

Understanding how social background influences student choice of GCSEs and post-16 pathways

Nic Pensiero

Jan Germen Janmaat

Carlo Barone

Executive summary

Background

The educational choices that young people make during adolescence in terms of preferred subjects and pathways leave a profound mark on the opportunities available to them in adulthood and on the different social destinations they achieve with these opportunities. At the same time these choices are not made in a vacuum, as they, in turn, are significantly shaped by social background and other characteristics of the social environment of young people. Particularly the effect of social background on educational choices has drawn a lot of attention from scholars because of the key role it plays in the social reproduction of a stratified society (or, in other words, in inhibiting social mobility).

However, after around three decades of research on this topic, there is little consensus on the key micro processes accounting for the association between socio-economic origins and educational choices. Existing studies have tended to focus on only a limited number of processes and mechanisms.

This study enriches this literature by offering a comprehensive assessment of these mechanisms in order to identify the most influential ways in which social background shapes educational choices among those students who have the same level of academic achievement.

We consider educational choices as constrained by costs, influenced by beliefs about the return of education and by preferences regarding subjects and attitudes towards school in general. Based on these assumptions, we identified and empirically tested the following mechanisms as relevant pathways of the effect of social background: a) differentials in economic resources and the related relative costs (Gambetta 1987, Delavande and Fumagalli 2019, Bleemer and Zafar 2018, Breen and Yaish 2006, Morgan 1998, 1996); b) differentials in the expected economic benefits of educational choices, described in terms of occupational returns (Breen and Yaish 2006, Breen and Goldthorpe 1997); c) differentials in the influence of peers (Manzo 2013, Jæger 2007, Morgan 2005, Thomas and Webber 2001); d) differentials in school engagement (Fredricks, Blumenfeld, & Paris, 2004) e) differentials in sense of personal control of students from different social origins (Pepper and Nettle 2017). Our theoretical framework thus integrates multiple mechanisms derived from models of sociology and behavioural economics.

Whilst a handful of papers looked at the effect of conformity with school peers on educational choices, this is the first analysis that looks at how the SES differentials in educational choices are accounted for by the effect of conformity with peers and is also the first analysis that looks both at social (conformity with peers) and occupational expected returns as mechanisms that mediate the association between socio-economic background and educational choices.

This project investigated the extent to which those mechanisms account for the effects of socio-economic background on two milestones of the English education systems – EBacc GCSE subject choice and the decision to continue to A-Level versus vocational pathways, which have significant implications for future social mobility and labour market prospects. Whilst vocational and technical qualifications are heterogenous in quality and labour market returns and the government has been trying to bring academic and vocational qualifications

under a common framework¹, our binary distinction between A-levels and vocational pathways is justified by the higher esteem that A-levels are perceived to have among most students in our cohort of analysis (YouGov 2015).² Recently however the esteem gap between A-levels and vocational pathways seems to be reducing as the perception among students of vocational qualifications is getting more positive (Gregory 2023, Gregory and Telling 2023).

Results

Using educational records from the National Pupil Database and the Individualised Learner Record (ILR) with data from the 1989/90 birth cohort study Next Steps (formerly the Longitudinal Study of Young People in England) we find that:

First, the perception of succeeding in education – proxied as the self-reported probability of a hypothetical university entry application being successful - is a reflection of socio-economic opportunities apart from prior academic attainment and has a large impact on educational choices. The extent to which individuals pursue more ambitious educational choices such as A-levels reflects the individual perception that efforts will be rewarded. We consider that most students take A-levels as an intermediate step to enter university and they evaluate the costs and rewards of choosing A-levels against the prospect of entering university and bearing the costs of university fees and living expenses and against the prospect of forgone income whilst studying at university instead of entering the labour

¹ https://consult.education.gov.uk/advanced-british-standards-directorate/the-advanced-british-standard/supporting_documents/A%20worldclass%20education%20system%20%20The%20Advanced%20British%20Standard%20consultation.pdf

² This does not imply that A-levels are “better” than vocational pathways or that all high achieving students should be encouraged to pursue A-levels. High quality vocational qualifications can have higher economic returns than A-levels.

market full time. Students from a lower SES background think they have fewer chances of getting into university even after taking into consideration prior academic attainment. Their lower propensity to choose A-levels is therefore an 'understandable' response to the lower opportunities they perceive that they have. It is plausible that they use the socio-economic status of their parents and of the people around them as an indicator of the socio-economic status they are likely to attain and infer that they are less likely to end up in a high-status position regardless of their academic achievement. Children make educational choices relying on information about the returns to different educational pathways assigning particular salience to the status of people in their network. This mechanism could account for some of the socio-economic differentials in the choice of A-levels.

Second, the choice of secondary school has a substantial role in shaping the choice for EBacc GCSE subjects and A-levels. Attending a school with a sixth form, a higher level of attainment at GCSE exams and a higher proportion of students choosing EBacc subjects and A-levels are associated with a higher likelihood of choosing EBacc GCSE subjects and A-levels post-16. They also account for a substantial part of the association between socio-economic background and those choices. Regarding the effect of peers' choices, a 1% increase in school peers choosing EBacc GCSE subjects is associated with a 1% percent increase in the likelihood of choosing those subjects and a 1% increase in school peers choosing A-levels is associated with a 3% percent increase in the likelihood of choosing A-levels. This estimate of the peers' effect is obtained using a statistical strategy based on the instrumental variable peers of peers which did not attend the same primary school as the cohort members' one. This strategy eliminates the effect of the confounding factors associated with attending the same school and coming from the same socio-economic background.

Policy implications

There are strategic reasons for choosing an educational pathway which have to do with the expected returns, there are non-strategic reasons for choosing an educational pathway which have to do with school engagement (such as liking school, teachers and classmates and having an interest in learning) and there are social reasons which have to do with children influencing each other's decisions and parents influencing their children's choices. Each type of mechanism has specific policy implications.

Intervening on the strategic reasoning of children requires programmes that aim to provide accurate information and change expectations. Intervening on children's approach to school requires different programmes which focus on behavioural change.

The extent to which expectations can be modified by interventions needs further research, particularly regarding effective interventions among students with very different reasons for the educational choices they make, but existing research offers a direction for intervening: focusing on programmes targeting disadvantaged students to provide them with information and guidance regarding the benefits of educational pathways. We already know from the research on career guidance that such programmes can be quite effective especially those involving experiential activities (Gorard et al. 2017) and student counsellor (Tomaszewski et al. 2017). The evidence also show that all students benefit from such programmes but that students from disadvantaged backgrounds benefit the most from them (Tomaszewski et al. 2017).

Apart from targeting students, research shows that there is scope for improving the provision and quality of post-16 vocational and technical qualifications thus reducing the quality and esteem gap between vocational and academic post-16 qualifications. Research shows that lower rates of participation in high quality

apprenticeships, relatively low resourcing of vocational qualifications and lower levels of curriculum standardisation across the academic and vocational routes are associated with lower skill levels and higher skill inequalities (Green et al. 2021, Pensiero and Green 2018, Green and Pensiero 2016). The government's plan to introduce the Advanced British Standard (ABS), a new Baccalaureate-style qualification framework for 16–19-year-olds goes in the direction of reducing the quality gap between vocational and academic qualifications (Department for Education 2023). The planned reform aims to bring together technical and academic routes into a single framework, increase the number of taught hours for all students and require students to study maths and English to the age of 18. The substantial influence of school peers and other school characteristics implies that the secondary school children attend affect students' choices and contributes to the level of SES segregation in colleges and sixth forms at the subsequent post-16 phase. Policies that aim at reducing the effect of school segregation on students' choices could try to:

- Increase the enrolment of disadvantaged students in good / desired schools. Examples of such programmes are the Brighton and Hove policy of giving pupils eligible for free school meals priority when applying for a secondary school place (Sarah Booker-Lewis 2024) and Minnesota's public-school choice option of open enrolment that allows students and parents to have access to schools that are not within their resident area. Another such programme is the Cambridge (US) controlled choice programme for public schools that allows parents to choose schools from across a district while simultaneously giving the district information about the families needed to ensure that schools were balanced socioeconomically. When the percentage of disadvantaged students at a school reflects the School District's averages, the school is considered to be "balanced."

- Collect information about school composition with respect to family socio-economic background for example parents' education apart from free school meal eligibility to be included in the NPD records. This will provide policy makers and researchers with valuable information to monitor schools' SES composition and segregation. The recommendation of making information on schools' SES composition (with respect to parents' education and FSM eligibility) available does not extend to the public as this is likely to increase segregation. There are two opposite effects at play: on the one hand the availability of information on school composition will increase competition for the schools with higher SES pupils, which in turn will increase school SES segregation in a system based on a catchment area admission policy; on the other families will tend to avoid highly segregated schools (this is because families tend to avoid schools where they are the only group and there is no diversity or where they are the minority). The former effect - which outweighs the latter - together with the catchment area-based allocation system is likely to exacerbate school segregation by parents' SES (Pensiero and Brede 2024).
- Reduce or defer the branching points in the education system or make them less salient. An example of making branching points less salient could be by making A levels and vocational courses more alike, for instance by introducing more general subjects in vocational education or including some practical courses in A-levels. England could learn from continental Europe here as many European countries offer a more comprehensive curriculum in upper secondary vocational education, including subjects such as citizenship education, history and a foreign language. A more comprehensive curriculum in both A levels and vocational education would also align well with the aforementioned

government plan to reduce the quality and esteem gap between these tracks.

