Received: 27 July 2022 | Accepted: 19 June 2023

DOI: 10.1002/berj.3892

ORIGINAL ARTICLE

BERJ BERA

Teacher autonomy: Good for pupils? Good for teachers?

John Jerrim[1] | **Andrew Morgan**[1] | **Sam Sims**[2]

[1]UCL Social Research Institute, London, UK

[2]UCL Centre for Education Policy and Equalising Opportunities, London, UK

Correspondence
John Jerrim, UCL Social Research Institute. 55-59 Gordon Square, London WC1H 0NU, UK.
Email: j.jerrim@ucl.ac.uk

Abstract

Should teachers have complete autonomy over teaching methods and practices, or should some aspects of their practice be determined by school or government policy? We address this question using repeated (value-added) maths test scores linked to rich survey data from the TALIS video study. With the possible exception of inexperienced teachers, we generally find no relationship between teacher autonomy and pupil outcomes (test scores, maths self-efficacy or interest in maths). In partial contrast with our findings for pupil outcomes, teachers with very low levels of autonomy are more likely to report reduced job satisfaction. It may hence be that some level of restriction on teacher autonomy is justified, especially among inexperienced teachers, particularly when it represents only partial control of teachers' approaches in the classroom and is done to introduce evidence-based methods.

KEYWORDS

autonomy, TALIS video study, teacher value-added

INTRODUCTION

Almost since the advent of publicly funded schooling, there has been debate about how much autonomy teachers should have in their own classrooms (Venezky, 1990). At one extreme are those who advocate for fully scripted lessons, in which the teacher's approach to presenting the material is pre-specified down to the word level. This line of thinking dates back at least as far as 1888, when Lewis Monroe published a manual containing near-fully scripted sets of lessons for teaching reading (Venezky, 1990). In the twentieth century, this tradition continued with Engelmann's famous Direct Instruction programmes (Engelmann &

Key insights

What is the main issue that the paper addresses?

This paper explores the association between the autonomy of mathematics teachers over various aspects of their work and outcomes for the pupils that they teach. It also explores the link between teacher autonomy and teacher job satisfaction.

What are the main insights that the paper provides?

We find no evidence of a link between the autonomy of mathematics teachers and pupil's outcomes. Teachers with the lowest levels of autonomy do, however, report lower levels of job satisfaction.

Carnine, 1982). These incorporated daily scripted lesson plans that 'tell the teacher exactly what to say and do' in an attempt to improve the sequencing of material and eliminate ambiguity from teachers' explanations (Engelmann et al., 1988, p. 304). Advocates of this approach can point to some meta-analytic evidence of its benefits (Stockard et al., 2018), along with a recent impact evaluation in Kenya which found that pupils attending schools using a highly standardised approach to education made much more substantial academic progress than their peers who did not (Gray-Lobe et al., 2022).

A slightly less prescriptive approach to teachers' practice can be found in the provision of off-the-shelf lessons for teachers. Examples of such products include the Voyager Universal Literacy System and Mathalicious (Crowley, 2017; Jackson & Makarin, 2018). These specify the content and activities for a sequence of lessons, while leaving teachers with some discretion over how to present, explain and link the lesson components. Oak Academy in England is a more recent example that emerged during the COVID-19 pandemic, providing curriculum and lesson planning resources for teachers. Yet it has recently come under fire from teaching unions for causing 'irreparable damage to school autonomy' (Martin, 2022). A related approach is to specify the overall structure for lessons but allow teachers to decide how to plan and deliver the activities within that structure. In England, the Literacy Hour required each lesson to consist of 10 min of whole class reading/writing, 10 min of phonics/spelling, 30 min of direct group activities and then a plenary (Machin & McNally, 2008). Advocates for this approach argue that it allows for evidence-based methods to be rolled out at scale, with both Mathalicious and the Literacy Hour having been found to be beneficial for pupils (Jackson & Makarin, 2018; Machin & McNally, 2008).

On the other side of the debate, advocates for teacher autonomy argue that teachers are best left to decide based on their own expertise and knowledge of their pupils. This is arguably the default position in most school systems. Indeed, the sociologist Lortie (1975) famously characterised schools as 'egg crates', in which each teacher works in isolation within their own self-contained classroom. Advocates can point to evidence that suggests constraining the autonomy of teachers can reduce their motivation (Collie et al., 2016; Gorozidis & Papaioannou, 2014; Piza et al., 2020; Skaalvik & Skaalvik, 2017), lead to the development of 'negative emotions' (Skerritt, 2019) and might prevent them tailoring instruction to pupils needs and interests (Shing & Brod, 2016). Indeed, in the interviews conducted by Brady and Wilson (2021), participants noted how having greater autonomy from government is one of the likely reasons why job satisfaction tends to be higher among teachers working in the private school sector. In contrast, teachers in the state sector may feel they have to put on

fabricated 'performances' to satisfy school inspectors, rather than acting in accordance with their own professional judgement (Ball, 2003; Skerritt, 2022). This lack of autonomy resulting from high-stakes accountability has been highlighted in qualitative research as a key factor why many teachers decide to leave the teaching profession (Perryman & Calvert, 2020).

Yet despite the longstanding attention given to this issue, there are still important gaps in our understanding of the value of teacher autonomy. Existing observational research often relies on cross-sectional data, addressing a single outcome. This limits what can be learned about the consequences and trade-offs involved in curtailing the freedoms of teachers. Meanwhile, the experimental and quasi-experimental studies cited above make it challenging to separate the effects of autonomy from the effects of the specific intervention being evaluated (e.g. the Literacy Hour). Such studies also struggle to shed light on the effects of different types of constraints on autonomy. Does prescribing curriculum materials have different results to prescribing pedagogical approaches, for example?

We address these gaps in the literature by exploring the effects of teacher autonomy using data from the TALIS video study. The focus of our work is the autonomy a sample of mathematics teachers feel they have over different aspects of their job, on a range of different mathematics outcomes (including pupil achievement, interest and self-efficacy in this subject). Our questionnaire-based measures allow us to specifically investigate the effects of the overall levels of autonomy experienced by mathematics teachers, as well as across six disaggregated dimensions. By looking at a range of pupil and teacher mathematics outcomes, we are also able to better assess the trade-offs involved in limiting the freedoms of mathematics teachers. In the next section, we set out how we conceptualise autonomy and hypothesise it to affect both pupils and teachers.

THEORY AND HYPOTHESES

Teacher autonomy

In general, definitions of worker autonomy centre on the 'discretionary freedom to organise one's job' (Evers et al., 2017, p. 806). This relates to control over the scheduling and the methods by which this work is carried out (Hackman & Oldham, 1975). Relative to other professions, teachers have little autonomy around the scheduling of work, with school terms and total teaching hours often set out in law (Worth & Van den Brande, 2020). Teachers' teaching commitments are usually specified by a centrally determined timetable and non-teaching commitments are often determined by a 'duty rota'. The debate around teacher autonomy therefore typically focuses on decisions around the methods of teaching. Researchers tend to distinguish two broad areas of autonomy over teaching methods (Friedman, 1999; Strong, 2012; Vangrieken et al., 2017). The first of these related to curriculum, materials and assignments. Some jurisdictions restrict autonomy here through, for example, a centrally determined curriculum or an approved set of textbooks (Wermke & Höstfält, 2014). The second area of autonomy relates to pedagogy, instruction, behaviour management and assessment. Some jurisdictions, such as the USA, have restricted autonomy in this area by specifying annual assessments that have to be conducted by all teachers (Amrein-Beardsley, 2009).

Teacher autonomy and pupil outcomes

Protecting teachers' autonomy may benefit pupils in several ways. For example, frontline workers are likely to have superior information about the local context in which they operate, as well as the specific needs of the individuals they serve (Vedung, 2015). Previous research

has also suggested that students are more likely to retain new learning if it can be related to their existing background knowledge (Shing & Brod, 2016). There are, however, often substantial differences in pupils' prior knowledge, with prescribed curriculum materials and lesson plans often unable to account for this (Timberlake et al., 2017). Tailoring instruction to build on their existing knowledge may hence help pupils master new mathematical skills and increase their mathematical self-efficacy as a result. Thus, we put forward the following hypothesis:

> **Hypothesis 1.** Increased teacher autonomy will be associated with improved maths achievement and maths self-efficacy.

To the extent that teachers understand the cultural backgrounds and interests of their pupils, they may be able to utilise tailored stimuli in order to nurture pupils' personal interests and motivation (Reeve & Cheon, 2021; Timberlake et al., 2017; Wearmouth & Soler, 2001). Autonomy is also thought to be beneficial for frontline workers in that they acquire tacit knowledge and expertise from their accumulated experience and practice (Elliott et al., 2011). This knowledge is, by definition, hard to codify or embody in instructional materials. School leaders and policymakers may hence arguably be better off leaving teachers to exercise their judgement on many pedagogical matters (Sternberg & Horvath, 1999). Based on these ideas, we put forward a second hypothesis:

> **Hypothesis 2.** Increased teacher autonomy will be associated with improved pupil interest in maths.

