, most gaps were relatively small, with 21 of the 36 subjects analysed showing a gap of ≤10 percentage points, and only 2 of the subjects

showing gaps ≥50 percentage points. By A level, only 4 of 31 subjects had gaps ≤10 percentage points, and 3 had gaps ≥50 percentage points. By HE, 4 of 21 subject groups had gaps of ≤10 percentage points and 6 had gaps ≥50 percentage points. This pattern of *growing* gaps probably reflects the reduction in constraints over time. Most young people take GCSEs, and at this stage certain subjects (Maths, English, Science) are compulsory, and taking certain others (those in the EBacc) is strongly encouraged. Schools themselves may also have constraints, such as requirements to take one of the humanities or a language. Moreover, as students often take eight or more GCSEs, there are opportunities to maintain a fairly broad curriculum. In post-16 education, A levels are not compulsory, there are no subject constraints, and typically only three subjects are studied, dramatically increasing the role – and necessity – of choice. Additionally, A levels determine future options for HE, thus there is a strong incentive to specialise. By HE, a single course must be chosen and the A level subjects chosen constrain the options available. Accordingly, the loss of constraints over time, combined with the need to specialise, is likely to be responsible for the increased sex gaps observed.

As noted above, many of the differences persisted over the years analysed. One set of gaps that *decreased*, however, was in uptake of science subjects. At GCSE, all of Biology, Chemistry and Physics started the time series with a male-favoured gap of around 10 percentage points; by 2022 they had gaps of around 0 percentage points. At A level, Biology started with a gap of around 10 percentage points in favour of females, which increased to around 30 percentage points; Chemistry started with a gap of around 5 percentage points in favour of males, which changed to a gap of around 10 percentage points in favour of females (approximately the same as the difference in entries across all subjects); Physics, conversely, showed gaps in favour of males of 50 to 60 percentage points across all years. At HE, Biological Sciences changed from a gap of around 5 percentage points in favour of males to close to 0 (although the gap across all enrolments was around 10 percentage points in favour of females); Physical Sciences showed gap of around 25 percentage points in favour of males in 2015, which decreased to around 10 percentage points by 2022. A key science-related subject group, Medicine and Dentistry, showed a shift from 10 percentage points in favour of females to around 25 percentage points in favour of females. Hence, other than Physics A level, all sciences showed shifts toward females, either becoming less male-dominated or (in the case of Biology A level and Medicine and Dentistry degrees) more female-dominated. There have long been concerns about numbers of females in STEM subjects and associated initiatives to address this, so the results here suggest that in *some* STEM subjects these efforts may be bearing fruit.

When considering STEM subjects, however, we must also consider Maths and Engineering. At GCSE, Maths is compulsory, so showed almost perfect equality throughout the years analysed. Design & Technology though, a precursor to engineering-related subjects, showed a gap increasing from around 0 in 2010 to 20 percentage points in favour of males by 2022. At A level, Maths showed a gap of around 20 percentage points in favour of males that slightly increased over time, whilst Further Maths showed a gap of around 40 percentage points in favour of males that also slightly increased. Design and Technology A level showed a gap that increased from around 10 percentage points in favour of males in 2010 to around 40 percentage points in 2022. At HE, Mathematical Sciences showed a slightly increasing gap over time, from just over 20 percentage points in favour of males in 2015 to almost 30 percentage points in 2022, and Engineering and Technology showed a largely stable gap of around 60 percentage points in favour of males. Hence, the shifts toward females seen in sciences were not seen in maths and engineering. Indeed, the subjects became *more* male-dominated, contrasting with overall

patterns of A level and HE participation. Further research into these patterns may therefore seek to explore how sciences differ from technology, engineering and maths, and what the possible implications are for future labour markets.

Participation gaps

The final pattern to discuss relates to participation in education, and the *types* of education undertaken. As already noted, GCSEs are taken by almost all young people in England, so differences in entries are small and largely reflect population-level demographic differences. After age 16 though, when students can choose their next steps (subject to constraints imposed by performance at GCSE), gaps immediately emerge. Females were more likely to progress to some form of education, and within that more likely to study academic qualifications in school sixth forms or sixth form colleges; males were more likely to progress to FE colleges or apprenticeships, but were also more likely to go into work or to become classed as NEET (not in education, employment or training). Note that this greater likelihood of males dropping out of education is not unique to England, with cross-country studies showing similar patterns (Encinas-Martín & Cherian, 2023). Even accounting for this filtering, students leaving KS5 showed similar progression gaps, with females more likely to go on to HE, FE or work, and males more likely to go on to apprenticeships or to have no sustained destination. Perhaps the more concerning aspect of these findings is that the gaps largely showed *increased* over time. The gap in progression to sixth form at age 16 increased from 6 to 9 percentage points in favour of females, while that in progression to FE increased from 2 to over 4 percentage points in favour of males; that for no sustained destination increased by around 1 percentage point over the period analysed. Likewise, the gap in progression to HE at age 18 increased from around 1 percentage point in favour of females to 6 percentage points by 2022, and the gap in progression to FE at 18 decreased from around 2 percentage points in favour of females to 0. Hence, these patterns suggest that after compulsory general education ends, there are growing gaps, with females increasingly likely to stay in education and in *academic* education, and males increasingly likely to go into *vocational* education or to lose engagement with education and training altogether. These shifting patterns may well have labour market and skills impacts, so the drivers, and possible implications, should be considered further.