1. Introduction

The research on the class differentials in educational outcomes consistently shows that children from privileged backgrounds are more likely to choose academic tracks in secondary education and to go to university than children from disadvantaged backgrounds even after considering prior academic achievements (Conlon 2005; Jackson 2013; Samuel et al 2014). In other words, social background still has an effect on educational choices among children that perform equally well at school. Yet the mechanisms accounting for the association between social background and educational choices are under-conceptualised and under-researched. After around three decades of research on educational inequalities, there is little consensus on the key micro processes accounting for the association between social background and educational choices (see literature cited below). A recent review of the literature showed that most empirical studies on educational inequalities did not empirically define decision making mechanisms and those who did found that a large portion of the effect of social background on educational choices remains even after including any of the decision-making processes so far considered and a number of relevant control variables such as achievement (Barone et al. 2021). In relation to the latter group of studies, it is possible that their poor performance in terms of explaining the effect of social background is due to the poor quality of the measures for the decision-making constructs or due to the fact that some key constructs have been neglected (Manzo 2013).

One approach often used by sociologists to define the decision-making mechanisms of young people that navigate the education system is to assume that educational choices are driven by the aim to maintain the social status of the

parents (Relative Risk Aversion mechanism). A second, typically used by economists, is that individuals invest in education to maximize future economic returns. Those two approaches constitute most of the literature which tries to analyse educational decisions. A third approach is to consider the conformity to peers as a driving force of educational decisions. Yet, despite the plausibility of the mechanism, only a handful of studies considered it (Manzo 2013, Jæger 2007, Morgan 2005, Thomas and Webber 2001). Finally, recent research introduced the idea of personal control and future oriented behaviour from evolutionary biology to explain the lower investment in education of disadvantaged children as an appropriate response to having limited control over the future outcomes (Pepper and Nettle 2017, Frankenhuis et al. 2016).

Each approach has specific advantages, but each is limited if taken on their own. It is reasonable to expect that families and students take into consideration multiple factors when deciding the best educational strategy (Jæger 2007). We consider educational choices as constrained by costs, influenced by beliefs about the return of education and by preferences regarding subjects and attitudes towards school in general. Based on these assumptions, we identified and empirically tested the following mechanisms as relevant pathways of the effect of social background: a) differentials in economic resources and the related relative costs (Gambetta 1987, Delavande and Fumagalli 2019, Bleemer and Zafar 2018, Breen and Yaish 2006, Morgan 1998, 1996); b) differentials in the expected economic benefits of educational choices, described in terms of occupational returns (Breen and Yaish 2006, Breen and Goldthorpe 1997); c) differentials in the social returns to educational investments relating to conformity with peers' choices (Manzo 2013, Jæger 2007, Morgan 2005, Thomas and Webber 2001); d) differentials in school engagement (Fredricks, Blumenfeld, & Paris, 2004) e) differentials in sense of personal control of students from different social origins

(Pepper and Nettle 2017). Our theoretical framework thus integrates multiple mechanisms derived from models of sociology and behavioural economics.

We focus on the moment when students have to choose GCSE optional subjects for Key Stage 4 (and notably the choice for EBacc subjects, typically at age 14) and the moment when they have to choose whether to continue with A-levels or proceed with vocational education as relevant educational choices after 16 years of age. Thus, the main research question of this project is to examine which of the three mechanisms noted above drives the effect of social background on the choice for EBacc subjects and A-levels.

Our approach is pragmatic in using a large multipurpose survey (Next Steps) linked to administrative records from the National Pupil Database (NPD) and Individualised Learner Record (ILR). The studies which relied on the subjective measures of beliefs about education's returns used smaller surveys which contained specific questions about those beliefs, which are rarely found elsewhere (Barone et al. 2021, Van de Werfhorst and Hofstede 2007, Stocké 2007 and Gabay-Egozi et al. 2010). In our study the operationalisation of the decision-making mechanisms is based on questions which are more widely available in national surveys and therefore can be more easily applied in other studies. However, we complement these measures with measures of actual economic returns to education. As for the social returns, we use the choices of school peers. We expect that this comprehensive approach will result in a better capacity of the proposed decision-making mechanisms to account for the SES differentials in educational decisions.

2. Theoretical framework

Relevant educational choices in the English context

During their school years adolescents in England face two important choices that have consequences for their educational and professional careers. At age 14 they need to choose the subjects they will take a GCSE exam in at the end of secondary school. Of particular relevance in this respect are the English Baccalaureate (EBacc) subjects of English Language and Literature, maths, a science subject, history or geography and a foreign language. According to the government, this set of subjects “keeps young people’s options open for further study and future careers” (UK Government 2024). Academic research confirms these subjects have greater value than others in widening the future options available to students (Anders et al. 2017, Henderson et al. 2017, Sullivan et al. 2010).

The second key moment of choice is at age 16 when they need to choose the post-16 pathway. Generally, here the choice is between opting for the more demanding and selective A-levels track or a vocational course, although it is also possible to combine A-levels subjects with vocational ones. A-levels is the academic track preparing young people for the continuation of their studies at university. Whilst vocational and technical qualifications are heterogenous in quality and labour market returns and the government has been trying to bring academic and vocational qualifications under a common framework (Department for Education 2023), A-levels offer better prospects than vocational education and are therefore considered more prestigious than the latter. Students need to achieve at least 5 A to C grades in their GCSEs to be admitted to A-levels. Although vocational Level 3 qualifications are increasingly accepted as valid qualifications to enter university with, the more prestigious universities, such as the Russell group ones, often still require A-levels. Hence, despite the government plans to bring about parity of esteem between the two tracks (as for instance shown by the introduction of T levels as an equivalent to A-levels), many young people still consider vocational

education to be second best (YouGov 2015) although recently the esteem gap between A-levels and vocational pathways seems to be reducing as the perception among students of vocational qualifications is getting more positive (Gregory 2023, Gregory and Telling 2023). We therefore focus on the choice of EBacc subjects at age 14 and the choice for A-levels at age 16 as the relevant outcomes for this study.

A framework for understanding decision making

We propose that students are driven by different mechanisms. In contrast with the structuralist view that views educational pathways as determined by societal forces, we propose – drawing on the rational choice tradition – that choices for educational pathways are in part driven by evaluations and decisions (Gintis 2017, Gambetta 1987). Based on the notion of bounded rationality, we hypothesise that individuals have goals and beliefs about how to achieve those goals, and that they act coherently with those beliefs within the constraints determined by their financial and other material resources. In terms of constraints, an educational choice has both direct — involving fees for tuition, books, and materials — and indirect costs — such as foregone earnings. We consider that the choice of EBacc subjects and A-levels do not involve costs in the short term, but individuals foresee the possibility of entering university and anticipate the related costs. In the following sections we discuss the relevance of beliefs and goals regarding the avoidance of downward mobility, the sense of personal control, economic returns and peers' influence.

Socio-economic differentials in educational choices

The focus of our analysis is the socio-economic background gradient in GCSE EBacc subjects and A-levels choices after accounting for prior academic achievement, also called *secondary effects* of socio-economic background. This effect is puzzling as it seems to capture a behaviour that perpetuates disadvantage: disadvantaged children by choosing less EBacc and A-levels educational pathways than their advantaged peers seem to make it difficult to escape disadvantage and enjoy upward social mobility.

The rational choice model proposed by Breen and Goldthorpe (1996) is the most influential model that explains SES differentials in the choice of taking the academic track in upper secondary education and to enrol in post-18 tertiary education. The model theorizes that more ambitious educational choices are riskier as they entail a higher risk of social demotion in case of non-completion, and that higher SES children are more willing to make ambitious educational choices because in this way they can maintain the socio-economic position of the parents and minimize the probability of downward mobility. This mechanism is called Relative Risk Aversion (RRA).³

A core tenet of the model is that individuals are driven by the concern to avoid downward mobility, which implies that individuals do not differentiate between immobility, short- and long-range mobility (Tutic 2017), in other words they are indifferent to differences between large and small gains. Some studies have criticized this counterintuitive assumption and replaced it with the more realistic loss aversion assumption (Breen and Yaish 2006, Barone et al. 2021). Drawing on

³ Many empirical studies on educational inequalities refer indirectly to the Breen and Goldthorpe model but very few test directly the assumptions of the model and those which did find that a large portion of the effect of the social class of origin on educational choices remains even after considering the RRA mechanism (Lievore and Triventi 2022, Barone et al. 2018, Gabay-Egozi et al. 2010, Stocké 2007, Van de Werfhorst and Hofstede 2007).

prospect theory (Kahneman 2012), the loss aversion assumption states that individuals differentiate between different types of gains and losses, and that losses weigh more than gains leading individuals to value the avoidance of downward mobility more than the attainment of upward mobility. This approach is confirmed by research showing that individuals evaluate their potential outcomes relative to a reference threshold (framing) and that losses constitute a stronger motivation than gains (loss-aversion) (Barberis 2013, Kahneman 2012).