Yet we also theorise that there are likely to be two important exceptions to the above. First, teachers are not a homogeneous group, and are likely to experience different aspects of the school environment in different ways. For instance, Skerritt et al. (2021: 16) note particular differences by levels of experience: 'teachers in the early stages of their careers can feel overwhelmed and inundated with their various tasks, duties, and responsibilities'. This is consistent with the work of Ball et al. (2011), who note different types of engagement with 'policy work' in schools by junior and more senior staff. Consequently, one might anticipate inexperienced teachers to be the most likely to benefit more from supportive materials that can help reduce the substantial cognitive demands of learning how to teach (Feldon, 2007). This is consistent with qualitative evidence that inexperienced teachers often find using pre-prepared lesson plans helpful (Ainsworth et al., 2012) and the findings from impact evaluations that less skilled teachers benefit most from off-the-shelf lessons (Jackson & Makarin, 2018). Inexperienced teachers may hence be able to provide better teaching if their autonomy is constrained, which may then help pupils learn maths faster, increasing their mathematical self-efficacy in the process.

> **Hypothesis 3.** Reduced teacher autonomy will be associated with improved pupil maths achievement and maths self-efficacy among the pupils of inexperienced teachers.

The second exception to H1 and H2 relates to school behaviour policy. As noted by Maguire et al. (2010: 157), different staff within a school 'may well have different interpretations of what constitutes disruption and competing views about how to discipline and/or control young students'. Thus, if teachers have high levels of autonomy over discipline, this may lead to inconsistency in approaches used across the school. Pupil behaviour may hence be better dealt with using a standardised school-wide approach (Allen, 2021). The rationale is that a consistent set of boundaries across teachers means that pupils should—in

theory—be clearer about what is expected of them, which in turn helps to establish habits of good behaviour (Bennett, 2020). Previous research has also found better behaviour to reduce disruptions in class, and in turn to improved teaching and learning (Kraft et al., 2016). Behaviour is therefore one area where teachers having greater autonomy may have a negative effect on pupils. This leads us to put forward a fourth hypothesis:

> **Hypothesis 4.** Increased teacher autonomy over behaviour is likely to be associated with reduced pupil learning.

Teacher autonomy and teacher outcomes

Self determination theory (SDT) predicts that autonomy increases motivation and engagement by nurturing intrinsic motivation (Deci & Ryan, 2000). These predictions have been corroborated in careful experimental studies (Falk & Kosfeld, 2006; Fehr et al., 2013). In addition, SDT predicts that autonomy improves wellbeing and satisfaction in the workplace by allowing workers to pursue 'preferred ways of being' (Ryan & Deci, 2011, p. 45). This hypothesis has been tested extensively in workplace settings (Deci & Ryan, 2014), where it has been validated in multiple panel data analyses (Benz & Frey, 2008a; Benz & Frey, 2008b; Bartling et al., 2013).

In an education context, several previous studies have found autonomy to predict teachers' job satisfaction and engagement with work (Collie et al., 2016; Fernet et al., 2013, 2016). For instance, investigating Irish migrant teachers working in the English education system, those interviewed by Skerritt (2019: 577) reflected that 'you're constantly being watched and told what to do', 'I don't think we have any autonomy in a school in England' and 'from what I understand to be autonomy, you have no autonomy'. Similarly, Skerritt (2020) reports how teachers' autonomy is undermined by various different forms of surveillance, including vertical surveillance (e.g. learning walks; student voice), horizontal surveillance (e.g. peer observations; parental voice) and intrapersonal surveillance (e.g. student performance data and paperwork). As noted by Perryman and Calvert (2020) such scrutiny can impact upon teachers' job satisfaction, wellbeing and, in turn, whether they choose to leave the teaching profession. Indeed, paradoxically, some school-level initiatives that have attempted to improve teacher wellbeing—such as compulsory cooking or sports sessions—have only served to undermine the autonomy of teachers and thus have proved to be among the least effective (Brady & Wilson, 2021).

Thus, based upon SDT and the aforementioned qualitative evidence, our final hypothesis is:

> **Hypothesis 5.** Increased teacher autonomy will be associated with high teacher job satisfaction.

METHODS

Overview of the TALIS video study

To estimate the effects of teacher autonomy, we use a novel dataset from the Organisation for Economic Co-operation and Development (OECD) Teaching and Learning International Survey (TALIS) Video Study.[1] The OECD is an international organisation of 37 industrialised member countries that work together to promote development and economic growth, with an increasing interest in education over the last 25 years. The TALIS video study was designed to better understand teaching practices of lower secondary school teachers around

the world. To do so, information was gathered from approximately 700 teachers across eight countries (Chile, Colombia, England, Germany, Japan, Spain, Mexico and China).[2] Within each country around 80 schools were randomly selected, with one mathematics teacher then selected per school. Students from one of the classes that this teacher regularly taught were then selected, encompassing approximately 17,500 students in total. Among the five countries that collected data on responses, consent to participate in the study by schools initially contacted ranged from a low of 33% in England to roughly 90% in Mexico and China (Shanghai). Roughly 67 and 75% of schools in Chile and Colombia, respectively, consented to participate after initial contact.

While the study intended to randomly sample teachers within countries, this was not possible in some countries. For instance, schools in the German sample were recruited from professional networks without randomisation. In Japan, all schools within the three cities in which the study was conducted were initially invited to participate. Additionally, data issues in Spain (Madrid) resulted in poor match quality between some students and teachers. In Appendix S1 we provide a set of alternative estimates having excluded data from these countries from our analytic sample.

To further investigate the external validity of the TALIS video study sample, we compare how responses to a selection of the questions included in the background questionnaire compare with those from teachers who participated in the 'main' TALIS survey.[3] The latter is a nationally representative survey conducted in seven of the eight jurisdictions included in our analysis, and contains some overlapping survey questions. Table 1 provides a comparison across the two resources having pooled the data across the seven common countries (with each country given equal weight in the analysis) with Appendix S2 providing a country-by-country breakdown.

Overall, the TALIS video study appears to be broadly representative in terms of the demographic characteristics of teachers and their self-reported self-efficacy. However, they report classroom discipline to be slightly better and to have slightly higher levels of job satisfaction than the average teacher across the broader population. Of particular note for this paper, the teachers who participated in the video study were more likely to report higher levels of autonomy in their job (compared with the average teacher in the main TALIS survey). For instance, 65% of teachers in the video study reported having high levels of control over the amount of homework they assign, compared with 40% of teachers from the same set of countries that responded to the (nationally representative) main TALIS survey. Such differences should be borne in mind when considering the external validity of our results.

The TALIS video study focused upon one specific mathematics topic—quadratic equations. Pupils completed a pre-test in general mathematics skills, while both pupils and their teachers completed a baseline questionnaire. Students were then taught a set of lessons about quadratic equations. When the set of lessons were completed, pupils completed a post-test, focused specifically on the topic of quadratic equations. The teacher and pupil also completed a follow-up questionnaire. In contrast to many prior studies, the TALIS video data thus contain extensive information on teaching practices that can be linked to longitudinal data for teachers and pupils focused on a tightly defined aspect of mathematics. The background questionnaires also captured detailed information on pupil and teacher demographic characteristics, their views on school procedures and multiple aspects of teachers' teaching practices.

Measuring autonomy

Within the baseline questionnaire (before the instruction of quadratic equations began), teachers were asked about their perceived level of autonomy in their classroom. Specifically, teachers were asked:

TABLE 1 Comparison of sample characteristics in the TALIS video study to the TALIS main survey data.