Methodological caveats

It is important to note that the gaps identified here are subject to various methodological caveats, so exact numbers should be treated with caution. Perhaps the main caveat is that no further demographic data was available for analyses, thus unobserved differences could have contributed to the gaps identified. For example, if there was an uneven distribution of socioeconomic status, special education needs, month of birth, or various other factors that can influence attainment, at least part of the gaps identified might be attributable to those factors. This may, however, be unlikely, given the large numbers of young people included in the data: we may reasonably assume a broadly even distribution of these other variables between males and females. Nevertheless, previous analyses have shown that gaps between male and female students are smaller than those between students with or without eligibility for free school meals, and that gaps are larger or smaller in different ethnic groups (Skelton et al., 2007), so the absence of these variables here means that the full complexity of gaps cannot be described.

The above point relates to a similar one about of gaps in general: the nature and size of attainment gaps can change over the distribution of the underlying values. For example, female students might outperform males at the top grades, but the gap may be smaller, or even in the

opposite direction, at lower grades. This is avoided here, to some extent, by considering attainment at multiple grades, all of which show largely the same pattern, but even this will miss some complexity; Bramley et al. (2015) tackled this issue by also analysing the raw marks underlying the awarded grades, but such data was not available here. Further, there are similar issues with understanding gaps over time: the percentages of young people classed as NEET shown in Table 14 and Figure 18 show a mean gap of 0.8 percentage points higher for males, but this masks a shift in the direction of the gap over the years considered. Although time series are reported along with summary statistics for every metric analysed here, the need to summarise and simplify gaps for interpretation can, and will, lead to the loss of sometimes-important complexity.

A further caveat comes from the way that years of data have been combined to create time series. Most of the time series were created by combining individual years of data, which may have been collected in differing ways. In some cases, such as the HESA data, there were documented changes part-way through the timeseries that could be accommodated to some degree (in that case, subject classifications were changed), whilst in other cases, such as EYFS tests, changes meant that gaps had to be left due to incomparable data. But these are the documented changes that permitted appropriate action to be taken: other datasets may well have included changes that were not explicitly documented and, thus, which were not accounted for in analysis. Such changes could introduce artefacts such as discontinuities into the timeseries, meaning that some caution should be applied when interpreting results. However, it is unlikely that these types of changes would influence longer-term trends, so they should not affect overall conclusions.

Other methodological caveats are described in the Methods section so are not detailed further here. However, the main point to note here is that the analysis is relatively simplistic, but describes complex phenomena, bringing together personal, social, cultural and political influences. The aim of this research was to provide simple, quantitative findings, and this should be remembered when interpreting results: these can indicate, at a coarse level, what is happening, but for deeper, more comprehensive understanding of any of the results, further, more focused work would be required.

Caveats on interpretation

Along with acknowledging caveats in the methods employed here, we must also be cautious in interpreting the findings. The fact that the patterns appear to be consistent in direction and persistent over time could lead to a sense that *something* must be done to promote more equal outcomes. However, if actions were to be taken, it would be vital to consider the evidence in light of various pitfalls that have been described before that could, if not acknowledged, lead to responses having limited, or even harmful, effects.

Oates (2007) describes several “myths” surrounding sex differences in education that remain highly pertinent for interpreting findings here. First, as described earlier in the report, educational sex differences are not new and are not only a product of the English education system; these are long-standing patterns that are found around the world. Oates (2007) also notes that the observed differences are not solely a product of the education system: this view may be supported by the findings relating to Early Years stages, a point at which children have had little engagement with formal education. A crucial “myth” to be considered is the idea that sex differences are the most important in the education system, with Oates (2007) listing social

class, ethnicity and poverty as examples of factors shown to have a greater impact on outcomes; note that this mirrors arguments made by Skelton et al. (2007). That is not to say the effects are unimportant, but it is crucial to maintain perspective, especially given the extent of media attention paid to sex differences. Oates (2007) also cautions against making striking changes to teaching and assessment in an attempt to aid male students: careful study and understanding of pedagogy, assessment models, learning approaches, and even culture, is required to understand how these issues might influence gaps. Finally, and perhaps most importantly, Oates (2007) points out that apparent advantages shown by females in education are not necessarily carried through to employment, with gaps in pay, opportunities and utilisation of skills still common in the labour market.

