

# Modelling the relationships between teacher working conditions, job satisfaction and desire to move school

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Teacher shortages are a recurring problem in publicly funded schools, in part because of poor retention. Working conditions in schools are an important predictor of teacher job satisfaction and retention, yet research has so far made limited headway in identifying the specific aspects of the working environment which matter. This research uses representative data on state secondary school teachers in England in 2013 to derive an unusually rich set of working conditions variables. Regression analysis is used to model the relationships between working conditions, teacher job satisfaction and turnover intentions. Results show strong associations with the nature of school leadership, whether teachers have received training in the specific subjects they are assigned to teach and scope for career progression within the school. These results are robust to checks for common source bias. The study identifies ways in which schools can improve retention.

# 1. Introduction

Teacher shortages are a widespread and recurring problem in publicly-funded school systems (Dolton, 2006). In the Teaching and Learning International Survey 2013, for example, over a third of teachers worked in schools where the Head reported difficulties recruiting staff (OECD, 2014). Evidence suggests such shortages are often the result of poor retention, which is in turn due to low job satisfaction among teachers (Cha & Cohen-Vogel, 2011; Sims, 2018; Skaalvik & Skaalvik, 2011).

Teacher shortages are concerning. High teacher turnover in a particular school has a detrimental effect on pupil attainment, both because the teachers who leave tend to be replaced by teachers who are initially less effective and because of the wider disruption it causes (Gibbons, Scrutinio, & Telhaj, 2018; Ronfeldt, Loeb, & Wyckoff, 2013). Where turnover is the result of low job satisfaction or stress, there are also often significant personal and emotional costs for teachers (Johnson, 2004). This has prompted organisations including the UN, World Bank and the OECD to warn that action is required to increase the retention and supply of teachers (Figazzolo, 2012; Schleicher, 2011; World Bank, 2013).

Researchers have recently made advances in understanding the determinants of teacher job satisfaction and retention. For example, psychologists have begun to pin down the processes through which teachers become burned out and quit (Fernet et al., 2013; Hakanen, Bakker, & Schaufeli, 2006). Recent education research has also begun to identify the concrete characteristics of schools that protect teachers against burnout and turnover. In particular, it appears that school leaders play a critical role in determining whether teachers are satisfied at work (Griffith, 2004; Leithwood & Jantzi, 2005; Malinen & Savolainen, 2016) and remain at their school (Kraft, Marinell, & Shen-Wei Yee, 2016).

Despite the progress made, the existing literature has some important limitations. Foremost among these is the narrow *scope* of working conditions considered. The need to manage respondent burden in surveys often means that researchers are left with fewer than twenty items to measure all aspects of working environment (e.g. Collie, Shapka, & Perry, 2012; Skaalvik & Skaalvik, 2009). This limits the number of aspects of working environment which can be investigated and may introduce omitted variable bias. A related limitation of the existing literature is that it remains at a high level of abstraction. As Shrivastra and Mitroff (1984) have pointed out, fulfilling the promise of evidence-based practice requires

researchers to identify empirical relationships with “direct action implications” (p. 23). This requires going beyond the identification of broad theoretical frameworks in order to identify specific changes to teachers’ working environment that leaders can implement in order to improve job satisfaction or retention. Finally, there have been no such studies in the English context. The current study addresses these shortcomings by utilising an exceptionally rich set of over 40 working conditions variables collected from teachers in England. The findings extend the existing literature by identifying working conditions that are related to both job satisfaction and retention. In doing so, the findings point towards concrete aspects of the school environment which school leaders can focus on in order to improve retention.

## 2. Literature and Conceptual Framework

Occupational psychology highlights the importance of working environment in explaining commitment at work. For example, the Job Demands-Resources model (JD-R) emphasises the balance of demands - things that requires sustained effort - and resources - things that facilitate learning and goal achievement (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). Where demands exceed resources over a sustained period, employees experience a loss of energy and commitment at work and eventually leave (Alarcon, 2011). Research with teachers has shown that where demands exceed resources, teachers become less satisfied with their work and are more likely to leave (Bogler & Nir, 2015; Hakanen, Bakker, & Schaufeli, 2006; McCarthy et al., 2016).

Recent research has helped unpack the JD-R model by specifying the specific types of demands and resources which are most important. Self Determination Theory (Deci & Ryan, 2008) suggests that humans have a basic need for autonomy, competence and connection with others. Where these needs are satisfied, individuals tend to be motivated and engaged. Where these needs are not met, individuals will seek to change their environment (or job) in order to fulfil them. Recent empirical work has shown job demands that reduce teachers’ sense of autonomy or competence to be particularly detrimental (Fernet et al., 2013; Skaalvik & Skaalvik, 2009). Conversely, job resources in the form of support from colleagues help guard against disengagement at work (Fernet et al., 2013).