	TALIS main	Video study
Demographics		
Male	40%	44%
Percentage MSc or PhD	25%	25%
Average age	42.6	40.4
Average years of teaching experience	15.8	14.1
Class discipline (percentage agree or disagree)		
When the lesson begins, I have to wait quite a long time for these students to quieten down	25%	22%
There is much disruptive noise in this classroom	25%	14%
I lose quite a lot of time because of students interrupting the lesson	25%	18%
Teacher self-efficacy (percentage agree or disagree)		
Get students to believe they can do well in schoolwork	79%	80%
Help students value learning	79%	79%
Craft good questions for students	85%	87%
Control disruptive behaviour in the classroom	84%	92%
Motivate students who show low interest in schoolwork	71%	70%
Make my expectations about student behaviour clear	89%	92%
Help students think critically	78%	73%
Get students to follow classroom rules	87%	94%
Calm a student who is disruptive or noisy	82%	91%
Use a variety of assessment strategies	80%	77%
Provide an alternative explanation, for example when students are confused	91%	94%
Vary instructional strategies in my classroom	84%	78%
Autonomy (percentage reporting high level)		
Determining course content	40%	40%
Selecting teaching methods	49%	68%
Assessing students' learning	45%	64%
Disciplining students	38%	56%
Determining the amount of homework to be assigned	40%	65%
Job satisfaction (percentage agree or disagree)		
The advantages of being a teacher clearly outweigh the disadvantages	77%	84%
If I could decide again, I would still choose to work as a teacher	79%	86%
I would like to change to another school if that were possible	25%	22%
I regret that I decided to become a teacher	8%	3%
I enjoy working at this school	87%	94%
I wonder whether it would have been better to choose another profession	28%	25%

(Continues)

TABLE 1 (Continued)

	TALIS main	Video study
I would recommend this school as a good place to work	80%	85%
I think that the teaching profession is valued in society	33%	30%
I am satisfied with my performance in this school	89%	91%
All in all, I am satisfied with my job	90%	95%

Note: 'TALIS main' refers to the TALIS 2018 survey data, which drew nationally representative samples and achieved high response rates. The 'video study' refers to the data used in this paper, where either convenience samples were used or response rates were low. Figures refer to the average responses given across seven of the eight countries included in this paper (Germany is the exception, which did not participate in the main TALIS survey). Appendix S2 provides an analogous comparison for each country.

To what extent do you have control over the following areas of your planning and mathematics teaching in the target class?

- choosing learning materials (e.g. textbooks, software and supplemental materials);
- determining course content;
- selecting teaching methods;
- assessing students' learning;
- disciplining students;
- determining the amount of homework to be assigned.

We aggregate this metric into one standardised autonomy measure using a summative scale (Cronbach $\alpha = 0.66$) and relate that to the growth in student outcomes for that teacher. The distribution of this scale can be found in Figure 1. Specifically, we examine how pupils' outcomes vary across quartiles of this teacher autonomy scale. We have chosen to divide the teacher autonomy scale into quartiles for two reasons. First, it provides a simple way of investigating whether there may be a non-linear association between teacher autonomy and pupil outcomes. Second, we believe it helps facilitate communication of results to a broad audience. Although there are possible alternative approaches (e.g. including the teacher autonomy scale as a continuous variable—possibly with a quadratic term), we believe that our approach makes the appropriate trade-off between being statistically well-principled and ease of interpretation of the findings. In Appendix S8 we do, however, present an alternative set of estimates where the underlying continuous teacher autonomy variable is used instead. This leads to no substantive change to our results. We additionally explore student outcome differences for each dimension of the autonomy scale.

Table 2 also provides descriptive statistics for teacher's self-reported measures of autonomy. Panel (a) lists the percentage breakdown of teacher responses for each question, ranging from no or little level of control, a moderate level control, or a great deal of control. Panel b provides a cross-tabulation between responses to each of these questions and quartiles of the overall teacher autonomy scale.

Pupil outcome measures

In the pre-test, pupils were examined on their level of general mathematics knowledge. They were then tested on their specific knowledge of quadratic equations after completing the series of lessons on this topic. Each test was given as a timed multiple-choice test (available from https://www.oecd.org/education/school/global-teaching-insights-technical-documents.

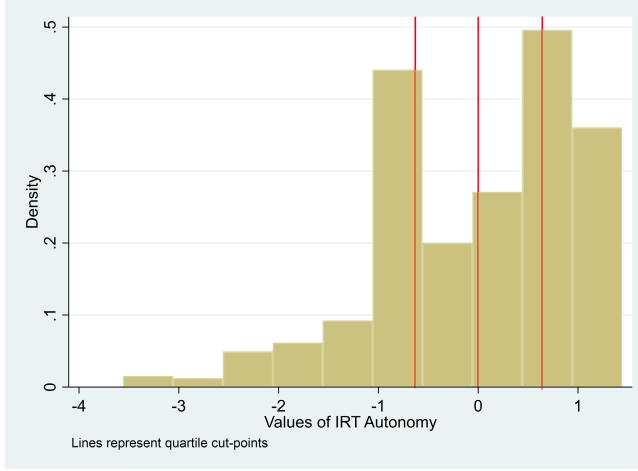

FIGURE 1 The distribution of the teacher autonomy scale.

htm). We estimate the Cronbach α for the pre-test measure to be 0.94, while for the post-test it is 0.91. The Pearson correlation between the pre-test and post-test is 0.74.

Students were also surveyed on their level of interest and self-efficacy in mathematics before and after the series of lessons on quadratic equations. All pupil outcome measures are standardised to mean zero and standard deviation of 1, meaning that our estimates can be interpreted in terms of effect sizes. The distribution of these variables are illustrated in Appendix S3. We estimate Cronbach α to be 0.84 for the self-efficacy measure and 0.91 for mathematics self-interest.

Teacher outcome measures

As part of the baseline questionnaire, teachers were asked the extent to which they agree with 10 statements about their job using a four-point scale. This included statements such as 'The advantages of being a teacher clearly outweigh the disadvantages', 'I regret that I decided to become a teacher' and 'All in all, I am satisfied with my job'. Responses to these questions have been converted into an overall job satisfaction scale (Cronbach $\alpha = 0.81$), which is then standardised to mean zero and standard deviation one.

Controls

In the background questionnaire, pupils were asked about their first- or second-generation immigration status, whether the language spoken at home was the same as the language of assessment, and their parents' education. They were also asked about the amount and types of possessions they have at home, which is used to construct a measure of background family wealth and home environment.

Analysis

We estimate pupil-level models capturing the link between teacher autonomy and pupils' outcomes. Controlling for pupil demographics and prior outcomes addresses the potential

TABLE 2 Distribution of responses to the teacher autonomy question.

(a) Distribution of responses

	Full sample			Low experience		
	No/low	Moderate	Great Deal	No/low	Moderate	Great Deal
Choosing materials	14%	31%	55%	16%	35%	49%
Determining course content	33%	29%	38%	44%	35%	21%
Selecting teaching methods	3%	26%	71%	2%	28%	70%
Assessing learning	4%	31%	65%	9%	33%	58%
Discipline	6%	38%	57%	12%	56%	33%
Determining amount of homework	7%	27%	66%	14%	26%	61%

(b) Cross-tabulation with teacher autonomy quartile

	Teacher autonomy quartile			
	Low autonomy	*Q2*	*Q3*	High autonomy
Choosing materials				
No/low	37	6	2	0
Moderate	43	45	23	0
Great deal	20	49	75	100
Course content				
No/low	63	41	9	0
Moderate	30	38	39	0
Great deal	7	21	52	100
Teaching methods				
No/low	9	0	0	0
Moderate	51	31	6	0
Great deal	40	69	94	100
Assessing learning				
No/low	12	0	0	0
Moderate	58	36	14	0
Great deal	30	64	86	100
Discipline				
No/low	12	5	1	0
Moderate	64	38	29	0
Great deal	24	57	70	100
Homework				
No/low	18	6	1	0
Moderate	52	28	12	0
Great deal	30	66	87	100

Note: (a) Figures refer to row percentages. Low experience refers to teachers with 3 years of teaching experience or less. (b) Figures refer to column percentages within each panel. For instance, of those in the bottom teacher autonomy quartile, 63% said they had no or low control over course content, 30% moderate control and 7% a great deal of control. In contrast, 100% of teachers in the high autonomy quartile reported that they had a high level of control over course content.

concern that teachers with differing levels of autonomy have been assigned to pupils of different abilities. In our full (headline) specification, the model we estimate is specified as:

$$S_{ijkt} = \beta . \text{Aut}_{jkt-1} + \delta . S_{ijkt-1} + \Omega . X_{ijk} + \theta . T_{jk} + \mu_k + \varepsilon_{ijkt} \quad (1)$$

where S_{ijkt} is the pupil outcome (e.g. test scores) at either baseline ($t-1$) or after the set of lessons is complete (t). Note that the baseline ($t-1$) score includes all test questions across a range of mathematics topics and not just those focused on quadratic equations. Aut_{jkt-1} is a set of dummy variables capturing teacher's level of classroom autonomy (reference = bottom quartile = low levels of autonomy). X_{ijk} is a vector of controls for pupil demographic characteristics. This includes gender, grade, language learner and immigration statuses, a scale measure of home possessions and parental education. T_{jk} is a vector of controls for teacher background characteristics. This includes experience, gender and total and proportion of time teaching mathematics, as well as self-reported measures of teaching as a personal responsibility and limitations to teaching due to classroom composition. μ_k represents the country fixed-effects; i is pupil i; j is teacher j; k is country k; t is the time period t ($t-1$ refers to baseline measures and t to the post-lesson outcomes); and ε_{ijkt} is the random error term.

All standard errors are clustered at the teacher level. Missing dummy indicators are used to account for missing covariate data, with alternative estimates using multiple imputation presented in Appendix S4. Our results and substantive conclusions are robust to whichever approach is used to handle missing covariate data.