Another criticism often made to the Breen-Goldthorpe model is that it is silent about class differences in attitudes towards education (Devine 1998, Hatcher 1998, Nash 2003). Low SES children may perceive the transition to a different social class as generating status-based identity uncertainty. Upward social mobility requires a change of network and the adoption of a new identity. Research shows that people who benefit from social mobility often suffer from social isolation as they struggle to fit in the new social class have fewer interactions with the class of origin. Therefore, low SES, high aspiring children deal with an inconsistency between the social class they aspire to be in and the social class they are from, which in turn is likely to generate a more challenging decision-making process which is reflected in more uncertainty and randomness in educational decisions. This is consistent with information entropy theory which posits that when inputs point in different directions, this is likely to determine uncertainty and randomness in deciding the best course of action, which in turn is associated with variability in choices. On the other hand when inputs operate in the same direction and there is alignment between the class of origin and the one of desired destination, entropy is minimal and it is easier to determine what the best strategy is.

Moreover, some individuals show more positive values and attitudes towards schools, which in turn account for different propensities to take the academic track and continue into post-18 tertiary education.⁴

Personal control and future oriented behaviour

Evolutionary behavioural scientists have proposed that individuals behave in a way that perpetuates disadvantage as a response to their lower personal control over outcomes in the future of investments made in the present (Pepper and Nettle 2017, Frankenhuis et al. 2016). The argument is that investing time, effort and money into education may yield future rewards but requires sacrificing rewards in the present. When individuals perceive that those costly investments in future outcomes are not likely to generate the outcomes as planned because of a lack of socio-economic resources, the reasonable response is to shift the focus from investments in the future (and costs in the present) to benefits in the presents (and costs in the future) (Pepper and Nettle 2017, Whitehead et al. 2016, Poortinga et al. 2008, Anderson and Galinsky 2006). Research conducted in different contexts including small scale societies shows consistently that low SES individuals are less future oriented and more pessimistic about the future than high SES individuals (Adams and White 2009, DeWit, Flory, Acheson, McCloskey, and Manuck 2007, Kirby 2002). The reason why lower SES individuals invest less in the future is therefore not poor judgment but a reasonable attempt to capitalise benefits in the present in a context where future returns to investments in the present are uncertain. A recent replication of the famous marshmallow experiment shows this point: children wait less if they are led to believe that the larger rewards associated with waiting are unlikely to materialise (Lee and Carlson 2015, Moffett et al. 2020). There are different ways in which SES is related to

⁴ Although the number of students entering universities with vocational Level 3 qualification (such as BTECs or NVQs) is steadily rising (Dilnot et al 2022), A-levels remains the most common route to enter higher education.

control over future outcomes: crucially, financial resources can buy solutions to problems, including private tuition and second chances should an educational pathway not be successful.

In the case of the secondary effects of SES that we are analysing the argument that educational choices reflect a future versus present orientation requires a clarification. As we are controlling for the effect of prior academic achievement, the educational choices of low SES children are compared to those of high SES children with comparable achievements. This implies that children have invested effort and time in doing well in school up to the point of making the choice, then make a choice which may not be consistent with the level of effort and achievement demonstrated up to that point. A possible explanation of this apparent paradox is that a low sense of personal control, once formed in the early years, tend to last later on in life even when circumstances are not unfavourable and academic achievements justify investing in ambitious educational pathways. In other words, the sense of personal control is hard to update, and individuals seem to react consistently with hardship and lack of resources experienced in childhood even when they managed to overcome those difficulties and achieve good grades.

We use the locus of control and perceived chances of success in a university entry application to define personal control, and academic achievement as a control factor. The locus of control captures the extent to which individuals perceive events as the result of personal efforts and achievements (internal forces) as opposed to bad luck or societal forces (external locus of control). Research consistently documents that children with a more internal locus of control show better educational attainment (Barón 2009; Flouri 2006). Whilst the locus of control is a direct measure of the extent to which the individual thinks she is in control of her destiny, a lower level of perceived academic ability (in our case the reported likelihood of entering university) than the demonstrated one would

predict is also a measure of the perception that effort and ability have lower returns.

A third distinct class of factors, which is usually not considered in the rational choice literature, are attitudes towards education. Existing studies found school engagement to be strongly related to academic motivation, achievement and knowledge (e.g. Morris et al 2021; Omerogullari and Glaser-Zikuda 2022; Jirout et al 2022). In turn, school engagement has been found to be influenced by parental socialisation activities such as reading aloud to children, telling them stories, and making music or drawings with them (Omerogullari and Glaser-Zikuda 2022), which are typically associated with the cultural capital of middle class parents (Nicholls 2000). Therefore, we expect low school engagement to be associated with disadvantaged social backgrounds and we also speculate that it may be linked to a preference for more vocational courses and an inclination to leave education at the earliest opportunity.

Economic returns

A group of studies analysed educational decisions as investments to maximize future economic returns. Although these studies have mostly focused on the choice to go to university they are relevant for our project as the choice to do A levels is often motivated by the intention to study at university. Some studies used measures of subjective beliefs regarding the economic returns to education to explain educational decisions (Gambetta 1987, Boneva and Rauh 2017, Delavande and Fumagalli 2019, Bleemer and Zafar 2018), whilst others used exogenous earnings' incentives such the economic opportunities for individuals with different qualifications as their main hypothesized motivational driver (Gambetta 1987, Breen and Yaish 2006, Morgan 1998, 1996). Gambetta (1987) found that Italian students who expressed a stronger preference for high wages have a higher

probability of entering university, irrespective of their prior achievement. This was one of the first studies in the field and although it captured the subjective importance of future wages it does not contain measures about the perceived importance of education for future wages. More recent studies used more specific measures of education returns. Boneva and Rauh (2017) showed that the expectations regarding the returns to higher education accounts for half of the socio-economic gap in university participation, with the pecuniary expectations playing a lesser mediating role than non-pecuniary expectations such as expected job satisfaction, parental approval, and perceptions about social life. Incomplete information about the costs and returns of university also plays a role in explaining the socio-economic differentials in university participation (Delavande and Fumagalli 2019; Bleemer and Zafar 2018). Belfield et al. (2019) showed that students' beliefs about the monetary returns and costs do not play an important role, while the students' expectation about how much they would enjoy going to university explains a substantial share of the variation in students' intentions to obtain further education. Possibly, economic returns have diminished in importance given the normalisation of going to university, particularly in England which has experienced a massive expansion of higher education since the implementation of the unitary model of higher education in the early 1990s (Panayotova 2020).

Other studies looked at actual economic returns. For example, Gambetta (1987) found that the local employment opportunities of university graduates were positively correlated with university enrolment rates in Italy. Breen and Yaish (2006) used the actual social class returns to educational qualification as a proxy for beliefs about education of the British National Child Development Study cohort born in 1958 and found that secondary aged students tended to decide whether to take A-levels, vocational education or leaving education partly based on the chances that those options would allow them to preserve their parents'

social class. Morgan (1998, 1996) showed that average earnings returns to education were positively related to the expected years of schooling reported by American high-school seniors.

To define the expected economic returns we focus on occupation as the outcome as it encompasses both social status and income returns. We compute the propensity of choosing GCSEs EBacc subjects and A-levels considering the returns to those choices, which vary depending on the perceived chances of entering university. To accomplish this, we generate a parameter to include as a covariate in the regression models using a quantal choice model (McKelvey and Palfrey 1998, Goeree et al. 2016, McFadden 1974). The model is suitable to represent boundedly rational choice when the options are represented by a set of finite and discrete outcomes, such as the choice for EBacc GCSE subjects and A-levels as the outcomes of the present study (see section on Data and Variables).

Peers' effect: social returns and imitation

A few studies have made the case that educational choices are not made in a vacuum and analysed the extent to which school peers influence each other educational decisions (Manzo 2013, Jæger 2007, Morgan 2005, Thomas and Webber 2001).

A case can be made that 'educational conformism' or the imitation of the relevant peers is a rational strategy to minimize the risks and costs associated with choices based solely on own beliefs about expected returns. There are both cognitive, normative and opportunistic reasons for emulating peers' behaviour (Hedstrom 1998). An educational option chosen by a large proportion of the student's contacts will be more cognitively salient for the student, thus increasing the probability that he/she will choose that option (Harding et al. 2011). Copying from others is one of the ways in which humans and other animals acquire useful

knowledge to better navigate complex environments. Apart from copying others, individuals acquire knowledge both through other forms of social learning such as teaching, and through asocial learning, i.e. independent exploration (Laland 2017). Copying others has the advantage of exploiting the knowledge others have acquired without incurring the risks of acquiring that knowledge first hand. On a normative level, a large proportion of the students' contacts choosing an educational option implies a large loss in terms of social identity for the student who makes a different choice (Akerlof 1997, Akerlof & Kranton 2002). Finally, a large proportion of the student's contacts that choose an educational option gives the student an easier access to relevant resources – information about the course, and coursework material, but also material resources like transportation and housing – useful to succeed in that educational option.⁵ Whilst we do not know which of these mechanisms prevails, the fact that all sorts of animals copy other individuals suggests that the normative, identity-based mechanism is not the only one at play. Finally, it is interesting to note that despite information about educational qualifications and their returns is readily available online, young people partly rely on their peers to make decisions about educational pathways. This is possibly the legacy of a past where the only public information about the successes and failures of a set of strategies was the observation of others.