A closely related strand of the literature, mostly drawn from research by educationalists and economists, has sought to identify the concrete characteristics of school working environments that affect satisfaction and retention. This literature sits at lower level of

abstraction than the psychological research. Early studies using administrative data found that teachers are much more likely to leave their job if they work in schools with high levels of deprived, minority or low attaining pupils (Hanushek, Kain, & Rivkin, 2004). These findings can be interpreted in terms of the additional demands placed on teachers working in such schools.

More recently, researchers have begun to utilise rich survey data to identify other aspects of the working environment that affect retention. In terms of job resources, these studies tend to identify supportive school leadership as having the strongest relationships with teacher job satisfaction (Bogler & Nir, 2015; Skaalvik & Skaalvik, 2011) and retention (Boyd et al., 2011; Ingersoll, 2001; Kraft et al., 2016; Ladd, 2011). In general, social connections appear to bolster job satisfaction (Reeves, Pun, & Chung, 2017; Skaalvik & Skaalvik, 2011) and protect against turnover (Simon & Johnson, 2015). In terms of job demands, research suggests that teachers with unmanageably large workloads have lower job satisfaction (Ma & MacMillan, 1999; Skaalvik & Skaalvik, 2011). Teachers who are assigned to teach multiple subjects are also more likely to leave (Donaldson & Johnson, 2010).

This review makes a number of things clear. First, the existing literature points towards the importance of working environment for improving teacher job satisfaction and retention. Second, that researchers have made considerable progress in determining the psychological mechanism by which working conditions affect teachers' motivation and retention. Third, by contrast, the literature identifying the specific, concrete aspects of working conditions that matter for teacher retention is less well developed. Indeed, at present it is limited to the findings that good leadership and social relationships have a protective effect, while inappropriate workload is a risk factor. Fourth, there is very little evidence pertaining to the English context. The present study aims to address these limitations by using richer data and more detailed measures of working conditions to answer the following two research questions, with a focus on the more concrete aspects of teachers working environment:

1. What are the relationships between teachers' working conditions and teachers' job satisfaction?
2. What are the relationships between teachers' working conditions and desire to move school?

### 3. Data and Methods

## *Data*

Addressing these research questions requires rich, teacher-level survey data covering a wide range of working conditions. It also requires data on relevant control variables, such as pupil demographic characteristics. In the current study, teacher-level survey data was taken from TALIS, an international teacher survey that collects information on teachers' beliefs, practices and working conditions. The teacher questionnaire for the 2013 survey contains 50 question groups covering teacher and school characteristics, professional development, feedback, pedagogy, attitudes to teaching, school climate and job satisfaction. The survey used a clustered, stratified design. I account for this in the analysis by applying the official replicate weights using the `REPEAT` command in the STATA software (Avvisati & Keslair, 2016). Applying these weights makes the data representative of lower-secondary teachers in England at the time the survey was collected.

The TALIS data covers over thirty countries. However, I restrict the sample to England for this analysis, for two reasons. First, it allows me to use seven additional working conditions variables derived from questions that were asked exclusively in England, which afford better measurement of leadership practices. Second, it allows me to link in extra data on TALIS respondents in England from the School Workforce Census (SWC). This dataset includes objective school-level measures of pupil disadvantage and the proportion of pupils from ethnic minority backgrounds. The final dataset in the current study contains 2,028 teachers across 130 schools and 42 working conditions variables. Table 1 shows descriptive statistics for the sample.

### **-Table1-**

## *Outcome Variables*

There are two outcome variables for this study: teacher job satisfaction and teacher desire to move school. The job satisfaction variable in the TALIS dataset, TJOBSATS, is a composite measure (Cronbach's Alpha,  $\alpha = 0.83$ ) made up of eight different items from question 46 (Desa et al., 2014). For example, "The advantages of being a teacher outweigh the disadvantages" and "I would recommend my school as a good place to work." Responses to each item are measured on a four-point scale from Strongly Disagree to Strongly Agree. Negative statements are reverse coded so that a higher score on TJOBSATS indicates higher job satisfaction. Table 2 summarises teachers' responses to each question in the international

sample. In the rest of the analysis, this variable is standardised to give it a mean of zero and a standard deviation of one.