The coefficient of interest, β, captures the association between our aggregate measure of teacher autonomy and our pupil outcomes. In other words, the direction and magnitude of this parameter will be used to test hypotheses H1 and H2. In separate specifications, we also estimate the effects on student outcomes for more specific measures of teacher autonomy, such as a teacher's levels of control over disciplining students (thus addressing hypothesis H4). In Appendix S3 we test the robustness of our results to using different sets of controls, including models that exclude the lagged (e.g. pre-test) measures. Similar findings emerge across model specifications, illustrating that our substantive results are not impacted by the choice of controls.

As noted in Section 2, teachers with fewer years of experience may have a more negative relationship with autonomy as they may benefit from more closely constrained instruction practice due to their inexperience. We thus additionally estimate our models focusing upon the sub-sample of teachers with 3 years of teaching experience or less. This will address hypothesis H3. In doing so, we note that a possible alternative approach would be to estimate a single model including an interaction between the inexperienced dummy and the teacher autonomy scale. This would have the advantage of offering slightly more statistical power, although adding slightly to the complexity of interpreting the results. We present alternative estimates in Appendix S5 where this approach (a single model including an interaction term) is used and find that it does not lead to any substantive change to our results.

We recognise that one potential limitation with using OLS regression is that our outcome measure takes only 24 unique values, and thus in reality sits somewhere between a continuous and count variable. We therefore present a set of alternative estimates in Appendix S6 where Poisson regression—which is more appropriate for count variables—is used instead. This leads to little change to the substantive findings reported in the main body of the paper.

Finally, to address hypothesis H5 (where we examine the link between autonomy and teacher job satisfaction) we estimate the following model:

$$J_{jk} = \beta . \text{Aut}_{jk} + \theta . T_{jk} + \mu_k + \varepsilon_{ijk} \quad (2)$$

where J_{jk} is the teacher's job satisfaction scale with all other variables as defined under Equation (1) (note that the sub-scripts *t* and *i* have been removed from Equation (2) owing to all measures being taken from the teacher baseline questionnaires). Robust standard errors are reported. The β parameter from this model will capture the link between teacher autonomy and their job satisfaction (H5). As this scale has also been standardised, estimates from this model can also be interpreted in terms of effect sizes.

RESULTS

Pupil outcomes

Table 3 presents our estimates of the relationship between teacher autonomy and pupils' outcomes for all teachers, and for lower experience teachers. This is complemented by Figure 2, which presents the unconditional association between the teacher autonomy scale and our outcomes of interest. Results from our main specification are presented, with results from across three separate model specifications presented in Appendix S3 to illustrate how

TABLE 3 The association between teacher autonomy and pupil outcomes.

	Test score		Interest		Efficacy	
	Effect size	SE	Effect size	SE	Effect size	SE
All teachers						
Teacher autonomy (reference: bottom quartile)						
Second quartile	0.02	0.02	−0.02	0.03	−0.03	0.03
Third quartile	0.00	0.02	0.0002	0.03	−0.01	0.03
Top quartile (high autonomy)	0.01	0.03	−0.04	0.04	−0.03	0.03
Observations	17,554		17,554		17,554	
Inexperienced teachers						
Teacher autonomy (reference: bottom quartile)						
Second quartile	0.02	0.06	−0.002	0.08	−0.08	0.07
Third quartile	−0.01	0.06	0.06	0.07	0.01	0.06
Top quartile (high autonomy)	−0.01	0.10	−0.02	0.10	0.05	0.09
Observations	2064		2064		2064	
Controls						
Country fixed effects	Y		Y		Y	
Pupil demographics	Y		Y		Y	
Teacher background	Y		Y		Y	
Teacher workplace	Y		Y		Y	
Prior achievement	Y		Y		Y	

Note: Effect size refers to the difference in pupil outcomes compared to the reference group (lowest quartile of teacher autonomy). Each column indicates the pupil outcome for each model. SE refers to the standard error. Standard errors are clustered at the teacher level. Pupil demographic controls include gender, grade and socioeconomic and immigration status. Teacher background controls include gender and years of experience. Teacher workplace controls include the ratio of teaching maths to other subjects, length of maths lesson, difficulty of the classroom composition and teaching as a personal responsibility. Observations refer to the number of pupils.

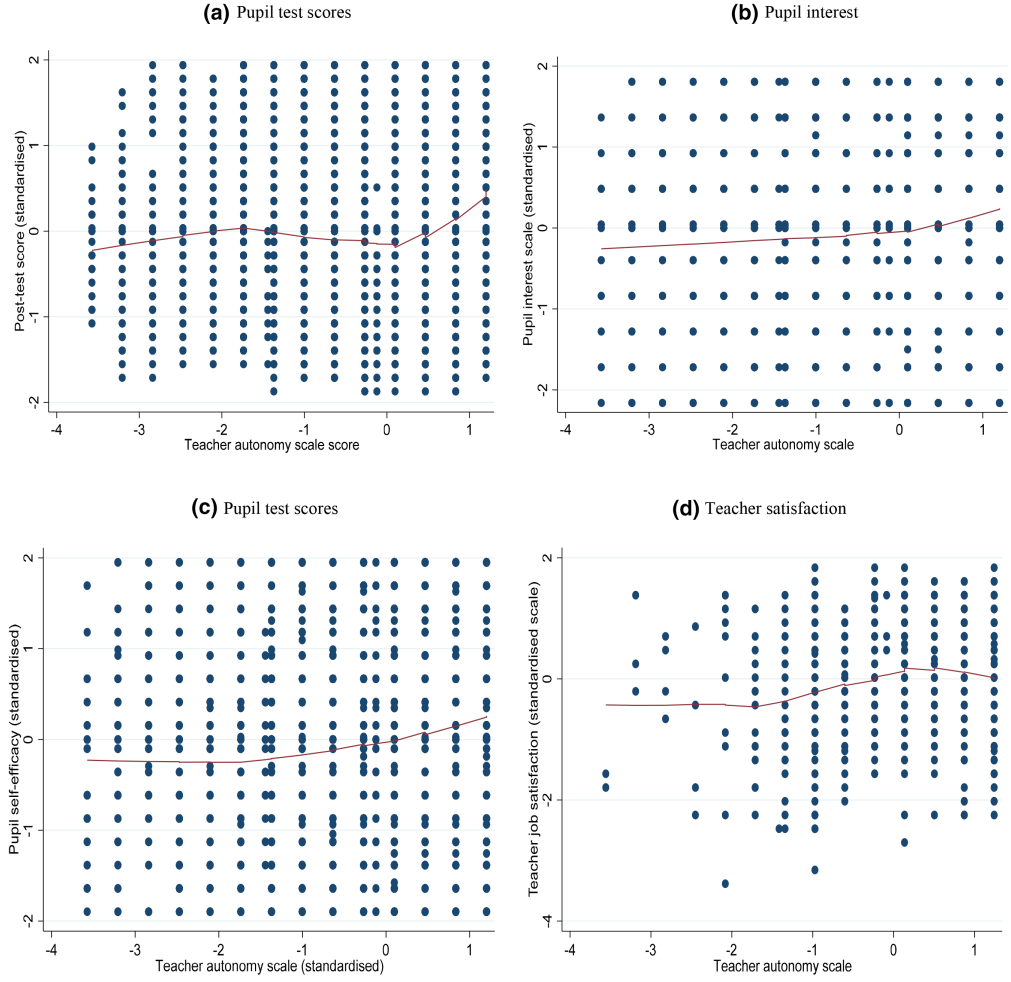

FIGURE 2 The bivariate association between teacher autonomy and pupil outcomes. Graphs illustrate the relationship between the teacher autonomy scale and each outcome of interest. All measures standardised to mean zero and standard deviation one. The Locally Weighted Scatterplot Smoothing (LOWESS) line is plotted in red.

the inclusion of different controls changes our parameter of interest. Overall, we find little evidence that teacher autonomy is related to the pupils achievement in mathematics. Across the outcomes (columns) in Table 3, the coefficient estimates on each autonomy quartile are small in terms of magnitude, with most not reaching statistical significance at the 5% level. For instance, the effect sizes reported for test scores (reported in column 1) are all around 0.02 or below. From this evidence, there appears to be essentially no meaningful relationship between teacher autonomy and pupils' outcomes. This finding holds true regardless of the model specification used. In sum, we find no support for our first hypothesis.

Columns 2 and 3 show the relationship between teacher autonomy and pupils' (a) personal interest and (b) self-efficacy in mathematics. A similar finding holds. Each of the coefficients represented in columns 2 and 3 is small in magnitude (all below an effect size of 0.05) with none statistically significant at conventional thresholds. Again, this is consistently true across different model specifications (presented in Appendix S3). There is hence little evidence to support our second hypothesis.