Focusing on the drivers of educational choices in Denmark, Jæger (2007) used a combination of subjective measures and assumptions about the best course of action that rational decision makers should take, and showed that individuals take simultaneously into consideration economic and social payoffs when making the choice, at age 15, for post-16 pathways, although economic returns seem to be somehow more important. Jæger (2007) did not look at how these expectations

⁵ This is not to say that students only rely on their peers for information about courses and educational pathways. Schools signpost to this information and information is now very easily available online (eg through UCAS and the career tools that schools use such as Unifrog).

mediate social class inequalities in educational choices. Jæger (2007) used the most commonly chosen type of secondary education in the student's cohort to capture the preference for preserving the existing peer group. This generalisation is dictated by data availability but is questionable for not capturing the effect of close peers, which are those which count the most.

Thomas and Webber (2001) used the actual choices of peers as the measure of peer group influence on the intention to continue on to education at the age of 16 in 1998 among the Bradford Youth Cohort members. The results suggest that that peer groups have a strong impact on the intention to stay on to post-compulsory education for boys, but not for girls.

Manzo (2013) contributed to the research on social interactions with a simulation study that uses agent-based modelling to model the effect of interdependence of choices among peers. The study is assessed against French data and shows that network-based interdependencies among educational choices contribute to educational stratification by amplifying the segregation of the educational choices that students make. The study did not include measures of actual peers' choices at the school or local level and therefore had to rely on assumptions regarding the extent of peers' influence on choices. It also had to rely on hypothesized values of students' ability and education benefit perceptions rather than representative individual survey data.

This project relates to several studies in economics, which look at the effect of peers' ability and socio-economic characteristics on students' outcomes. The standard references in economics for the study of peer effects are De Bartolome (1990) and Bénabou (1993). In a multi class environment, children choose whether to pursue more or less ambitious pathways and qualifications, whereby the cost associated with each option is proportional to the proportion in each class choosing such pathways and qualifications. Lavy et al. (2012) and Gibbons and Telhaj (2015), Mendolia et al. (2016), Hedges and Speckesser (2017), Belfield et al.

(2019), Boneva and Rauh (2017), and Battiston et al. (2020) used econometric techniques to address the issue of causality. Lavy et al. (2012), Gibbons and Telhaj (2015), Mendolia et al. (2016) and Hedges and Speckesser (2017) exploited the change in peers from primary to secondary school and use English datasets to analyse the effect of peers' academic achievement on individual achievement in secondary school and post-16 educational choices. Lavy et al. (2012) used within-pupil regressions to exploit the variation in achievements across different subjects. Gibbons and Telhaj (2015) used the peers' academic achievement in primary school as the key explanatory variable and, by using multiple age-cohorts, they also control for primary and secondary school fixed effects. While Lavy et al. (2012) found no effect of peer achievement on average, they find strong effects of low-achieving peers on average outcomes. Gibbons and Telhaj (2015) found small and significant peer effects, which do not vary across sub-groups. Battiston et al. (2020) looked at post-16 educational choices and found that school peers' achievement has a strong positive effect on the decision to take A-levels.

While the previous studies used the National Pupil Database (NPD), which has only a limited set of background characteristics, Mendolia et al. (2016) was based on the Next Steps, which includes information on the child, the family, and the school. The richness of Next Steps is ideal to control for confounding effects. To increase the plausibility of the peers effect estimates, the study also uses the peers of peers methodology. It found that peer quality has a small effect on an individual's test scores, with a larger proportion of low-achieving peers having a significantly detrimental effect on the achievements of an average student. Furthermore, peer achievement seems to have a stronger effect on students at the bottom of the academic achievement distribution. This chimes with a study by Duru-Bellat and Mingat (1999) which found that the gain to lower-achieving pupils from learning in mixed ability classes in France is stronger than the loss to the more able pupils.

This finding has been used by scholars to advocate for comprehensive education and the postponement of selection on the basis of ability (Green et al 2006).

3. Data and variables

Our analyses are based on data drawn from the high quality longitudinal Next Steps study, which follows a cohort of around 16,000 children born in 1989/1990 throughout eight waves up to age 25. The survey covers GCSE subject choices and post-16 pathways, as well as very rich information on the factors which might account for educational choices and academic achievement: social origins (parental education and occupation, family income), and individual factors (expectations, school engagement). We link Next Steps data to administrative education records from the National Pupil Database (NPD) and the ILR (Individualised Learner Records) on academic attainment of both the cohort members and their school peers. In the Next Steps survey schools were the primary sample units and the sample size per school is 30 pupils on average, with a total sample of 15,800 pupils in wave 1 when the students were aged 13/14. Of these survey members, 5208 individuals consented to their survey data being linked to administrative records.

The educational choice of interest is EBacc GCSE subjects versus non-EBacc subjects, which are usually chosen in Year 9 and A-levels or a combination of A-levels and vocational qualifications as opposed to vocational qualifications only after Year 11. Only 150 Next Steps members with achievement data from the NPD decided to leave education after Year 11. Hence, we decided to drop those cases from the sample. We also drop individuals who attended schools where no student took EBacc GCSE subjects as this likely indicates that the option of EBacc subjects was not available in that school. In Next Steps children were asked about

the reasons for choosing optional GCSE subjects and only a handful of cases – not included in the analysis – reported that the school allocated the optional subjects and that they did not get to choose. We used the survey weights provided with the dataset to account for the oversampling of the more deprived schools and pupils from minority ethnic groups and for the likelihood of dropping out from the survey. It should be noted that leaving education completely at 16 was a choice when the Next Steps sample were 16 in 2006 but it is not now. We also note that while the EBacc was introduced in 2010, i.e. after this cohort were in Year 9 when they chose GCSE subjects, we do focus on the choice for EBacc subjects for the reasons outlined above.

We use the GCSE capped point score and KS2 total point score as measures of **academic achievement** for the analysis of respectively post-16 choices and GCSE subject choice. Key Stage 2 are national examinations administered in all state schools at age 11 in the three core subjects of English, Mathematics, and Science. GCSEs or Key stage 4 are national examinations administered in all state schools at age 16 in the core subjects English, maths, science, and foundation subjects computing, physical education, citizenship, and optional subjects such as arts, design and technology, humanities and foreign languages. The variable, which has a mean of 323 and a standard deviation of 97, is divided by 10 for ease of interpretation.

School peers' choices are defined as the proportion of school peers of the same year group and the year before that completed A-levels and GCSE EBacc subjects. We include older peers too from the school year before as they are plausibly used as reference too. Most students take A-levels in schools and are included in the NPD database, however a minority complete A-levels in colleges, which instead are included in the ILR dataset. For this reason, we determine whether peers choose A-levels versus vocational qualifications by using both the NPD records and the ILR databases.

To define **socio-economic status** (SES) we use parents' ISEI and parents' education. ISEI stands for International Socio-Economic Index of Occupational Status. It is a measure of the status of occupations which considers occupation as an intervening variable between education and income (Ganzeboom et al. 1992). ISEI is derived from mapping the SOC 9 category classification of parents' occupation into ISCO88 and from ISCO88 to ISEI (age 14). The index is the average of both parents' ISEI and divided by 10 for ease of interpretation. Parents' education is the highest of parents' educational qualifications in six categories (no qualifications, level 1, GCSEs grades A-C, A-levels, higher education (non-degree), degree). The variable is coded in three categories: level 1 qualifications and below, GCSEs grades A-C and A-levels, and tertiary education.

We also include a variable indicating whether the family lives in an **urban** areas or areas with less than 10000 persons.

In estimating the **costs of education** we consider that students in general use A-level as a stepping stone to go into university and consider EBacc GCSE subjects as functional to take A-levels and therefore to ultimately enter university. Thanks to the student maintenance grant and Educational Maintenance Allowances (EMAs) for post 16 education, we consider that the 16 to 18 phase did not affect the estimated cost. Whilst A-levels are not costly per se, university fees were £3000 per year at that time, living expenses for those not living at home were £7000 and we consider that 80% of students do not live at home⁶ and that students plan to complete at least their bachelor's degree. To account for the greater weight that costs have for economically deprived children, we normalise costs by the equivalised family income. Yet, the largest component of the costs of pursuing A-

⁶ Our calculation from 2014 HESA data. Earlier data not available. <https://www.hesa.ac.uk/data-and-analysis/students/chart-4>

levels is the forgone earnings, i.e. the earnings that the person would have earned between the age of 18 and 21⁷ had they chosen a vocational qualification instead.

Cost of A-levels: $((7000*0.8*3+3000*3)/(\text{Equivalised family income}))+((11950*3)/(\text{Equivalised family income}))$

Where 11950=239(weekly gross earnings, year 2005, 18-21 YO's with vocational qualifications, Labour Force Survey)*50

Perceived chances of success: binary variable distinguishing between those who answer very likely or fairly likely (1) to the question about the likelihood of a hypothetical university entry application being successful versus other values (0).