The aim of this section is not to undermine the findings in the report. Instead, it seeks to urge caution when considering how to interpret and respond to the findings. By carefully considering the observed gaps in outcomes, along with how they fit into the wider education system and, indeed, the wider economy, it may be possible to identify routes forward. It might be possible to identify actions that would prove beneficial in some way, but the path to this is not simple, and any such attempts would have to engage with the complexities involved to avoid pitfalls that could, as noted, render changes ineffective or harmful.

Conclusions

The analyses conducted here are intended primarily to document the presence, direction, and temporal trends in sex gaps in education. In all stages analysed, gaps were present, from the earliest entry to the education system to outcomes of HE qualifications. The gaps primarily showed higher female attainment, and higher female participation in academic education. Subject choices showed gaps along ‘traditional’ lines, which increased in magnitude from GCSEs to A levels to HE. Some subject uptake gaps, most notably those in sciences, had decreased over the period analysed, but others, such as those in technology and maths, increased or remained stably high. Hence, the main summary of findings is that sex gaps in education are much the same as ever, with some even appearing to get worse rather than better. There may be no ‘right’ level of balance for participation, subject choice, or even attainment, but the patterns highlighted here will all have social and economic implications, and these, along with the underlying drivers of the differences – the social, cultural and personal factors that influence decisions – should be considered as part of any discussions about the future of education as it recovers from the disruptions of recent years.

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Addendum: 2023 gaps

The analyses presented in the main report were conducted before the August publication of 2023 GCSE and A level results. Although the report itself was published after the release of results, the main datasets used for analysis of GCSE and A level uptake and attainment, which are collated by the Department for Education, are typically not available for several months after results are released to candidates. Consequently, main analyses could not be updated to include 2023 data. However, the Joint Council for Qualifications (JCQ) release aggregated provisional results on the same days that results are released to candidates. In the main report, a decision was taken to focus on DfE data instead of JCQ data due to the wider range of subjects for which data was available, but JCQ data was still analysed and showed very similar patterns to the DfE data. Hence, to gain an understanding of sex gaps in 2023, JCQ data can be analysed, albeit acknowledging that results may not be directly comparable to those in the main analysis, and that fewer subjects are available. This addendum therefore reports simple estimates of the gaps seen in 2023 for subject uptake and attainment in GCSEs and A levels, using provisional results released by JCQ (available at https://www.jcq.org.uk/examination-results/).

The methods used were similar to those in the main report, but this analysis focused just on gaps in 2023, rather than looking at the whole timeseries. For each subject, the percentages of males and females taking the subject, or receiving one of the focal grades (GCSE grades A/7, C/4 and G/1, or A level grades A and E) were taken from the JCQ data. These were used to calculated simple gaps, in percentage points. To contextualise the size of gaps, they were compared to equivalent gaps from both 2019 (the last year in which ‘normal’ examinations were held before Covid-related disruption), and 2022 (in which examinations were held, but with outcomes intermediate between ‘normal’ conditions and the higher-than-typical outcomes of 2020 and 2021) to give a gap ‘change’ value. These gaps and change values took the same direction as gaps in the main report: positive gaps indicated higher female percentages and negative gaps indicated higher male percentages; positive *change* values indicated the gap had grown more female-favoured or less male-favoured, while negative change values indicated the gap had grown more male-favoured or less female-favoured. The aim of the analysis was not, then, to produce figures directly comparable to those in the main report, but to indicate the size of gaps, and the directions of any change in gap size. This should provide a snapshot of the state of gaps in 2023, but full analysis of the DfE data, once released, would be required to make firmer conclusions.

2023 GCSE results

Table A 1 shows subject uptake gaps for GCSEs awarded in 2023. Unlike the long-term average observed in the main report, there was a small male-favoured gap overall; this was more male-favoured than either 2019 or 2022, as indicated by negative change values for each year. It is unclear whether this reflects a shift in the underlying population, or a change in entry patterns. As in main results, the largest female-favoured gaps were seen for Social Sciences, Drama, Art and Design, and Modern Foreign Languages. The largest male-favoured gaps were again seen for Computing, Economics, PE, Business, and Design and Technology.