In Figure 3 we consider the relationship between each component question of our teacher autonomy scale and pupils' outcomes. The blue dots represent test scores. These compare teachers who report 'minor'/'no control' and those who report 'a great deal' of control to the middle category ('moderate control') as the reference group. Each point on a plot represents a coefficient from our full specification (analogous to those in Table 3). For instance, the plot in the top-right of Figure 3 illustrates whether pupils whose teacher reports having high or low levels of autonomy over their teaching methods have higher or lower levels of achievement in mathematics.

Again, we find little meaningful relationship. For each of the six component questions, the relationship between teacher autonomy is weak, producing small effect sizes (typically around 0.05 or below) and almost always failing to reach statistical significance at the 5% level. Most notably, this includes the relationship between autonomy over discipline and pupils' outcomes. There is thus no support for hypothesis H4: that increased teacher autonomy over behaviour is linked with reduced pupil learning. Similar results emerge when looking at other student outcomes with respect to the link between teacher autonomy and pupils' interest in mathematics and their self-efficacy (red and green dots, respectively). The results reported in Table 1 are hence not being driven by positive effects of teacher autonomy in some areas being offset by negative effects in others. Rather, there seems to be null effects across the board.

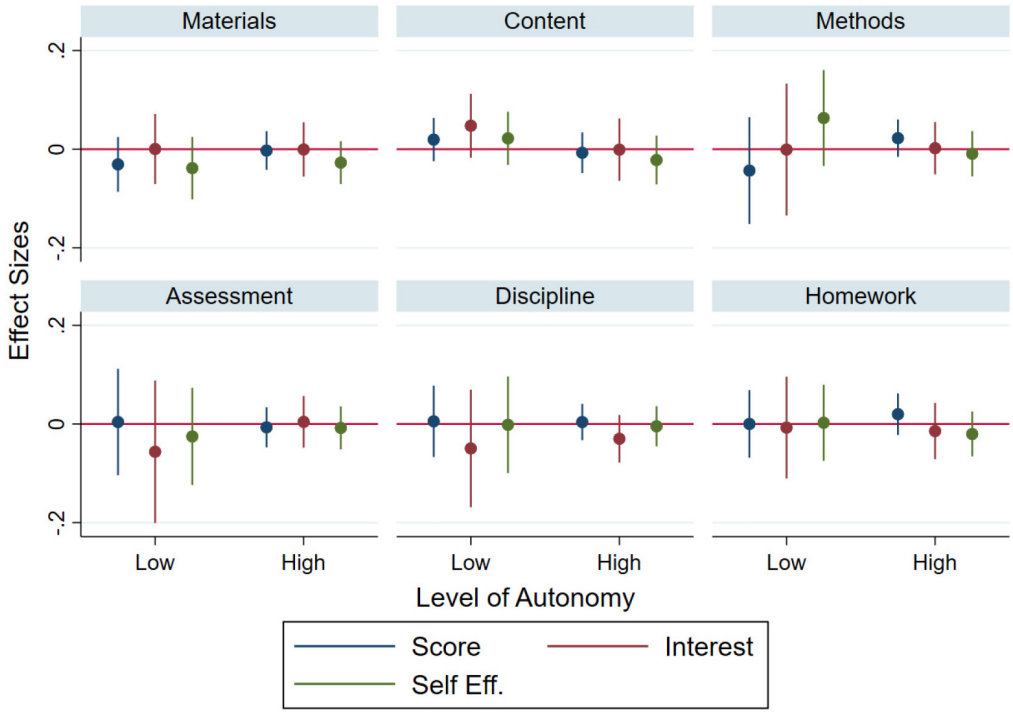

FIGURE 3 The association between autonomy over different aspects of teaching and pupils' mathematics test score, personal interest, and self-efficacy. Effect size refers to the difference in pupil outcomes in maths compared to the reference group (teachers responding with having a 'moderate' level of control on each measure of autonomy). Points represent coefficient estimates from our full speciation model for all teachers, including controls for teacher background and workplace as well as student background and prior test scores. Bars represent 95% confidence intervals of the estimates. Standard errors are clustered at the teacher level.

Might we find different results for inexperienced teachers? The second part of Table 3 provides our results based upon our full model specification, which addresses hypothesis H3 (see Appendix S3 for the results from different model specifications for each outcome). The same finding emerges, with no clear evidence of an association between autonomy levels reported by inexperienced teachers and pupils' learning outcomes. Figure 4 presents equivalent results with respect to autonomy over 'discipline', providing further evidence addressing both hypotheses H3 and H4. Again, little evidence of any meaningful association emerges. Together this suggests that, even for inexperienced teachers, the amount of autonomy they have over their working practises does not seem to make much difference for their pupils' learning outcomes.

The one exception to our general pattern of null results relates to the 'methods of teaching' component of autonomy for inexperienced teachers, which shows a negative association with both test scores and pupil self-efficacy in maths (Figure 5, top right graph). In both cases the effect size is large (0.4–0.5 SD) and statistically significant at the 5% level, although we find no comparable estimate on pupil personal interest in maths. We therefore find partial support for H4, albeit only in the specific domain of autonomy over teaching methods/pedagogy.

FIGURE 4 The association between teacher autonomy over pupil discipline and pupils' outcomes. Estimates for inexperienced teachers. Effect size refers to the difference in pupil outcomes compared with the reference group (teachers responding with having a 'moderate' level of control). Points represent coefficient estimates from our full speciation model for teachers with 3 years of experience or less, including controls for teacher background and workplace as well as student background and prior test scores. Bars represent 95% confidence intervals of the estimates. Standard errors are clustered at the teacher level.

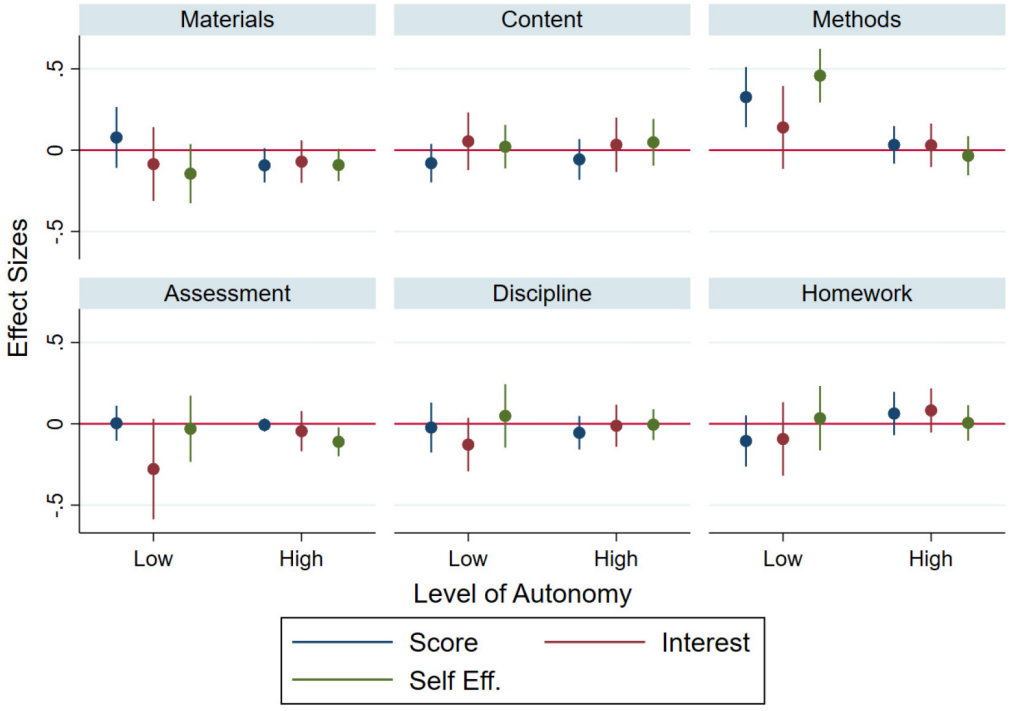

FIGURE 5 The association between autonomy over different aspects of teaching and pupils' mathematics test score, personal interest and self-efficacy. Estimates for inexperienced teachers. Effect size refers to the difference in pupil outcomes in maths compared with the reference group (teachers responding with having a 'moderate' level of control on each measure of autonomy). Points represent coefficient estimates from our full speciation model for teachers with less than 3 years of experience, including controls for teacher background and workplace as well as student background and prior test scores. Bars represent 95% confidence intervals of the estimates. Standard errors are clustered at the teacher level.

Teachers' job satisfaction

The previous sub-section found no overall association between teacher autonomy and pupils' outcomes. Yet having greater levels of autonomy may still bring benefits for teachers, such as in terms of their job satisfaction. We hence conclude by presenting some evidence on this matter—addressing our fifth and final hypothesis—in Table 4. Specifically, this presents differences (in effect sizes) on the TALIS job satisfaction scale, stratified by quartiles of the teacher autonomy scale.