Locus of control (age 14). It is the first component of the principal factor analysis conducted on the following Likert 4 point scale questions ranging from strongly agree (4) to strongly disagree (1): even if I do well at school, I'll have a hard time getting the right kind of job, working hard at school now will help me get on later on in life, people like me don't have much of a chance in life, I can pretty much decide what will happen in my life, doing well at school means a lot to me, how well you get on in this world is mostly a matter of luck, if you work hard at something you'll usually succeed. The original battery also contains the item: if someone is not a success in life, it is usually their own fault. The analysis shows that this item is not part of the dimension defined by the battery of items and has therefore been excluded. After excluding this item, the Cronbach's Alpha of the 7 items is 0.6.

Expected occupational (ISEI) returns. To compute this parameter, we proceed as follows. We first generate expected ISEI returns using the actual ISEI returns to education using the Labour Force Survey. It is plausible that individuals take into consideration multiple factors when defining the expected returns and ISEI

⁷ We assume here that young people choosing A levels think that they will go to university, meaning that the issue of foregone earnings applies for ages 18 to 21.

provide a composite measure of both income and prestige as proxied by the educational level of individuals which are in a particular occupation. In 2005 the Next Step cohort made the decision whether to take A-levels or vocational courses, with 15 percent of students opting a combination of A-levels and vocational courses at age 17. Therefore, the individuals aged between 25 and 65 in the year 2005 provide an accurate description of the labour market of prime aged individuals when Next Steps Cohort members chose between A-levels and vocational courses and we use their ISEI as a proxy for the Next Steps members subjective beliefs regarding the returns to education.

Considering that choosing vocational qualifications was associated with 44 ISEI, A-levels were associated with 59 ISEI and GCSEs A-C with 43 ISEI, ISEI returns can therefore vary between 43 and 59 depending on perceived chances of getting into university. To define the perceived chances of entering university we consider the self-reported probability of applying to university (age 14 and 16) * self-reported probability of getting into university when applying (age 14 and 16).

For the analysis of GCSE subject choice we use the age 14 variables, for the analysis of A-levels we use the age 16 variables.

The variable varies between very likely and not at all likely. We have translated these categorical values into probabilities when computing the probability of entering university: not at all likely: 0%, not very likely: 25%, fairly likely: 75%, very likely: 90%. Therefore the expected ISEI returns are: $43+16$ (which is the range of possible ISEI returns)*perceived chances of entering university.

We denote the expected occupational (ISEI) returns with U_{ij} , with i being the individual student (family) making the choice, and k the set of options, in this case A-levels versus vocational education.

Students then select A-levels (j) versus vocational courses with propensity γ_{ijk} .

$$\gamma_{ik} = \frac{e^{(\beta * U_{ik})}}{\sum_{j=1}^2 e^{(\beta * U_{ik})}}$$

In the above, the parameter β models using a quantal choice model the degree of uncertainty in the decision-making process (McKelvey and Palfrey 1998, Goeree et al. 2016, McFadden 1974). When the parameter is 0, the uncertainty is maximum, and individuals' choices are indifferent between the different options. For high levels of the parameter (in our setting, $\beta > 0.5$), the model approximates perfect rationality and the individual chooses almost with certainty the most desirable pathway (A-levels). For intermediate values, individuals tend to choose the most desirable pathway, but might not in some cases. We use the locus of control to operationalize this parameter (rescaled to have a mean of 0.4). The idea is that an internal locus of control implies more confidence in achieving the expected reward and therefore less uncertainty in making decisions. γ_{ik} is used as a covariate in the regression models of EBacc subject choice and choice of A-levels. The extent to which the estimate of the SES variables is reduced once the parameter is included provides an indication of the capacity of the hypothesized decision mechanisms to account for the effect of SES.

We include a measure of **school engagement** (age 13), which is a recognised indicator of student's motivation (Fredricks, Blumenfeld, & Paris, 2004). The measure is defined as the first component of the principal factor analysis conducted on the following Likert 4 point scale questions ranging from strongly agree (4) to strongly disagree (1): I am happy when I am at school, school is a waste of time for me, school work is worth doing, most of the time I don't want to go to school, people think my school is a good school, on the whole I like being at school, I work as hard as I can in school, in a lesson I often count the minutes till it ends, I am bored in lessons, the work I do in lessons is a waste of time, the work I do in lessons is interesting to me, I get good marks for my work, my school is clean and tidy. The Cronbach's Alpha of the items is 0.8.

Preferred subjects (age 14): Children were asked which GCSE subject was their favourite. We grouped the subjects to capture whether the individual stated that her favourite subject is the humanities (English, languages), social sciences (history, geography, social studies), arts (art, music, drama), maths and sciences, and vocational and applied subjects.

Preference for job types (age 13). Questions are on a three-point scale: 'matters a lot', 'matters a little', 'does not matter'. 1) Preference for having own business (level of importance of being own boss or having own business and having a job that pays well). 2) Preference for high status jobs: importance assigned to a job where you can have promotions, is interesting and pays well. When children assign at least some importance to each of the factors, we consider them to have a preference for having own business or high-status jobs (1), otherwise no (0).

To capture **school level characteristics** we compute the school average GCSE point score (using NPD data) and whether the school has a sixth form or not (using Next Steps data).

4. Statistical models

We model GCSE EBacc subject choice versus non-EBacc subjects and A-levels versus vocational qualifications using a probit model. Our analysis is characterised by multilevel data, by the use of an instrumental variable strategy to estimate the effect of peers' choices and by a mediation analysis of the role of the hypothesized mechanisms in accounting for the association between SES variables and educational choices.

We take into account the multilevel structure of the data whereby students are nested in schools using mixed models which take school differences as parallel shifts in the regression line using school-specific (random) intercepts. In contrast

to fixed models, which control for enrolment in a school, mixed models estimate the effect of variables that are constant within schools, such whether it has a sixth form (Raudenbush and Bryk 2002). The fixed effect of the model takes the average effect of the independent variables using an overall regression line, which does not vary between schools. The random school intercept models between-school variability by shifting the regression line up or down according to each school after controlling for other variables. Survey weights are used to take into consideration that more deprived schools and pupils from minority ethnic groups have been oversampled by survey design.

Any analysis of the effect of peer groups faces two main complications. First, individuals tend to sort into groups, which are similar to their characteristics. This implies that when individuals behave consistently with the group, it might be incorrect to infer a group influence as it may be that group formation has occurred after and on the basis of similar behaviours. The second is the reciprocal influence among group members, with the result that the individual influences the group as much as the group influence him/her. If those issues are not accounted for, the estimation of the effect of the group on educational choices is biased. Random assignment addresses the sorting bias but not the reciprocal influence problem. This latter problem requires measures of the characteristics of group members prior to the peer group formation. Our identification strategy follows the studies that used NPD to analyse the effect of peers on educational outcomes by using a peers of peers methodology. Like Battiston et al. (2020), Mendolia et al. (2018), Hedges and Speckesser (2017) and Gibbons and Telhaj (2015) we exploit the fact that many children change school at age 11 when they transition to secondary education and that in secondary schools, as a result of this change, a large proportion of a students' cohort consists of new peers on average. On average, only a handful of students within a given primary school move to the same secondary school. Hence a relatively high number of primary schools feed

into the average secondary school (Mendolia et al. 2018). The peers of peers methodology uses the academic attainment at KS2 of the primary school peers' of the secondary school peers, who attended a different primary school than that of the individual of interest, as an instrument for the influence of secondary school peer group choice of EBacc subjects and A-levels. As the peers of peers did not attend the same primary or secondary school as the individual of interest, they cannot have had any direct impact on the individual's choices. Hence the idea to focus on the part of the variability of secondary school peers' choices that is related to the primary school peers defined above. Using this strategy, we overcome the sorting and mutual influence statistical bias and identify how the secondary school peers' choices would have been had they not been influenced by the secondary school they attend. In the first stage equation, the probability that school peers choose EBacc subjects and A-levels is regressed on the KS2 performance of the students who went to the same primary school as those in the secondary school peer group but then progressed to different secondary schools. The F statistic (303 and 151 for the secondary school peers' choice of A-levels and EBacc subjects respectively) allows us to confidently reject the hypothesis that the KS2 performance of the peers of peers is a weak instrument. The predicted probability of school peers' choosing EBacc subjects and A-levels are then used in the second stage equations as predictors of the Next Steps members educational choices instead of the actual school peers' choices. The standard errors of these estimates are corrected to consider that these are predicted values (Wooldridge 2013, p. 466).

We decompose the total effect of SES variables into direct and indirect – via prior academic attainment – effects. The part of the effect of SES which is accounted for by prior academic attainment is called primary effect. Moreover, we account for the residual association between SES variables and educational choices once prior academic is considered (secondary effects) using the hypothesized mechanisms.

The mediation analysis is conducted using the difference in coefficients method. The outcome is regressed on the SES variables with and without the mediating variables. The difference between the coefficient of the SES variables in the first model (reduced model) and the second model (full model) quantifies the indirect effect of the SES variables through the mediating variables. The standard error of the indirect effect is computed using the delta method (Valeri and VanderWeele 2013). We obtain comparable results when using the product of coefficients method. The consistency of the results across the two methods is a result of the use of average marginal effects, which are discussed below.