The largest *change* in gap relative to 2019 was seen for Media, Film and TV Studies, which increased by nearly 12 percentage points, shifting from male-favoured to female-favoured. Drama also became more female-favoured relative to 2019, with an increase of 7 percentage points. The large male-favoured change relative to 2019 was seen in Music, which moved 9 percentage points toward males but remained slightly female-favoured. Economics, which showed one of the largest male-favoured gaps, showed that the gap had increased by 5.7 percentage points since 2019. Changes in gap relative to 2022 were largely similar to those seen relative to 2019.

Table A 1. Sex gaps, in percentage points, in GCSE entries in 2023, and the changes relative to gaps in 2019 and 2022. A positive gap indicates a greater female percentage and a negative value indicates a greater male percentage; a positive change value indicates the gap has shifted toward females, while a negative value indicates the gap has shifted toward males. The table is sorted in order of 2023 gap, from the largest female-favoured difference to the largest male-favoured difference. The dashed line indicates the position of the 'all subjects' difference.

Subject	2023 gap	Change vs. 2019	Change vs. 2022
All Subjects	-0.6	-0.8	-0.4
Social Science Subjects	43.5	+2.1	+3.6
Drama	35.7	+7.0	+6.1
Art And Design Subjects	32.0	-1.2	+1.7
French	13.1	-3.5	-1.3
Spanish	12.5	-2.9	-2.3
Religious Studies	8.2	-0.7	-0.1
Media, Film, TV Studies	3.5	+11.9	+6.3
Classical Subjects	3.0	+0.1	+0.7
Music	1.8	-9.0	-2.2
History	1.4	-4.3	-1.6
Mathematics	-0.5	-1.1	+0.2
English Literature	-0.7	-0.6	-0.3
Biology	-0.8	-1.0	-1.6
German	-0.8	-3.9	-2.1
Science: Double Award	-0.9	-0.5	+0.2
Chemistry	-1.7	-0.4	-1.4
Physics	-2.4	-0.5	-1.4
English	-3.9	+0.1	-0.2
Geography	-8.7	-1.0	-0.6
Design And Technology	-13.7	+1.8	+2.2
Business Studies	-15.2	+3.5	+2.8
Physical Education	-28.5	-1.4	-3.1
Economics	-39.4	-5.7	-0.7
Computing	-57.9	-0.8	-0.5

Table A 2 shows gaps in attainment of GCSE grades A/7 or above for 2023. As in the main analysis, most subjects showed higher female attainment, with only three, Maths, Economics, and Physics, showing higher male attainment. Of those showing higher female attainment, patterns were broadly similar to those seen in the main analysis, with Art showing the largest gap, and Media, Film and TV Studies, Design and Technology, Religious Studies, Drama, PE and English Literature all showing gaps greater than 10 percentage points.

More interesting patterns were seen in the gap changes. Relative to both 2019 and 2022, there was a shift towards male attainment, with many negative change values: although overall attainment was still higher for females, the size of the gap reduced. This pattern of reduced gaps was particularly noticeable when compared to 2022, with almost all subjects showing the gap reducing in size. Only Economics, Classical Subjects and Biology showed positive change values, with the female-favoured Classical Subjects and Biology gaps growing and the male-favoured Economics gap shrinking. Results from 2022 were still influenced by the disruption caused by Covid, which the main analysis showed to often lead to larger female-favoured gaps. This shift toward smaller gaps may therefore reflect a return to more 'normal' conditions.

Comparisons with gaps in 2019 provide a comparison to the last 'normal' examinations before Covid-related disruption. Even with this comparison, 16 of the 24 subjects showed negative changes, i.e., growing male-favoured gaps in Maths, Economics and Physics, and reduced female-favoured gaps in the other subjects. This left just Art and Design, Design and Technology, PE, French, Computing, Biology, and Music, where the female-favoured gap had grown relative to 2019. The gap for Double Award Science (named Combined Science in the main analysis) was identical to that in 2019. Hence, at high attainment levels, 2023 GCSE results mostly showed a reduction in sex gaps.

Table A 3 shows attainment gaps for 2023 GCSEs at grade C/4. Once again, patterns were similar to those seen in the main analysis, with higher female attainment in all but four subjects. One notable difference was Chemistry, which here showed a small male-favoured gap, instead of the female-favoured gap seen in the main analysis. Whether this reflects the start of a new trend, or is just year-to-year variation, is of course unclear. Overall, though, there was again evidence of higher female attainment at this intermediate level.

Most changes compared to 2019 were negative, with nineteen subjects showing this pattern. Most of these changes indicated reduced female-favoured gaps, but for Chemistry, Maths and Physics, the change indicated growing male-favoured gaps. Only four subjects showed positive changes, with the largest, at 3.8 percentage points, seen for Computing. Hence, compared to 2019, gaps again showed improving male attainment.