In contrast to the results for pupils, a positive relationship between autonomy and teacher job satisfaction emerges. This is to a large extent being driven by differences between the bottom quartile (as the reference category) and the other three groups. For instance, teachers with very low levels of autonomy (bottom quartile) reported job satisfaction levels around 0.3 standard deviations below their peers in the second and third quartiles. Those in the top autonomy quartile report higher levels of job satisfaction still—although the differences between the second, third and fourth quartiles are not statistically significant at conventional levels. Hence the evidence presented in Table 4 suggests that very low levels of autonomy are linked to substantially lower levels of job satisfaction. Yet the association between job satisfaction and having high vs. average levels of autonomy remains unclear. We also caution readers to note that estimates capture conditional associations only, rather than establishing cause and effect.

TABLE 4 The association between teacher autonomy and teacher job satisfaction.

	Model 1		Model 2	
	Effect size	SE	Effect size	SE
Teacher autonomy (reference: bottom quartile)				
Second quartile	0.30***	0.10	0.31***	0.11
Third quartile	0.32***	0.10	0.31***	0.10
Top quartile (high autonomy)	0.44***	0.12	0.39***	0.13
Controls				
Country fixed effects	Y		Y	
Teacher background	–		Y	
Teacher workplace	–		Y	
Observations	648		648	

Note: Effect size refers to the difference in teacher job satisfaction compared to the reference group (lowest quartile of teacher autonomy). SE refers to the standard error. *, ** and *** indicate statistical significance at the 10, 5 and 1% levels respectively. Standard errors are robust to heteroscedasticity. Teacher background controls include gender and years of experience. Teacher workplace controls include the ratio of teaching maths to other subjects, length of maths lesson, difficulty of the classroom composition and teaching as a personal responsibility. Observations refer to the number of teachers.

Figure 6 illustrates the association between the autonomy teachers feel they have over six different aspects of their work and their job satisfaction. Two specific dimensions stand out. The first is discipline, where those who report having high levels of control over this aspect of their job (57% of the sample) have job satisfaction levels around 0.4 standard deviations higher than those who report moderate levels (38% of the sample).[4] The second is teaching materials, where those reporting high levels of autonomy (71% of the sample) report job satisfaction levels around 0.2 standard deviations above those with moderate levels of autonomy (26% of the sample) and around 0.4 standard deviations above those reporting low levels of autonomy over this aspect of their job (3% of the sample). Evidence of a relationship between autonomy over the other four areas and teacher job satisfaction is notably weaker. This suggests that ensuring teachers feel they have adequate control over managing challenging behaviour and the materials that they teach may be particularly important for keeping educators content with their work.

Exploratory analysis of heterogeneity

To conclude, at the request of an anonymous referee, we provide some exploratory analysis of potential differences in the association between teacher autonomy and pupil outcomes across some additional sub-groups. First, we explore potential differences across countries, given that the importance of teacher autonomy could vary across cultures and/or education systems. Second, heterogeneity across the classes with different levels of prior achievement are considered. In particular, it is possible that teachers having the ability to adapt aspects of their provision—such as lesson content, materials and homework—could be more important for either high ability classes (in order to stretch pupils appropriately) or low ability classes (to ensure pupils are able to access the content). Finally, we also investigate variation across classes with differing proportions of 'challenging' pupils, in terms of them being (for instance) disruptive, or having lower levels of prior knowledge. It may for instance be particularly important for teachers to have autonomy when teaching such pupils in order to engage and manage the class effectively.

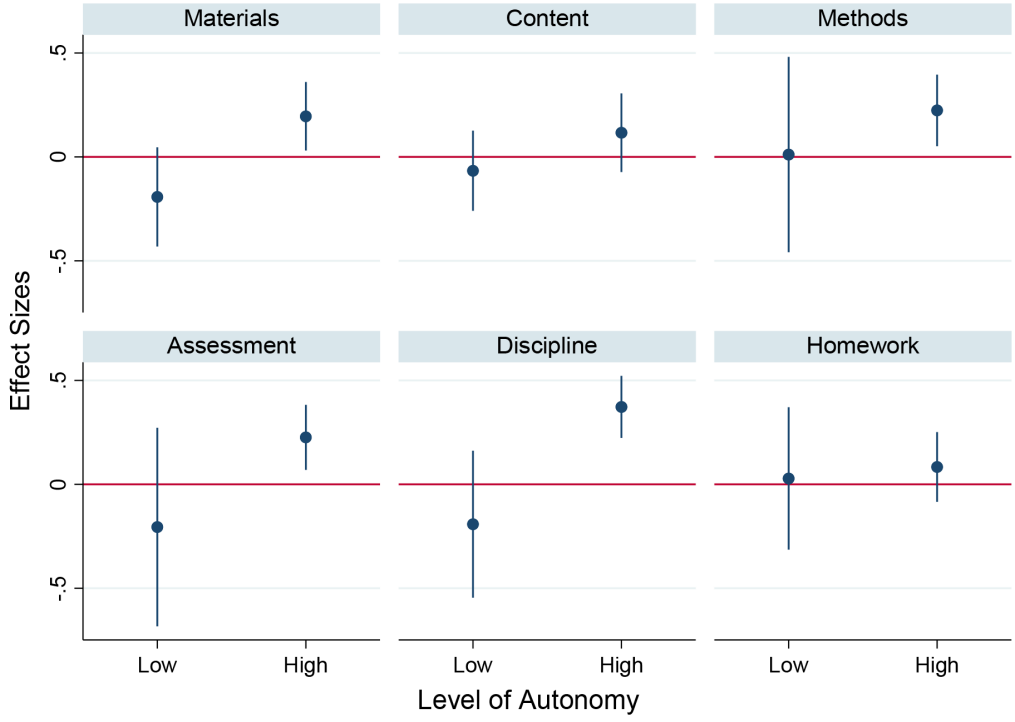

FIGURE 6 The association between autonomy over different aspects of teaching and teacher job satisfaction. Effect size refers to the difference in job satisfaction compared with the reference group (teachers responding with having a 'moderate' level of control on each measure of autonomy). Bars represent 95% confidence intervals of the estimates. Teacher background controls includes gender and years of experience. Teacher workplace controls include the ratio of teaching maths to other subjects, length of maths lesson, difficulty of the classroom composition and teaching as a personal responsibility.

The results for each of these sub-groups are presented in Table 5, focusing on the relationship between teacher autonomy and pupils' post-test score. Analogous results for pupil interest in mathematics and their mathematics self-efficacy can be found in Appendix S7. For each sub-group, estimates capture the difference in post-test scores for teachers in each autonomy quartile relative to the reference group (bottom quartile of the autonomy scale).

Overall, there is no clear pattern to the results, with little suggestion that teachers having higher levels of autonomy is particularly important for any given sub-group. The only possible exceptions maybe (a) Japan—where pupils with teachers in the bottom autonomy quartile make substantially less progress than pupils with teachers in the other three quartiles (effect size ~0.8) and (b) classes with higher achieving pupils, with some limited evidence that they may make less progress if their teacher feels that they have particularly low levels of autonomy. However, even in these instances, the evidence remains relatively weak (in part owing to the large standard errors). Hence results from this exploratory sub-group analysis are to some extent inconclusive, but provide little clear evidence of there being heterogeneous effects.

DISCUSSION

Educationalists have long debated the question of how much autonomy teachers should have over their teaching (Timberlake et al., 2017; Venezky, 1990). Indeed, this question is

TABLE 5 Exploratory analysis of heterogeneous effects of autonomy on mathematics test scores by country, class achievement and composition of the target class.

	Q2		Q3		Q4	
	Effect size	**SE**	**Effect size**	**SE**	**Effect size**	**SE**
Country						
Chile	0.12	0.38	−0.11	0.39	−0.32	0.51
China (Shanghai)	0.77	0.42	−0.53	0.31	−0.45	0.35
Colombia	−0.09	0.36	0.13	0.41	0.15	0.47
Germany	−0.33	0.44	0.25	0.45	0.47	0.67
Japan	0.89*	0.27	0.79	0.50	0.73*	0.34
Mexico	−0.24	0.28	−0.20	0.28	0.07	0.32
Spain	−0.72	0.60	−0.85	0.49	−0.53	0.55
England	−0.11	0.45	−0.06	0.82	0.12	0.56
Class achievement level						
Low prior achievement (bottom third)	−0.29	0.15	−0.18	0.14	−0.03	0.19
Middle third	−0.10	0.27	−0.44	0.28	−0.02	0.31
High prior achievement (top third)	0.69*	0.28	0.35	0.28	0.23	0.31
Challenge of class composition						
Least challenging (bottom third)	0.38	0.25	0.16	0.28	−0.01	0.29
Middle third	0.08	0.32	−0.14	0.27	0.55	0.43
Most challenging (top third)	−0.28	0.29	−0.29	0.25	−0.29	0.26

Note: Models estimated separately by group. Models control for teacher, school and pupil characteristics along with prior mathematics test scores. 'Effect size' column refers to differences in post-test scores relative to the bottom quartile of the teacher autonomy scale. 'SE' refers to the standard error. * Difference from the bottom autonomy quartile (reference group) is statistically significant at the 5% level.

part of a more general debate over the autonomy that should be awarded to front-line workers in public services (Vedung, 2015). We set out to provide new empirical evidence on this topic using rich longitudinal data capturing a range of pupil and teacher outcomes.