**-Table2-**

**-Figure1-**

Teachers' desire to move to another school is measured using a single item from question 46, which asks teachers whether they agree with the statement "I would like to change to another school if that were possible", measured on the same four-point scale. Although this item also contributes to the overall job satisfaction score (see above), it was analysed separately because intentions to move school are of particular theoretical and policy interest. Table 2 summarises the descriptive data for this outcome variable.

#### *Working Conditions Variables*

Existing research has not settled on a dominant conceptualisation of working conditions. As such, I use an exploratory factor analysis (EFA) to identify a smaller number of latent (unmeasured) variables underlying the many measured working conditions variables. I use the POLYCHORIC command in the Stata software (Kolenikov & Angeles, 2004) to construct the correlation matrix between all the working conditions variables. The various working conditions are likely to be correlated within schools, so I use an oblique rotation. Table 3 shows the factor loadings after rotation, which indicate how much each variable contributes to each factor. All the factor loadings are above 0.32, which is conventionally considered the cut-off for a statistically meaningful loading (Yong & Pearce, 2013). The rotated factor structure is very simple, with no variables loading on more than one factor. Figure 2 shows that eight factors have an eigenvalue above 1 (meaning they explain more variation than one of the original variables) and come before the elbow point in the scree plot. Consequently, I retain the first eight factors, which between them explain 94.5% of all the variation captured in the 42 TALIS working conditions variables.

**-Table3-**

**-Figure2-**

I give each of the eight factors a name based on my own interpretation of what unifies the variables that make them up. They are:

- Leadership/Management (Cronbach's Alpha,  $\alpha = 0.86$ ) is formed of eight questions relating to the way in which direction is set and the efficient functioning of the school is maintained. For example, "The school management team give clear vision and direction".
- Teacher Cooperation ( $\alpha = 0.76$ ) is formed of eight questions relating to the way in which teachers engage in shared work with a common goal. For example, (How often do you) "exchange teaching materials with other teachers" and "Attend team conferences".
- Feedback ( $\alpha = 0.70$ ) is formed of five questions relating to the way in which teachers receive advice aimed at improving their instruction. For example, (How often do you get) "feedback following a review of your students test scores".
- Scope for Progression ( $\alpha = 0.84$ ) is formed of three questions relating to whether teachers can develop their skills and career. For example, "I have scope to progress into a leadership team role".
- Professional Development ( $\alpha = 0.74$ ) is formed of four questions relating to the way in which teacher training is structured and designed. For example, Example items include (To what extent does professional development) "include opportunities to use active learning methods".
- Preparation for Teaching Assignments ( $\alpha = 0.69$ ) is formed of four questions relating to whether teachers have been trained in the subjects which they have been assigned to teach. For example, a teacher with a physics degree who is asked to teach maths is less well prepared for their assignment than a teacher with physics degree who is asked to teach physics. Example items include (Do you feel prepared for the) "content of the subjects you teach".
- Discipline ( $\alpha = 0.77$ ) is formed of two questions relating to whether students comply with expected standards of behaviour. For example, (Can you) "get students to follow classroom rules".
- Workload has an alpha of 0.5 indicating inadequate reliability. I therefore replace it with a single variable measuring whether teachers feel their workload is

unmanageable, measured on a four-point scale from Strongly Disagree to Strongly Agree.

Table 4 lists the full set of items which load on each factor. The factors that emerge from the EFA are broadly consistent with those identified from exploratory factor analysis in previous research (Boyd et al., 2011; Ladd, 2011; Kraft et al., 2016). The factors also include several not previously investigated, such as scope for progression and preparation for teaching assignments. Table 5 shows the pairwise correlations for the eight factors, which are generally low.

**-Table4-**

**-Table5-**

### *Analytical Approach*

I use regression analysis in order to model the conditional associations between the different working conditions and job satisfaction and retention. Job satisfaction is a continuous variable and is therefore modelled using ordinary least squares regression. In contrast, desire to move schools is an ordered categorical variable and is therefore modelled using ordered logistic regression. All coefficients in the ordered logistic regression tables are reported as odds ratios. I report one version of each model using multiple imputation by chained equations to account for missing data on the covariates. This maintains sample size at the cost of invoking the missing at random assumption.

A serious concern when using survey data in this way is that the results will be affected by common source bias (Meier & O'Toole, 2010; Podsakoff & Organ, 1986). This occurs when both the dependent and independent variables contain shared measurement error due to being from a common source, such as a single questionnaire. The shared measurement error emanating from the common source acts as an omitted variable and can cause large bias in the regression coefficients (Podsakoff, Mackenzie, & Podsakoff, 2012).