Changes compared to 2022 were more mixed: thirteen subjects showed a positive change (all of which reflected a growing female-favoured gap), and eleven showed a negative change (reflecting a mix of reduced female-favoured gaps and growing male-favoured gaps). This mix probably reflects the same process of returning to 'normal' as described above: several subjects in the main analysis showed Covid-related disruption to shrink female-favoured gaps at this intermediate attainment level, so the return to 'normal' would be expected to lead to positive changes as female attainment increased or male attainment decreased.

Table A 4 shows GCSE gaps at grade G/1. Gaps at this level were much smaller, with the largest being History at 2.2 percentage points. However, once again, there was a strong signal of higher female attainment, with only Economics showing a male-favoured gap of -0.1 percentage points. Compared to 2019, 14 subjects showed negative changes (mostly indicating smaller female-favoured gaps), while 8 showed positive changes (all indicating growing female-favoured gaps), but the changes were small. Relative to 2022, 13 subjects showed positive changes, and 6 showed negative changes; again, all were small. The largest changes seen were for Computing, with the gap increasing by over one percentage point.

Table A 2. Sex gaps, in percentage points, in attainment of GCSE grade A/7 or above in 2023, and the changes relative to gaps in 2019 and 2022. A positive gap indicates a greater female percentage and a negative value indicates a greater male percentage; a positive change value indicates the gap has shifted toward females, while a negative value indicates the gap has shifted toward males. The table is sorted in order of 2023 gap, from the largest female-favoured difference to the largest male-favoured difference.

Subject	2023 gap	Change vs. 2019	Change vs. 2022
All Subjects	5.8	-0.7	-1.6
Art And Design Subjects	17.6	+2.0	-2.9
Media, Film, TV Studies	15.2	-0.3	-2.2
Design And Technology	14.2	+2.4	-1.9
Religious Studies	13.3	-2.4	-2.6
Drama	13.0	-0.6	-5.3
Physical Education	12.6	+1.3	-1.9
English Literature	11.0	-1.0	-2.3
Social Science Subjects	9.2	-0.5	-3.6
English	8.7	-0.4	-2.0
French	7.6	+0.3	-1.6
Spanish	7.4	-0.6	-1.6
History	7.2	-0.5	-1.5
Computing	6.9	+2.8	-1.4
Geography	6.9	-0.6	-2.1
German	5.2	-1.5	-2.0
Business Studies	4.7	-0.2	-1.2
Biology	4.6	+0.8	+1.2
Music	4.4	+1.1	-2.1
Classical Subjects	3.7	-1.0	+2.3
Science: Double Award	2.0	0.0	-0.3
Chemistry	0.9	-1.4	-0.6
Mathematics	-1.8	-0.6	-0.8
Economics	-3.6	-2.8	+0.7
Physics	-5.5	-1.6	-2.9

Table A 3. Sex gaps, in percentage points, in attainment of GCSE grade C/4 or above in 2023, and the changes relative to gaps in 2019 and 2022. A positive gap indicates a greater female percentage and a negative value indicates a greater male percentage; a positive change value indicates the gap has shifted toward females, while a negative value indicates the gap has shifted toward males. The table is sorted in order of 2023 gap, from the largest female-favoured difference to the largest male-favoured difference.

Subject	2023 gap	Change vs. 2019	Change vs. 2022
All Subjects	6.8	-2.0	-0.1
Art And Design Subjects	19.2	-0.6	+3.0
Media, Film, TV Studies	17.8	-1.6	+1.6
Design And Technology	17.4	+0.4	+2.2
Drama	15.5	-1.6	+0.5
English	13.3	-3.0	+0.3
English Literature	11.9	-2.8	-0.2
Religious Studies	11.4	-3.3	-0.2
Social Science Subjects	11.2	-2.3	-0.4
French	9.2	-1.5	+1.1
Spanish	8.9	-1.5	+0.3
Computing	8.3	+3.8	+3.1
Physical Education	7.9	-0.4	+2.4
Music	6.3	+0.1	+0.4
German	6.1	-2.2	+1.1
History	5.5	-1.7	-0.1
Geography	4.9	-2.3	-0.5
Classical Subjects	3.5	+1.0	+2.6
Business Studies	3.4	-1.4	-0.2
Science: Double Award	2.9	-2.2	-0.7
Biology	0.9	-0.4	+0.3
Physics	-0.3	0.0	-0.3
Chemistry	-0.3	-1.4	-0.8
Mathematics	-1.5	-0.8	-1.5
Economics	-2.2	-2.0	-1.6

Table A 4. Sex gaps, in percentage points, in attainment of GCSE grade G/1 or above in 2023, and the changes relative to gaps in 2019 and 2022. A positive gap indicates a greater female percentage and a negative value indicates a greater male percentage; a positive change value indicates the gap has shifted toward females, while a negative value indicates the gap has shifted toward males. The table is sorted in order of 2023 gap, from the largest female-favoured difference to the largest male-favoured difference. The dashed line indicates the position of the 'all subjects' difference.