Comparing odds ratios or log-odds ratios across models is problematic because the coefficients reflect unobserved heterogeneity, which can vary across samples and groups even if the omitted variables are not correlated with the independent variables (Mood 2010). To overcome the issue, we report the coefficients as average marginal effects, which express the average effect of a one-unit change in the independent variable on the probability that the outcome is positive ($\Pr(y=1)$). As average marginal effects are not affected by unobserved heterogeneity that is unrelated to the independent variables in the model, it is legitimate to compare them across models (Mood 2010).

5. Results

Descriptive statistics

Table 1 shows that high SES (in terms of ISEI and education) children tend to choose A-levels more than lower SES children do. Children with parents in first quartile of ISEI and with parents with lowest level of education (low SES) choose A-levels respectively 38% and 32% of the times. Conversely, children with parents in the top quartile of ISEI and with a tertiary degree (high SES) tend to choose A-

levels 71% and 73% of the times. Low SES children's choices are more diverse than those of higher SES children. Choices of lower SES children are more evenly distributed between the different options, whilst high SES children tend to focus on A-levels and opt for alternatives quite rarely. Children with parents in the first quartile of ISEI have four options above 10% apart from A-levels, and children with parents with a tertiary degree have five options above 10%. High SES children instead have only A-levels above 10%. The lower propensity to choose A-levels and the higher heterogeneity in the choices of low SES children is accounted for by the differences in academic attainments between high and low SES children as we will show later on in the analysis. However, the part which is not accounted for by academic attainment, it can be probably accounted for by the inconsistency of the direction in which social forces and stimulus operate their effect of choices. In other terms, despite relatively high aspirations, low SES children might have relatively low perceived chances of success and a relatively low proportion of peers opting for ambitious educational pathways. This inconsistency or entropy of the factors influencing choices, with inputs pointing in different directions, is likely to determine uncertainty and randomness in deciding the best course of action, which in turn is associated with variability in choices according to information entropy theory. On the other hand, for high SES children inputs operate in the same direction and there is alignment between aspirations, perceived chances of success, and peers' choices. Entropy is minimal for this group of students and it is easier to determine what the best strategy is.

Table 1. Educational choice – qualification being studied at age 17 by parents' SES variables (column percentages)

	Average	ISEI 1 st quartile	ISEI 2 nd quartile	ISEI 3 rd quartile	ISEI 4 th quartile	Level 1 and below	GCSEs, A-levels	Tertiary
A-levels	59	39	48	64	76	37	56	78
NVQs, GNVQs	6	11	7	4	2	10	6	2
BTEC, OCR	9	10	10	8	7	10	10	6
Key, basic skills	12	15	14	11	8	17	12	8
Work full time	7	12	9	6	2	12	7	3
NEET	5	9	7	3	2	9	5	1
Other	4	5	5	4	3	5	4	2
Total	100 (4208)	100	100	100	100	100	100	100

Table 2 – Selected school level and individual variables by parents' SES variables (proportions)

	School's KS4 performance	Proportion of school peers choosing A-levels	Proportion of school peers choosing EBacc subjects	Proportion attending a sixth form school	Proportion living in an urban area	Proportion reporting high likelihood of getting into university (age 14)	Proportion reporting high likelihood of getting into university (age 16)
ISEI 1 st quartile	278	0.59	0.25	0.64	0.72	0.55	0.39
ISEI 2 nd quartile	283	0.60	0.26	0.62	0.75	0.62	0.46
ISEI 3 rd quartile	301	0.60	0.30	0.70	0.72	0.71	0.57
ISEI 4 th quartile	322	0.62	0.35	0.75	0.68	0.79	0.66
Level 1 and below	273	0.60	0.23	0.61	0.76	0.59	0.42
GCSEs, A-levels	295	0.59	0.29	0.68	0.70	0.64	0.50
Tertiary	321	0.62	0.34	0.74	0.70	0.81	0.69

Accounting for the effect of SES on educational choices

The analysis consists of a sequence of nested probit models that progressively add school factors, attitudes and the occupational returns parameter to the baseline model of that regresses educational the choice of EBacc GCSE subjects and the choice of A-levels on the SES variables. The results of the regression models are presented in Tables 3 and 4. Model 1 in both Table 3 (EBacc) and 4 (A-levels) show the unconditional effect of parents' SES measures. Models 2 and 3 add respectively prior academic attainment on Key stage exams and the school characteristics (school has a sixth form and the school average KS performance) as covariates. The effect of the parents' SES variables in Model 2 are the secondary effect, which our study tries to account for. Model 4 includes both model 2 and 3 covariates and Model 5 adds the cost of education. Model 6 include all subjective measures and the model 5 covariates. Models 7 and 7.1 analyse the effect of peers' choices (instrumental variable and observed variable respectively) and model 8 looks at both the effect of peers' choices and the occupational returns parameter. Model 9 looks at the effect of all school level variables. Model 10 includes both the subjective measures and the school level variables and is the model with all covariates (locus of control and perceived chances of success are not included as covariates as they are part of the definition of the occupational returns parameter). The extent to which the estimate of the SES variables is reduced once those variables are added to the baseline model provides an indication of the capacity of the hypothesized decision mechanisms to account for the effect of SES on educational choices. The analysis of the decomposition of the effect of the SES variables into its direct and indirect effects, i.e. mediated by the hypothesized mechanisms is presented in Tables 5 and 6.

Table 3 – Probit mixed level models of GCSE EBacc subjects (marginal effects). Next Steps, NPD linked data													
	1	2	3	4	5	6	7	7.1	7.2	8	9	10	11
ISEI	0.028*** (0.006)	0.017** (0.006)	0.020*** (0.005)	0.012** (0.006)	0.012** (0.005)	0.010* (0.005)	0.011** (0.006)	0.011** (0.005)	0.016** (0.006)	0.008 (0.006)	0.011** (0.006)	0.010* (0.006)	0.008 (0.006)
Parents' education (Ref: level 1 or below)													
GCSEs A-C, A-levels	0.065** (0.020)	0.013 (0.020)	0.044** (0.020)	0.001 (0.020)	0.002 (0.020)	-0.001 (0.019)	0.001 (0.020)	-0.005 (0.019)	0.011 (0.020)	-0.001 (0.020)	-0.001 (0.020)	-0.002 (0.020)	-0.001 (0.020)
Tertiary education	0.149*** (0.025)	0.056** (0.025)	0.113*** (0.025)	0.034 (0.024)	0.034 (0.024)	0.026 (0.024)	0.033 (0.024)	0.029 (0.024)	0.053** (0.025)	0.024 (0.024)	0.032 (0.024)	0.025 (0.024)	0.023 (0.024)
KS2 performance		0.145*** (0.010)		0.129*** (0.010)	0.129*** (0.010)	0.107*** (0.010)	0.127*** (0.010)	0.127*** (0.010)	0.141*** (0.010)	0.103*** (0.011)	0.127*** (0.010)	0.105*** (0.010)	0.101*** (0.011)
School has a sixth form			0.053** (0.025)	0.047* (0.024)	0.047* (0.024)	0.043* (0.024)	0.048** (0.024)	0.040 (0.021)		0.044* (0.024)	0.048** (0.024)	0.043* (0.024)	0.045* (0.024)
School's KS4 performance			0.239*** (0.028)	0.187*** (0.028)	0.187*** (0.028)	0.183*** (0.027)	0.182*** (0.028)	0.062* (0.032)		0.176*** (0.028)	0.182*** (0.028)	0.178*** (0.023)	0.175*** (0.027)
Cost of Education					0.002 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.002)		0.001 (0.001)	0.001 (0.002)
Locus of control						0.023** (0.009)						0.023** (0.009)	
School engagement						0.041*** (0.009)						0.041*** (0.009)	0.041*** (0.009)
Perceived chances of success						0.052** (0.017)						0.052** (0.017)	
High status jobs aspirations						-0.015 (0.019)						-0.015 (0.020)	-0.017 (0.020)
Own business aspirations						-0.016 (0.014)						-0.016 (0.014)	-0.015 (0.014)
Occupational returns										0.038*** (0.006)			0.029*** (0.006)
School peers' choice of EBacc (Instrumental variable approach)							0.010 (0.009)		0.019* (0.010)	0.08 (0.008)	0.010 (0.009)	0.09 (0.008)	0.08 (0.008)

School peers' choice of Ebacc (observed variable)								0.006*** (0.001)					
N	4208	4208	4208	4208	4208	4208	4208	4208	4208	4208	4208	4208	4208
Control variables: two-parent household, gender, ethnicity, lives in an urban area													
p: 0.001***, 0.05**, 0.1*													