Favero and Bullock (2015) distinguish individual common source bias and environmental common source bias. In the current study, individual common source bias could result from



the affective state of the teachers at the time they responded to the survey. For example, if a teacher is having a particularly bad day, it might influence them to report more negatively on the working conditions in the school *and* report more negatively on their job satisfaction or desire to leave. This would inflate the regression coefficient. In order to address individual-level common source bias, I run one version of each of my models using working conditions measures reported by the focal teachers' colleagues. That is, I measure working conditions  $W$  for teacher  $i$  in department  $j$ , using the mean of working conditions reported by other teachers in their department  $\bar{W}_{i \neq i, j}$ .

Environmental common source bias may also be a concern in the current study if, for example, the organisational culture in a particular school affects the way that teachers interpret and respond to the TALIS questionnaire. Teachers in schools with a deferential culture, for example, may feel less inclined to give an honest report on the quality of leadership in their school, which would give a downward bias to the coefficient on the leadership variable. In order to address such school-level common source bias I run one version of each of my models including dummy variables for each school, effectively comparing teachers within the same schools.

## 4. Results

### *Modelling Job Satisfaction*

Table 6 shows the results from modelling teachers' job satisfaction (z scored) based on their personal characteristics, the characteristics of their school and the working conditions in their school. Coefficients show the standard deviation increase in job satisfaction associated with a one unit increase in each independent variable, conditional on the other independent variables. FSM does not show any relationship with job satisfaction when entered into the model with demographic characteristics in Column 1.

In Column 2, when the working conditions are entered simultaneously, Leadership, Scope for Progression, Discipline and Workload all show clear associations with job satisfaction. Leadership again has the largest coefficient, with a one SD increase associated with a 0.38 SD increase in job satisfaction. The association with Leadership is robust to the addition of imputed values (Column 3), school fixed effects (Column 4), and the use of colleague reported working conditions (Column 5).

In Column 2 a one SD increase in scope for progression and discipline is associated with a 0.18 SD and 0.07 SD increase in job satisfaction, respectively. In Columns 2 and 4, the coefficients remain broadly stable and statistically significant at the 5% level. However, in Column 5 they change sign and are not statistically significant, which is consistent with the presence of individual-level common source bias. The coefficient on workload follows a similar pattern, remaining stable across Columns 2, 3 and 4, but reducing in magnitude and no longer being statistically significant at conventional levels in the model in Column 5. The coefficient on preparation is positive and fairly stable (between 0.03 and 0.1) across all models. However, it is no longer statistically significant at conventional levels in the model in Column 4, which is consistent with the presence of school-level common source bias.

### **-Table6-**

#### *Modelling Desire to Move School*

Table 7 repeats the analysis in Table 6 but using desire to move to another school as the outcome variable. The models are estimated using ordered logistic regression and the coefficients show the percentage change in the odds of being one category higher (closer to Strongly Agree), associated with a one-unit change in the independent variable, holding the other variables constant.

Column 6 shows the relationship between each of the variables when they are entered into the model one-by-one. As with all models in Table 7, the findings in Column 1 are conditional on demographic variables, which are described in the notes to the table. The coefficient on the variable measuring the proportion of pupils who qualify for free school meals (FSM) is positive and statistically significant at the 1% level. All the working conditions variables except discipline show a relationship with desire to move school when entered one-by-one.

In Column 7, which includes all seven of the working conditions variables simultaneously, the coefficient on FSM drops substantially and is no longer statistically significant. Four of the coefficients on the working conditions variables reach statistical significance at conventional levels. The strongest relationship is with leadership. A one standard deviation increase in the quality of leadership reported by a teacher is associated with a 61% reduction in the odds that a teacher is one category closer to Strongly Agree. A one SD increase in Scope for Progression is associated with a 28% reduction in the odds of being one category

closer to Strongly Agree. Similarly, a one SD increase in Preparation is associated with a 13% reduction in the odds of being one category closer to Strongly Agree. Finally, moving one category closer to Strongly Agree that workload is unmanageable is associated with a 20% increase in the odds of wanting to move school. The other four working conditions measures – collaboration, feedback, professional development and discipline – show no association with desire to move school.

The number of observations included in the model in Column 6 drops to 1,508 because of missing data on the covariates. Column 7 reports the same model with all missing data imputed. The results are qualitatively similar, though the strength of the associations does reduce slightly.