Subject	2023 gap	Change vs. 2019	Change vs. 2022
All Subjects	0.9	-0.1	+0.1
History	2.2	0.0	+0.7
Computing	1.8	+1.4	+1.1
English	1.6	+0.3	+0.5
Media, Film, TV Studies	1.6	+0.3	-0.2
Social Science Subjects	1.5	-0.6	+0.2
Religious Studies	1.4	-0.4	-0.1
English Literature	1.4	-0.3	0.0
Design And Technology	1.2	+0.1	0.0
Geography	1.0	-0.2	+0.1
Classical Subjects	0.7	+0.1	+0.4
Business Studies	0.7	-0.1	+0.2
Science: Double Award	0.7	0.0	+0.2
Art And Design Subjects	0.5	-0.1	+0.1
Music	0.5	-0.1	-0.4
Drama	0.4	-0.3	-0.5
French	0.4	-0.1	0.0
Spanish	0.4	-0.2	0.0
German	0.3	-0.2	+0.1
Physical Education	0.2	+0.2	+0.2
Physics	0.2	+0.2	+0.1
Chemistry	0.1	+0.1	-0.1
Mathematics	0.1	-0.4	-0.1
Biology	0.0	-0.1	+0.1
Economics	-0.1	-0.6	0.0

2023 A level results

Table A 5 shows the sex gaps in A level subject uptake in 2023. The overall gap was still strongly female-favoured at 8.7 percentage points, but this was smaller than in either 2022 or 2019, as indicated by the negative change values for both years. Patterns were similar to those seen in the main analysis, with Sociology showing the largest female-favoured gap, followed by English, Art, Drama, Psychology, Religious Studies, and Modern Foreign Languages. As in the main analysis, these gaps were large at over 35 percentage points. The largest male-favoured gap was for Computing, at -69.8 percentage points; other large male-favoured gaps were seen for Physics, Further Maths, Economics and Technology Subjects. Hence, the long-term patterns were largely replicated here.

Relative to 2019, there was a mixture of gap changes, with 13 subjects showing positive changes and 15 showing negative changes. The largest observed changes were for Geography and Music, which had changes of -10.3 and -10.2 percentage points respectively; for Geography this turned a small female-favoured gap into a moderate male-favoured gap, while for Music this increased the size of the male-favoured gap. The largest positive change was for Political Studies, which showed a change of +7.7 percentage points, moving it from male-favoured to female-favoured, albeit still less-so than the ‘all subjects’ gap. Other Sciences showed a similar change of +7.4 percentage points, but this remained strongly male-favoured.

Changes relative to 2022 were similarly variable, with 11 subjects showing positive changes and 17 showing negative changes. The changes were smaller than those seen relative to 2019, with the largest overall Music at -6.1 percentage points, then PE at -4.5 percentage points and Spanish at -4.1 percentage points. The largest positive changes were for Political Studies and Other Modern Languages, which both showed changes of +3.7 percentage points.

Table A 5. Sex gaps, in percentage points, in A level entries in 2023, and the changes relative to gaps in 2019 and 2022. A positive gap indicates a greater female percentage and a negative value indicates a greater male percentage; a positive change value indicates the gap has shifted toward females, while a negative value indicates the gap has shifted toward males. The table is sorted in order of 2023 gap, from the largest female-favoured difference to the largest male-favoured difference. The dashed line indicates the position of the 'all subjects' difference.