Table 4 – Probit mixed level models of A-level choice (marginal effects). Next Steps, NPD linked data. Subsample of those eligible (5 GCSEs, A-C)													
	1	2	3	4	5	6	7	7.1	7.2	8	9	10	11
ISEI	0.027*** (0.006)	0.014** (0.005)	0.019** (0.005)	0.011* (0.005)	0.010** (0.005)	0.005 (0.005)	0.009* (0.005)	0.013* (0.006)	0.011** (0.005)	0.003 (0.005)	0.009* (0.005)	0.004 (0.005)	0.002 (0.005)
Parents' education (Ref.: level 1 and below)													
GCSEs A-C, A-levels	0.046* (0.026)	0.013 (0.021)	0.033 (0.024)	0.010 (0.020)	0.010 (0.020)	0.009 (0.020)	0.007 (0.020)	0.019 (0.022)	0.008 (0.021)	0.004 (0.019)	0.007 (0.020)	0.006 (0.020)	0.003 (0.019)
Tertiary education	0.151*** (0.027)	0.076** (0.024)	0.122*** (0.026)	0.071** (0.023)	0.071** (0.022)	0.067** (0.022)	0.068** (0.023)	0.068** (0.026)	0.071** (0.023)	0.059** (0.022)	0.068** (0.023)	0.063** (0.022)	0.059** (0.021)
KS4 performance		0.031** * (0.002)		0.029*** (0.002)	0.029*** (0.002)	0.022*** (0.002)	0.028*** (0.002)	0.033*** (0.002)	0.031*** (0.002)	0.029*** (0.002)	0.029*** (0.002)	0.022*** (0.002)	0.019*** (0.002)
School has a sixth form			0.076*** (0.016)	0.081*** (0.014)	0.080*** (0.014)	0.067*** (0.014)	0.081*** (0.014)	0.067*** (0.015)		0.071*** (0.013)	0.081*** (0.014)	0.073*** (0.014)	0.068*** (0.013)
School's KS4 performance			0.124*** (0.018)	0.038** (0.019)	0.039** (0.019)	0.039** (0.019)	0.028 (0.019)	-0.196*** (0.043)		0.030* (0.017)	0.028 (0.019)	0.022 (0.019)	0.028 (0.018)
Cost of Education					-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)		-0.002** (0.001)	-0.002** (0.001)
EBacc subject choice						0.019 (0.014)						0.017 (0.014)	0.009 (0.013)
Locus of control						-0.012 (0.008)						-0.012 (0.009)	
School engagement						0.013* (0.008)						0.013* (0.008)	0.003* (0.001)
Perceived chances of success						0.162*** (0.023)						0.162*** (0.023)	
High status job aspirations						0.049** (0.018)						0.049** (0.018)	0.046** (0.018)
Own business aspirations						-0.016 (0.013)						-0.016 (0.013)	-0.015 (0.013)
Preferred subject (Ref.: Humanities)													
Social Sciences						0.032 (0.025)						0.035 (0.025)	0.020 (0.024)

Arts						0.059** (0.019)						0.061** (0.019)	0.056** (0.019)
Science						0.040 (0.025)						0.041 (0.025)	0.035 (0.025)
Vocational, applied						0.035** (0.016)						0.035** (0.016)	0.027** (0.016)
Occupational returns										0.004*** (0.001)			0.004*** (0.001)
School peers' choice of A- levels (Instrumental variable approach)							0.029* (0.014)		0.034* (0.015)	0.028* (0.014)	0.029* (0.014)	0.030* (0.015)	0.028* (0.014)
School peers' choice of A- levels (observed variable)								0.006*** (0.001)					
N	2716	2716	2716	2716	2716	2716	2716	2716	2716	2716	2716	2716	2716
Control variables: two-parent household, gender, ethnicity, lives in an urban area													
p: 0.001***, 0.05**, 0.1*													

The results show that a large part of the effect of ISEI and parents' education is accounted for by prior academic achievement at Key Stage exams. This is in line with existing research and particularly relevant for the English case because of the high-stakes nature of Key Stage exams. The comparison between the baseline Model 1, and Model 2 which adds prior academic attainment shows that for A-levels choice, half of effect of ISEI and parental tertiary education and 70% of the effect of GCSEs/A-levels is accounted for by prior academic achievement. For GCSE EBacc subject choice (Table 4), prior academic attainment at Key Stage 2 accounts for roughly 40%, 60% and 80% of the effect of ISEI, parental tertiary education and parental GCSEs/A-levels.

Table 5 - Mediation analysis of the association between socio-economic background variables and choice of GCSE EBacc subjects

Ses variables	Control variables										
	Total (reduced model 1)	KS2 performance (model 2)		School factors + KS2 performance (model 7)		Peers' effect + KS2 performance (model 7.2)		Attitudes + School factors + KS2 performance (model 10)		ISEI returns + School factors + KS2 performance (model 8)	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
ISEI	0.028***	0.017**	0.011	0.011**	0.017	0.016**	0.012	0.010*	0.018	0.008	0.020
% total effect			39%		61%		43%		64%		71%
GCSEs A-C, A-levels	0.056**	0.013	0.043**	0.001	0.055**	0.011	0.045**	-0.002	0.056**	-0.001	0.057**
% total effect			77%		98%		80%		100%		100%
Tertiary education	0.149***	0.056**	0.093**	0.033	0.116***	0.053**	0.096***	0.025	0.124***	0.024	0.125***
% total effect			62%		78%		64%		83%		83%

Ses variables	Total secondary effect	School factors		Peers' effect		Attitudes		ISEI returns	
		Indirect	% of secondary effects	Indirect	% of secondary effects	Indirect	% of secondary effects	Indirect	% of secondary effects
ISEI	0.017**	0.006	35%	0.001	6%	0.001	6%	0.003	18%
GCSEs A-C, A-levels	0.013	0.012	92%	0.002	15%	-0.004	0%	-0.004	0%
Tertiary education	0.056**	0.023	41%	0.003	5%	0.004	7%	0.005	9%

Table 6 - Mediation analysis of the association between socio-economic background variables and choice of A-levels

Ses variables	Control variables										
	Total (reduced model 1)	KS4 performance (model 2)		School factors + KS4 performance (model 7)		Peers' effect + KS4 performance (model 7.2)		Attitudes + School factors + KS4 performance (model 10)		ISEI returns + School factors + KS4 performance (model 8)	
		Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
ISEI	0.027***	0.014**	0.013	0.009*	0.018	0.011	0.016	0.004	0.023	0.003	0.024
% total effect			48%		67%				85%		89%
GCSEs A-C, A-levels	0.046*	0.013	0.033**	0.007	0.039**	0.008	0.038**	0.006	0.040**	0.004	0.042**
% total effect			71%		85%		83%		87%		91%
Tertiary education	0.151***	0.076**	0.075**	0.068**	0.083***	0.071	0.080***	0.063**	0.088***	0.059**	0.092***
% total effect			50%		55%		53%		58%		61%

Ses variables	Total secondary effects	School factors		Peers' effect		Attitudes		ISEI return	
		Indirect	% of secondary effects	Indirect	% of secondary effects	Indirect	% of secondary effects	Indirect	% of secondary effects
ISEI	0.014**	0.004	29%	0.003	21%	0.007	50%	0.008	57%
GCSEs A-C, A-levels	0.013	0.006	46%	0.005	38%	0.004	31%	0.006	46%
Tertiary education	0.076**	0.008	11%	0.005	7%	0.008	11%	0.012	16%

Models 4 and 7 analyse the association between school factors and the outcomes: Model 4 includes the school KS4 performance and whether the school has a sixth form, Model 7 adds the school peers' average choices. School factors have a substantial association with the two educational choices and account for a substantial portion of the effect of SES variables. Peers' choice of A-levels has a substantial positive effect on the probability of choosing A-levels. A 1% increase in school peers choosing A-levels is associated with a 3% percent increase in the probability of choosing A-levels (Model 7, IV estimation strategy). The effect of

peers' choice on GCSE EBacc subject choice is smaller (roughly 1%). The OLS estimate (Model 7.1) for both the A-levels and EBacc subject choice models is smaller but in line with the IV estimate (0.6% for both choices) and highly significant. Whether the school has a sixth form and the school average performance at Key stage 4 exams have a substantial association with educational choice. Overall school factors (Model 7) account for a substantial portion of the effect of SES variables. School factors account for 35%, 92% and 41% of the secondary effect of ISEI, parental GCSs/A-levels and parental tertiary education on GCSE EBacc subjects choice and for 29%, 46% and 11% of the secondary effect of these SES variables, respectively, on A-levels choice (Tables 5 and 6). The three school variables together are likely to provide an overestimation of school effects. This is because they also capture individual factors that account for the choice of secondary school. Students planning to pursue A-levels often attend schools with a sixth form and high academic performance. This partial overlap makes it challenging to separate the influence of the school from the characteristics of the individual students. We can consider the estimates provided under 'School factors' (Tables 5 and 6) as upper bound estimates of the influence of school. The variable peers' (Model 7) choice instead provides a lower bound estimate of the influence of school. While the IV strategy helps reduce the influence of confounding factors when estimating the effect of peers' choices, it focuses on only one aspect of schools. This approach overlooks other important factors like school culture and the influence of teachers. The influence of peers accounts for 6%, 15% and 5% of the secondary effects of ISEI, parental GCSs/A-levels and parental tertiary education on GCSE EBacc subjects choice and for 21%, 38% and 7% of the secondary effects of these SES variables, respectively, on A-levels choice (Tables 5 and 6).

The addition of costs of pursuing further education (Model 5) has a small but significant effect on the A-levels choice. The higher the costs, the lower the

probability of choosing A-levels. Students consider the forgone opportunity to earn an income whilst doing A-levels and university, and also the costs in terms of fees and living expenses of pursuing university. Costs instead do not have an association with GCSE EBacc subject choice.