By and large, our results suggest that debates about the value of teacher autonomy for pupil outcomes are somewhat overblown. We generally find no relationship between overall levels of teacher autonomy and growth in pupil test scores, pupil interest in maths or pupil self-efficacy. This result holds for autonomy over choosing learning material and course content. Hence, arguments around the value of curricular autonomy for allowing teachers to tailor stimuli or content to their pupils' backgrounds and interests are not supported by our analysis (Reeve & Cheon, 2021; Timberlake et al., 2017; Wearmouth & Soler, 2001). Interestingly, our results here appear to be in tension with well-established empirical findings that pupils are better able to learn new knowledge when it is connected to existing knowledge (Shing & Brod, 2016). Although we can only speculate as to the reasons for this, one plausible explanation is that—in the absence of fully scripted lessons—teachers may still have scope to tailor their instruction to pupils' background knowledge, even if they are mandated to use certain curricular materials or pedagogical methods.

The one isolated exception to our generally null findings on pupil outcomes relates to inexperienced teachers and their autonomy over one of the six subdomains: instructional methods. Here we find quite large, negative associations between teacher autonomy and growth in both pupil test scores and pupils' maths self-efficacy. This is consistent with survey evidence suggesting that early-career teachers find access to pre-prepared lesson plans helpful (Ainsworth et al., 2012) and with evidence from experimental evaluations which have found that less skilled teachers benefit most from the provision of structured lesson plans to aid with their teaching (Jackson & Makarin, 2018). We believe the best way of accounting for these findings is with reference to the high cognitive demand involved in initial teacher training and early career teaching (Feldon, 2007). It is plausible that worked examples of good teaching help teachers to be more effective in their early careers (Paas & van Merriënboer, 2020).

In contrast with our results for pupil outcomes, we find some evidence of a positive association between teacher autonomy and teacher job satisfaction. This, however, is being driven by teachers who report having very low levels of autonomy feeling particularly dissatisfied in their job. Our results here are nevertheless consistent with the predictions of self-determination theory (Deci & Ryan, 2000) and a range of workplace-based empirical research (Benz & Frey, 2008a; Benz & Frey, 2008b; Bartling et al., 2013). Our data therefore provide some support for those who have expressed concern about the psychological impact of declining teacher autonomy (Lundström, 2015). The relationship between autonomy and job satisfaction appears to be particularly pronounced for those in the lowest quartile of autonomy—although we stress that some caution is needed in interpreting this, result, since it may be that schools intentionally constrain the autonomy of some teachers for the purposes of performance management.

These findings should, of course, be interpreted in light of the limitations of this research. While our rich data allow us to control for many potential confounders of the relationship between autonomy and our various outcome measures, our observational research design means that we cannot rule out unobservable differences between high- and low-autonomy teachers. In addition, the large associations that we observe between teacher-reported autonomy and teacher-reported job satisfaction might be in part driven by common source bias deriving from the single questionnaire instrument used to collect these two measures. Unfortunately, the fact that we usually observe only one teacher per school leaves us with few options for checking this empirically (Favero & Bullock, 2015). The true relationship may well be smaller than our estimate. Moreover, the TALIS video study is focused upon a single subject (mathematics) and the teaching of a specific area (quadratic equations). This may, in turn, limit the external validity of our results. Similarly, we illustrate in Table 1 that the characteristics of teachers participating in the TALIS video study to some extent differed from those of teachers participating in nationally representative surveys. This too may have implications for external validity.

Despite these limitations, we believe that our analysis has a number of implications for when and where constraints on teachers' autonomy might be justified. Taken together, our findings on pupil test scores and teacher job satisfaction suggest that the general presumption should be against introducing significant constraints on autonomy, on the grounds that this may demoralise the teaching workforce. However, the existing evidence also suggests two important caveats to this. First, our own results are consistent with the argument that constraining early-career teachers' autonomy by providing evidence-based guidance on teaching may have some benefits for pupils. For example, the recently introduced *Early-Career Framework* in England specifies an evidence-based framework for what early-career teachers should know and be able to do in order to teach effectively (Department for Education, 2019). However, for these to be useful for early career teachers, the emphasis should be on providing useful guidance and exemplars,

rather than adding additional demands on early-career teachers. The second way in which it might be worth overturning the presumption against autonomy is where there are programmes which constrain autonomy but have been shown in rigorous evaluations to improve pupil outcomes. For example, many countries legally mandate the teaching of reading via synthetic phonics, owing to the strong supporting evidence (Castles et al., 2018; Glennie, 2021). In such cases, the demonstrable benefits for pupils may make the trade-offs with teacher job satisfaction worthwhile.

ACKNOWLEDGEMENTS

The authors would like to thank three anonymous reviewers for their helpful comments on the manuscript.

FUNDING INFORMATION

None.

CONFLICT OF INTEREST STATEMENT

None.

DATA AVAILABILITY STATEMENT

The data used are available in the public domain from https://www.oecd.org/education/school/global-teaching-insights-technical-documents.htm

ETHICS STATEMENT

The study has been conducted following the BERA ethical guidelines for educational research (https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-2018).

ENDNOTES

[1] https://www.oecd.org/education/school/global-teaching-insights.htm

[2] In Spain, teachers participated from Madrid. In China, the sample included teachers from Shanghai.

[3] The main TALIS video study (the data used in this paper) is an entirely separate study and sample from the 'main' TALIS survey—despite the two sharing a similar name and being run by the same organisation (the OECD). The emphasis in the main TALIS survey was on ensuring a representative sample of teachers responded to a questionnaire. In contrast, the TALIS video study placed less importance on representativeness and more on the quality of measures collected (including the ability to link teacher responses to student outcomes). One potentially important difference is that the TALIS video study includes just mathematics teachers, while the main survey includes those teaching all lower-secondary school subjects.

[4] The difference between the 'low' and 'moderate' (reference) groups for discipline is not statistically significant. This is likely due to the 'low' group representing just 6% of the sample—hence the wide confidence intervals.

REFERENCES

Ainsworth, M. T., Ortlieb, E., Cheek, E. H., Jr., Pate, R. S., & Fetters, C. (2012). First-grade teachers' perception and implementation of a semi-scripted reading curriculum. *Language and Education*, *26*(1), 77–90.

Allen, B. (2021). *When should we force alignment in teacher practice*. Becky Allen https://rebeccaallen.co.uk/2021/09/23/when-should-we-force-alignment-in-teacher-practice/

Amrein-Beardsley, A. (2009). The unintended, pernicious consequences of" staying the course" on the United States' No child left behind policy. *International Journal of Education Policy and Leadership*, *4*(6), 1–13.

Ball, S. J. (2003). The teacher's soul and the terrors of performativity. *Journal of Education Policy*, *18*(2), 215–228.

Ball, S. J., Maguire, M., Braun, A., & Hoskins, K. (2011). Policy actors: Doing policy work in schools. *Discourse: Studies in the Cultural Politics of Education*, *32*(4), 625–639.

Bartling, B., Fehr, E., & Schmidt, K. M. (2013). Discretion, productivity, and work satisfaction. *Journal of Institutional and Theoretical Economics*, *169*, 4–22.