Subject	2023 gap	Change vs. 2019	Change vs. 2022
All Subjects	8.7	-1.3	-0.9
Sociology	51.4	-3.0	-0.8
English	51.2	-0.4	+0.1
Art And Design Subjects	49.8	+1.4	+1.4
Drama	49.5	+4.1	+0.2
Psychology	46.7	-2.2	-0.7
Religious Studies	41.2	-2.8	-2.7
French	39.1	-0.7	-2.1
Spanish	35.1	+0.9	-4.1
Law	29.3	-0.2	-2.1
Biology	27.2	+1.3	-0.3
Classical Subjects	26.9	+4.8	+2.1
German	20.7	-0.7	+2.6
Other Modern Languages	18.5	+0.7	+3.7
Media, Film, TV Studies	12.6	+3.6	+1.2
Chemistry	11.9	+4.4	+0.6
History	5.9	-6.3	-1.3
Political Studies	4.3	+7.7	+3.7
Geography	-8.3	-10.3	-3.1
Music	-11.9	-10.2	-6.1
Physical Education	-19.8	-1.5	-4.5
Business Studies	-19.9	+1.3	-1.2
Mathematics	-24.7	-2.2	-0.2
Other Sciences	-32.7	+7.4	-1.3
Technology Subjects	-39.6	-3.2	+0.9
Economics	-40.4	-0.6	-2.2
Mathematics (Further)	-43.8	-0.9	-0.1
Physics	-54.1	+0.7	-0.4
Computing	-69.8	+3.7	+0.2

Table A 6 shows attainment gaps at A level grade A or above for 2023. Across all subjects, there was a small female-favoured gap of just 0.6 percentage points, which was 0.5 percentage points larger than the gap in 2019, but 1.6 percentage points smaller than the gap in 2022. This change relative to 2022 once again reflects the return to 'normal' attainment patterns following the higher-than-typical outcomes in 2020-2022. Of the 28 subjects analysed, 19 showed female-favoured gaps, with Geography, PE, and Art and Design showing the largest gaps at over 10 percentage points. The largest male-favoured gaps were seen for German (-7.3 percentage points), Chemistry (-5.3 percentage points) and Further Maths (-4.3 percentage points). There were some differences in these patterns relative to the main analysis, with Music, Physics, and Further Maths showing male-favoured gaps here, but female-favoured gaps in the main analysis.

Relative to 2019, 17 subjects showed positive changes, mostly reflecting growing female-favoured gaps. The largest positive change was in Media, Film and TV Studies, which grew by

4.1 percentage points. A notable change was seen for Computing, which increased by 2.4 percentage points, changing it from one of the smallest female-favoured gaps to a mid-ranking one. The 11 subjects showing negative change reflected a mix of reduced female-favoured gaps and increased male-favoured gaps, with German the largest at -7 percentage points taking it from only slightly male-favoured to strongly male-favoured. Hence, unlike at GCSE, there was no strong sign of relative improvements in male attainment.

Once again, comparisons to 2022 showed the influence of returning to 'normal' attainment patterns, with 23 subjects showing negative changes. The largest negative change was seen for PE, at -7.7 percentage points. Psychology also showed a moderately large change at -4.2 percentage points. Of the five subjects that showed positive changes relative to 2022, French had the largest at +1.2 percentage points.

Finally, Table A 7 shows the gaps at grade E or above for 2023 A levels. Across all subjects there was a gap of 0.9 percentage points, which was 0.1 percentage point smaller than 2019, but 0.3 percentage points greater 2022; such small differences could occur as a result of simple year-to-year variation. Only five subjects showed male-favoured gaps, with Chemistry showing the largest at -0.7 percentage points, and the other four showing gaps of just -0.1 percentage points. The remaining subjects (other than Further Maths, which showed no gap), showed female-favoured gaps, the largest of which were for Psychology (2.3 percentage points) and Technology Subjects (2.1 percentage points). These patterns differed somewhat from those seen in the main analysis, which showed only Other Science to have a male-favoured gap at this level. However, the order of subjects was broadly similar.

Thirteen subjects showed positive changes relative to 2019, while twelve showed negative changes; three showed no change. The largest was seen for Chemistry, with a change of -1.5 percentage points taking it from a moderate female-favoured gap to the largest male-favoured gap. The largest change in the other direction was for Technology Subjects, with an increase of 0.8 percentage points making it one of the largest female-favoured gaps. Relative to 2022, eighteen changes were positive, seven were negative, and three were zero. This once again reflects the return to 'normal' conditions, with male students appearing to have benefited most from the higher outcomes during the period of disruption.

Table A 6. Sex gaps, in percentage points, in attainment of A level grade A or above in 2023, and the changes relative to gaps in 2019 and 2022. A positive gap indicates a greater female percentage and a negative value indicates a greater male percentage; a positive change value indicates the gap has shifted toward females, while a negative value indicates the gap has shifted toward males. The table is sorted in order of 2023 gap, from the largest female-favoured difference to the largest male-favoured difference.