Model 6 adds the subjective variables. Table 3 shows that the locus of control and the perceptions about school do not have a substantial or significant association with A-levels. The perceived chances of success is the variable with the strongest association with A-levels choice (coefficient=0.162). A preference of arts related and applied, vocational GCSE subjects (coefficients respectively of 0.059 and 0.035) and aspirations to have a high-status job (0.049) are also related to A-levels choice. GCSE Ebacc choice similarly to A-levels depends on chances of success (0.052), although the size of the effect is smaller. Differently from A-levels, EBacc subject choice depends on the locus of control (0.023) and on school engagement (0.041). Those variables mediate only marginally the effect of SES variables on the GCSE EBacc subjects choice, but they account for half of the secondary effects of ISEI, and 31% and 11% of the secondary effect of GCSEs/A-levels and tertiary education in the model that analyses the choice of A-levels.

The parameter *ISEI returns* predicts the probability of choosing Ebacc GCSE subjects and A-levels using the expected ISEI returns adjusted for the perceived chances of success. It also uses the locus of control to model uncertainty and bias in decision making (bounded rationality). The parameter has a significant association with the two educational choices and accounts for some of the effect of SES variables. It accounts for 18%, 0% and 9% of the secondary effect of ISEI, parental GCSEs/A-levels and parental tertiary education on GCSE EBacc subject choice, and 57%, 46% and 16% of the secondary effect of these SES variables, respectively, on A-levels choice. Therefore, the expected ISEI returns are more consequential for the A-levels choice than for GCSE EBacc choice.

Finally, the mediating mechanisms we analysed cannot explain the entirety of the secondary effect of the SES variables. The residual is likely to capture unobserved characteristics, which we did not consider. One such a factor that the literature on social stratification has long debated is the avoidance of downward mobility. It is plausible that the residual represents the drive not to fall below the level of educational attainment and socio-economic status of the parents.

6. Conclusions

This study advances existing knowledge regarding the SES differentials in educational choices by providing an empirical test of the following mechanisms: a) differentials in economic resources and the related relative costs (Gambetta 1987, Delavande and Fumagalli 2019, Bleemer and Zafar 2018, Breen and Yaish 2006, Morgan 1998, 1996); b) differentials in the expected economic benefits of educational choices, described in terms of occupational returns (Breen and Yaish 2006, Breen and Goldthorpe 1997); c) differentials in the influence of peers (Manzo 2013, Jæger 2007, Morgan 2005, Thomas and Webber 2001); d) differentials in school engagement (Fredricks, Blumenfeld, & Paris, 2004) e) differentials in sense of personal control of students from different social origins (Pepper and Nettle 2017). Our theoretical framework thus integrates multiple mechanisms derived from models of sociology and behavioural economics.

Thanks to the richness of Next Steps, we could empirically define those mechanisms in detail but as any study looking at decision making mechanisms, we had to rely to some extent on assumptions regarding what students want and believe and the type of constraints students are subject to. Data limitations also implied that 1) we could not identify the influence of close, significant peers or peers similar to the individual, which are the types which are likely to influence

choices the most. As individuals are more likely to adopt the goals and preferences of similar and close others (Loersch, Aarts, Payne, & Jefferis, 2008), we might expect that our analysis underestimated the influence of peers by averaging out the influence of non-close and close peers; 2) we could not consider the profile of GCSE subjects offered by the secondary school, which limits the choice of optional GCSE subjects.

Notwithstanding those limitations, this study contributes to our knowledge of SES differentials in educational choices in important ways. First, the perception of succeeding in education – proxied as the self-reported probability of a hypothetical university entry application being successful - is a reflection of socio-economic opportunities apart from prior academic attainment and has a large impact on educational choices. The extent to which individuals pursue more ambitious educational choices such as A-levels reflects the individual perception that efforts will be rewarded. We consider that most students take A-levels as an intermediate step to enter university and they evaluate the costs and rewards of choosing A-levels against the prospect of entering university and bearing the costs of university fees and living expenses and against the prospect of forgone income whilst studying at university instead of entering the labour market full time. Students from a lower SES background think they have fewer chances of getting into university even after taking into consideration prior academic attainment. Their lower propensity to choose A-levels is therefore an ‘understandable’ response to the lower opportunities they perceive that they have. It is plausible that they use the socio-economic status of their parents and of the people around them as an indicator of the socio-economic status they are likely to attain and infer that they are less likely to end up in a high-status position regardless of their academic achievement. Children make educational choices relying on information about the returns to different educational pathways assigning particular salience

to the status of people in their network. This mechanism could account for some of the socio-economic differentials in the choice of A-levels.

Second, the choice of secondary school has a substantial role in shaping the choice for EBacc GCSE subjects and A-levels. Attending a school with a sixth form, a higher level of attainment at GCSE exams and a higher proportion of students choosing EBacc subjects and A-levels are associated with a higher likelihood of choosing EBacc GCSE subjects and A-levels post-16. They also account for a substantial part of the association between socio-economic background and those choices. Regarding the effect of peers' choices, a 1% increase in school peers choosing EBacc GCSE subjects is associated with a 1% percent increase in the likelihood of choosing those subjects and a 1% increase in school peers choosing A-levels is associated with a 3% percent increase in the likelihood of choosing A-levels. This estimate of the peers' effect is obtained using a statistical strategy based on the instrumental variable peers of peers which did not attend the same primary school as the cohort members' one. This strategy eliminates the effect of the confounding factors associated with attending the same school and coming from the same socio-economic background.

Our study shows that there are strategic reasons for choosing an educational pathway which have to do with the expected returns, there are non-strategic reasons for choosing an educational pathway which have to do with school engagement (such as liking school, teachers and classmates and having an interest in learning) and there are social reasons which have to do with children influencing each other's decisions and parents influencing their children's choices. Each type of mechanism has specific policy implications.

Intervening on the strategic reasoning of children requires programmes that aim to provide accurate information and change expectations. Intervening on

children's approach to school requires different programmes which focus on behavioural change.

The extent to which expectations can be modified by interventions needs further research, particularly regarding effective interventions among students with very different reasons for the educational choices they make, but existing research offers a direction for intervening: focusing on programmes targeting disadvantaged students to provide them with information and guidance regarding the benefits of educational pathways. We already know from the research on career guidance that such programmes can be quite effective especially those involving experiential activities (Gorard et al. 2017) and student counsellor (Tomaszewski et al. 2017). The evidence also show that all students benefit from such programmes but that students from disadvantaged backgrounds benefit the most from them (Tomaszewski et al. 2017).

Apart from targeting students, research shows that there is scope for improving the provision and quality of post-16 vocational and technical qualifications thus reducing the quality and esteem gap between vocational and academic post-16 qualifications. Research shows that lower rates of participation in high quality apprenticeships, relatively low resourcing of vocational qualifications and lower levels of curriculum standardisation across the academic and vocational routes are associated with lower skill levels and higher skill inequalities (Green et al. 2021, Pensiero and Green 2018, Green and Pensiero 2016). The government's plan to introduce the Advanced British Standard (ABS), a new Baccalaureate-style qualification framework for 16–19-year-olds goes in the direction of reducing the quality gap between vocational and academic qualifications. The planned reform aims to bring together technical and academic routes into a single framework, increase the number of taught hours for all students and require students to study maths and English to the age of 18.

The substantial influence of school peers and other school characteristics implies that the secondary school children attend affect students' choices and contributes to the level of SES segregation in colleges and sixth forms at the subsequent post-16 phase. Policies that aim at reducing the effect of school segregation on students' choices could try to:

- Increase the enrolment of disadvantaged students in good / desired schools. Examples of such programmes are the Brighton and Hove policy of giving pupils eligible for free school meals priority when applying for a secondary school place (Sarah Booker-Lewis 2024) and Minnesota's public-school choice option of open enrolment that allows students and parents to have access to schools that are not within their resident area. Another such programme is the Cambridge (US) controlled choice programme for public schools that allows parents to choose schools from across a district while simultaneously giving the district information about the families needed to ensure that schools were balanced socioeconomically. When the percentage of disadvantaged students at a school reflects the School District's averages, the school is considered to be "balanced."
- Collect information about school composition with respect to family socio-economic background for example parents' education apart from free school meal eligibility to be included in the NPD records. This will provide policy makers and researchers with valuable information to monitor schools' SES composition and segregation. The recommendation of making information on schools' SES composition (with respect to parents' education and FSM eligibility) available does not extend to the public as this is likely to increase segregation. There are two opposite effects at play: on the one hand the availability of information on school composition will increase competition for the

schools with higher SES pupils, which in turn will increase school SES segregation in a system based on a catchment area admission policy; on the other families will tend to avoid highly segregated schools (this is because families tend to avoid schools where they are the only group and there is no diversity or where they are the minority). The former effect - which outweighs the latter - together with the catchment area-based allocation system is likely to exacerbate school segregation by parents' SES (Pensiero and Brede 2024).

- Reduce or defer the branching points in the education system or make them less salient. An example of making branching points less salient could be by making A levels and vocational courses more alike, for instance by introducing more general subjects in vocational education or including some practical courses in A-levels. England could learn from continental Europe here as many European countries offer a more comprehensive curriculum in upper secondary vocational education, including subjects such as citizenship education, history and a foreign language. A more comprehensive curriculum in both A levels and vocational education would also align well with the aforementioned government plan to reduce the quality and esteem gap between these tracks.

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