Bennett, T. (2020). *Running the room: The Teacher's guide to behaviour*. John Catt Educational.
Benz, M., & Frey, B. S. (2008a). Being independent is a great thing: Subjective evaluations of self-employment and hierarchy. *Economica*, *75*(298), 362–383.
Benz, M., & Frey, B. S. (2008b). The value of doing what you like: Evidence from the self-employed in 23 countries. *Journal of Economic Behavior & Organization*, *68*(3–4), 445–455.
Brady, J., & Wilson, E. (2021). Teacher wellbeing in England: Teacher responses to school-level initiatives. *Cambridge Journal of Education*, *51*(1), 45–63.
Castles, A., Rastle, K., & Nation, K. (2018). Ending the Reading wars: Reading acquisition from novice to expert. *Psychological Science in the Public Interest*, *19*(1), 5–51.
Collie, R. J., Shapka, J. D., Perry, N. E., & Martin, A. J. (2016). Teachers' psychological functioning in the workplace: Exploring the roles of contextual beliefs, need satisfaction, and personal characteristics. *Journal of Educational Psychology*, *108*(6), 788–799.
Crowley, C. B. (2017). Professional development as product implementation training. *Teaching and Teacher Education*, *67*, 477–486.
Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227–268.
Deci, E. L., & Ryan, R. M. (2014). The importance of universal psychological needs for understanding motivation in the workplace. In M. Gagné (Ed.), *The Oxford handbook of work engagement, motivation, and self-determination theory*. Oxford University Press.
Department for Education. (2019). *Early career framework*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/978358/Early-Career_Framework_April_2021.pdf.
Elliott, J. G., Stemler, S. E., Sternberg, R. J., Grigorenko, E. L., & Hoffman, N. (2011). The socially skilled teacher and the development of tacit knowledge. *British Educational Research Journal*, *37*(1), 83–103.
Engelmann, S., Becker, W. C., Carnine, D., & Gersten, R. (1988). The direct instruction follow through model: Design and outcomes. *Education and Treatment of Children*, *11*(4), 303–317.
Engelmann, S., & Carnine, D. (1982). *Theory of instruction: Principles and applications*. Irvington Publishers.
Evers, A. T., Verboon, P., & Klaeijsen, A. (2017). The development and validation of a scale measuring teacher autonomous behaviour. *British Educational Research Journal*, *43*(4), 805–821.
Falk, A., & Kosfeld, M. (2006). The hidden costs of control. *American Economic Review*, *96*(5), 1611–1630.
Favero, N., & Bullock, J. B. (2015). How (not) to solve the problem: An evaluation of scholarly responses to common source bias. *Journal of Public Administration Research and Theory*, *25*(1), 285–308.
Fehr, E., Herz, H., & Wilkening, T. (2013). The lure of authority: Motivation and incentive effects of power. *American Economic Review*, *103*(4), 1325–1359.
Feldon, D. F. (2007). Cognitive load and classroom teaching: The double-edged sword of automaticity. *Educational Psychologist*, *42*(3), 123–137.
Fernet, C., Austin, S., Trépanier, S. G., & Dussault, M. (2013). How do job characteristics contribute to burnout? Exploring the distinct mediating roles of perceived autonomy, competence, and relatedness. *European Journal of Work and Organizational Psychology*, *22*(2), 123–137.
Fernet, C., Trépanier, S. G., Austin, S., & Levesque-Côté, J. (2016). Committed, inspiring, and healthy teachers: How do school environment and motivational factors facilitate optimal functioning at career start? *Teaching and Teacher Education*, *59*, 481–491.
Friedman, I. A. (1999). Teacher-perceived work autonomy: The concept and its measurement. *Educational and Psychological Measurement*, *59*, 58–76.
Glennie, A. (2021). 'Why Scotland is getting it wrong on phonics.' *Tes*.
Gorozidis, G., & Papaioannou, A. G. (2014). Teachers' motivation to participate in training and to implement innovations. *Teaching and Teacher Education*, *39*, 1–11.
Gray-Lobe, G., Keats, A., Kremer, M., Mbiti, I., & Ozier, O. (2022). Can education be standardized? Evidence from Kenya. *Becker Friedman Institute for Economics Working Paper* 2022-68. https://bfi.uchicago.edu/wp-content/uploads/2022/06/BFI_WP_2022-68-1.pdf
Hackman, J. R., & Oldham, G. R. (1975). Development of the job diagnostic survey. *Journal of Applied Psychology*, *60*, 159–170.
Jackson, K., & Makarin, A. (2018). Can online off-the-shelf lessons improve student outcomes? Evidence from a field experiment. *American Economic Journal: Economic Policy*, *10*(3), 226–254.
Kraft, M. A., Marinell, W. H., & Shen-Wei Yee, D. (2016). School organizational contexts, teacher turnover, and student achievement: Evidence from panel data. *American Educational Research Journal*, *53*(5), 1411–1449.
Lortie, D. C. (1975). *Schoolteacher, a sociological study*. University of Chicago.
Lundström, U. (2015). Teacher autonomy in the era of new public management. *Nordic Journal of Studies in Educational Policy*, *2015*(2), 28144.
Machin, S., & McNally, S. (2008). The literacy hour. *Journal of Public Economics*, *92*(5–6), 1441–1462.
Maguire, M., Ball, S., & Braun, A. (2010). Behaviour, classroom management and student 'control': Enacting policy in the English secondary school. *International Studies in Sociology of Education*, *20*(2), 153–170.

Martin, M. (2022). Axe 'unwanted and ill-fated' Oak, Keegan told. TES 18th November 2022. https://www.tes.com/magazine/news/general/axe-unwanted-oak-national-academy-gillian-keegan-curriculum
Paas, F., & van Merriënboer, J. J. (2020). Cognitive-load theory: Methods to manage working memory load in the learning of complex tasks. *Current Directions in Psychological Science*, *29*(4), 394–398.
Perryman, J., & Calvert, G. (2020). What motivates people to teach, and why do they leave? Accountability, performativity and teacher retention. *British Journal of Educational Studies*, *68*(1), 3–23.
Piza, C., Zwager, A., Ruzzante, M., Dantas, R., & Loureiro, A. (2020). Supporting teacher autonomy to improve education outcomes [Policy Research Working Paper 9371]. World Bank.
Reeve, J., & Cheon, S. H. (2021). Autonomy-supportive teaching: Its malleability, benefits, and potential to improve educational practice. *Educational Psychologist*, *56*(1), 54–77.
Ryan, R. M., & Deci, E. L. (2011). A self-determination theory perspective on social, institutional, cultural, and economic supports for autonomy and their importance for well-being. In V. Chirkov, R. Ryan, & K. Sheldon (Eds.), *Human autonomy in cross-cultural context. Cross-cultural advancements in positive psychology* (Vol. 1). Springer. https://doi.org/10.1007/978-90-481-9667-8_3
Shing, Y. L., & Brod, G. (2016). Effects of prior knowledge on memory: Implications for education. *Mind, Brain, and Education*, *10*(3), 153–161.
Skaalvik, E. M., & Skaalvik, S. (2017). Still motivated to teach? A study of school context variables, stress and job satisfaction among teachers in senior high school. *Social Psychology of Education*, *20*(1), 15–37.
Skerritt, C. (2019). Irish migrant teachers' experiences and perceptions of autonomy and accountability in the English education system. *Research Papers in Education*, *34*(5), 569–596.
Skerritt, C. (2020). School autonomy and the surveillance of teachers. *International Journal of Leadership in Education*, 1–28.
Skerritt, C. (2022). Are these the accountable teacher subjects citizens want? *Education Policy Analysis Archives*, *30*, 103.
Skerritt, C., O'Hara, J., Brown, M., McNamara, G., & O'Brien, S. (2021). Enacting school self-evaluation: The policy actors in Irish schools. *International Studies in Sociology of Education*, 1–23.
Sternberg, R. J., & Horvath, J. A. (1999). *Tacit knowledge in professional practice: Researcher and practitioner perspectives*. Psychology Press.
Stockard, J., Wood, T. W., Coughlin, C., & Rasplica Khoury, C. (2018). The effectiveness of direct instruction curricula: A meta-analysis of a half century of research. *Review of Educational Research*, *88*(4), 479–507.
Strong, L. E. G. (2012). A psychometric study of the teacher work-autonomy scale with a sample of U.S. teachers (Doctoral dissertation). http://preserve.lehigh.edu/etd/1092/.
Timberlake, M. T., Thomas, A. B., & Barrett, B. (2017). The allure of simplicity: Scripted curricula and equity. *Teaching and Teacher Education*, *67*, 46–52.
Vangrieken, K., Grosemans, I., Dochy, F., & Kyndt, E. (2017). Teacher autonomy and collaboration: A paradox? Conceptualising and measuring teachers' autonomy and collaborative attitude. *Teaching and Teacher Education*, *67*, 302–315.
Vedung, E. (2015). Autonomy and street-level bureaucrats' coping strategies. *Nordic Journal of Studies in Educational Policy*, *2015*(2), 28643.
Venezky, R. L. (1990). The American reading script and its nineteenth-century origins. *Book Research Quarterly*, *6*(2), 16–28.
Wearmouth, J., & Soler, J. (2001). How inclusive is the literacy hour? *British Journal of Special Education*, *28*(3), 113–119.
Wermke, W., & Höstfält, G. (2014). Contextualizing teacher autonomy in time and space: A model for comparing various forms of governing the teaching profession. *Journal of Curriculum Studies*, *46*(1), 58–80.
Worth, J., & Van den Brande, J. (2020). *Teacher autonomy: How does it relate to job satisfaction and retention?* National Foundation for Educational Research.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Jerrim, J., Morgan, A. & Sims, S. (2023). Teacher autonomy: Good for pupils? Good for teachers? *British Educational Research Journal*, *00*, 1–23. https://doi.org/10.1002/berj.3892