Subject	2023 gap	Change vs. 2019	Change vs. 2022
All Subjects	0.6	+0.5	-1.6
Geography	13.7	+2.9	-2.3
Physical Education	11.0	+0.8	-7.7
Art And Design Subjects	10.5	+2.4	-0.8
Psychology	9.7	+1.0	-4.2
Media, Film, TV Studies	9.4	+4.1	-2.9
Technology Subjects	8.0	+1.5	-3.7
Sociology	7.8	+0.6	-1.5
Drama	6.7	-0.6	-2.4
Other Modern Languages	6.3	-2.0	+0.9
History	4.2	+1.0	-2.7
Law	4.2	-2.3	-2.4
Economics	4.1	+0.4	-0.8
Business Studies	3.8	+0.4	+0.3
English	3.5	+1.1	-0.9
Computing	3.3	+2.4	-1.2
Political Studies	3.3	+0.6	+0.4
Classical Subjects	1.5	-1.4	-3.3
Religious Studies	1.5	+0.8	-1.3
Biology	0.7	-1.6	-0.6
Music	-0.6	+1.4	+0.1
Spanish	-0.8	-0.7	-0.5
French	-1.2	-0.3	+1.2
Mathematics	-1.6	+1.4	-2.1
Physics	-1.9	-3.0	-2.7
Other Sciences	-3.8	+0.6	-3.9
Mathematics (Further)	-4.3	-0.8	-1.0
Chemistry	-5.3	-2.3	-1.8
German	-7.3	-7.0	-0.1

Table A 7. Sex gaps, in percentage points, in attainment of A level grade E or above in 2023, and the changes relative to gaps in 2019 and 2022. A positive gap indicates a greater female percentage and a negative value indicates a greater male percentage; a positive change value indicates the gap has shifted toward females, while a negative value indicates the gap has shifted toward males. The table is sorted in order of 2023 gap, from the largest female-favoured difference to the largest male-favoured difference.

Subject	2023 gap	Change vs. 2019	Change vs. 2022
All Subjects	0.9	-0.1	+0.3
Psychology	2.3	-0.1	+0.8
Technology Subjects	2.1	+0.8	+1.2
Sociology	1.4	-0.3	+0.2
Geography	1.3	+0.5	+0.7
Law	1.3	0.0	0.0
Art And Design Subjects	1.2	+0.3	+0.7
Computing	1.2	+0.5	+0.2
Physical Education	1.0	0.0	+0.2
Mathematics	0.8	+0.4	+0.1
Media, Film, TV Studies	0.7	-0.2	+0.2
Physics	0.6	+1.1	+0.3
Drama	0.5	+0.1	+0.1
Music	0.4	+0.3	+0.5
Spanish	0.4	+0.5	+0.7
English	0.4	-0.1	0.0
French	0.3	+0.3	+0.3
Other Modern Languages	0.3	-0.7	+0.1
Biology	0.2	-0.4	+0.1
History	0.2	0.0	0.0
Religious Studies	0.2	-0.7	-0.4
Classical Subjects	0.1	-0.3	+0.1
Economics	0.1	+0.4	-0.1
Mathematics (Further)	0.0	+0.2	-0.2
German	-0.1	-0.3	-0.3
Business Studies	-0.1	-0.2	-0.1
Other Sciences	-0.1	-1.1	-1.3
Political Studies	-0.1	+0.4	+0.1
Chemistry	-0.7	-1.5	-0.9

2023 interpretation

While we must be cautious in comparing results from 2023 to those in the main analysis, several tentative conclusions can be drawn. First, gaps were largely similar to those seen in the main analysis, both in terms of direction and magnitude, for both subject uptake and outcomes. The conclusions drawn in the main report therefore apply equally to results from 2023; there was not a complete upending of established patterns. Second, attainment gaps at GCSE tended to *decrease*, even relative to the last 'normal' exams taken in 2019, but particularly relative to the higher-than-typical outcomes in 2020 to 2022. We must be particularly cautious in this comparison, as the main analysis focused on long-term averages and trends over time, whereas here we are looking at a single year; single years of data will, inevitably, vary around the mean. However, the reduced gaps in GCSE results from 2023 are strikingly consistent across subjects, and this *does* appear to be somewhat unusual; monitoring differences over coming years will help to establish whether this is simply year-to-year variation or the start of a longer trend. It will also be interesting to see how gaps in A level results look when the 2023 GCSE cohort take A levels in 2025, to see whether the reduced gaps feed through into differences at this later stage of education. Finally, changes relative to 2022 showed how results have gone some way back toward 'normality' following Covid disruption. There may, however, still be work to do to understand how the gaps seen in the disrupted years of 2020 to 2022 feed through into A levels, Further Education, Higher Education, and the workforce.

Overall, then, analysis of provisional GCSE and A level results data from 2023 shows largely similar patterns to those identified in the main analysis from earlier years, but there are also signs of some differences, particularly at GCSE level. To truly understand what happened in the 2023 summer exams, however, it may be necessary to repeat analyses when final datasets become available.