### **-Table7-**

I run two additional specifications of my model in Table 7 to test for common source bias. Column 9 includes school fixed effects and a measure of happiness at work in order to try to account for school-level common source bias. The coefficients on leadership and preparation are fairly stable and both remain statistically significant at the 5% level or higher. However, the coefficients on scope for progression and workload become weaker and are no longer statistically significant. Column 10 uses colleague reports of working conditions to try and account for individual-level common source bias. The coefficient on leadership falls noticeably compared to Column 7 but remains statistically significant at the 5% level. The coefficient on scope for progression switches sign and is no longer statistically significant at conventional levels. The coefficient on preparation remains stable and statistically significant at the 5% level.

Odds ratios are not always intuitive to interpret, so in order to give a sense of the material significance of these associations, Figure 3 shows predictive margins for the relationship between working conditions and whether a te

her wants to leave their school. More specifically, the graphs show the predicted probability of a teacher reporting that they either disagree or strongly disagree (67.2% of respondents in England) that they would like to move to another school, for varying values of Leadership, Scope for Progression and Preparation, when the other variables are set to their average values. The x axes are again measured in z scores and the y axis shows probabilities

measured between one and zero. Leadership shows by far the strongest relationship with desire to stay: a move from one SD below the mean to one SD above the mean is associated with around a 30 percentage point increase in the probability that a teacher desires to stay. The same change for scope for progression and preparation are associated with an increase of less than 0.1 in the probability that a teacher wishes to remain in their current school.

**-Figure3-**

## 5. Discussion

This research set out to extend our understanding of the relationships between teachers' working conditions, job satisfaction and retention. In particular, the study aimed to identify concrete aspects of teachers' working environments which can be changed in order to improve these outcomes.

*Working conditions and job satisfaction.*

First, this study examined the relationship between working conditions and teachers' desire to move schools. To my knowledge, this research is the first to show that scope for progression is associated with teacher job satisfaction, conditional on other working conditions. The association between Scope for Progression and job satisfaction is robust across four of the five models presented. The model in which it is not statistically significant is based on colleague reports of scope for progression. This specification is however, particularly ill-suited for this variable, because scope for progression varies across staff within schools. Indeed, within a department, scope for progression to middle leadership for one teacher may preclude it for another teacher. I therefore argue that the result being robust across Models 6-9 is sufficient to support this finding. This finding is broadly consistent with Self-Determination Theory, which predicts that teachers who are recognised for their good work through promotion are more likely to feel competent and satisfied with their jobs.

As can be seen from Table 4, the manifest variables that make up the Scope for Progression latent variable capture whether teachers believe they can progress as classroom teachers, towards leadership and in terms of pay. This provides pointers toward managerially controllable variables which school leaders can use to improve job satisfaction. For example, leaders can design performance review and promotion criteria to give teachers a clear sense

of what they need to do to achieve promotion. Management hierarchies can be designed to provide opportunities to take on additional responsibilities between promotions, in order to provide a sense of progression. Similarly, providing middle or senior leadership apprenticeship opportunities (Bush, 2011) can help in this respect. School leaders can also utilise non-promotion forms of progression, such as providing professional development that leads to accreditation of additional skills. Finally, leaders should be careful to communicate the potential for progression to those they particularly hope to retain, as part of a careful succession planning strategy (Rhodes & Brundrett, 2009).

Leadership and Management has a very strong association with teacher job satisfaction, as well as desire to move school. This is consistent with existing empirical research (Bogler, 2011; Griffith 2004; Leithwood & Jantzi, 2005; Skaalvik & Skaalvik, 2011). Viewed alongside prior research, the detailed measure of leadership in the current study helps triangulate specific behaviours which can be used by school leaders. As with retention, it is the combination of enabling and direction setting which seems to hold most promise for improving retention.

#### *Working conditions and the desire to move school*

Second, this study examined the relationship between working conditions and teachers' desire to move schools. Although prior research found associations between retention and teachers' preparation for their teaching assignments (Ingersoll, Merrill, & May, 2014; Ronfeldt, Schwartz, & Jacob, 2014), the present research extends these findings by showing that this association holds conditional on other working conditions. As can be seen from Table 4, the manifest variables that make up the preparation latent variable capture both whether teachers have had formal or informal training in the subjects they are assigned to teach and whether they feel prepared to teach these subjects. The association between preparation and desire to move school is fairly strong and is robust across all five models. This finding is broadly consistent with the predictions of Self-Determination Theory and the Job Demands-resources model, that teachers who feel competent because they have had the appropriate training are more likely to remain in their jobs.

The finding that preparation is related to turnover intentions also goes beyond existing theory, in that it has direct action implications for school leaders. In particular, this evidence suggests that leaders should try to give teachers assignments in the subjects in which they have a relevant degree or have received teacher training. This may require allocating teaching

assignments later in the academic year, in order to ensure that teachers joining the school during the summer can also be taken into consideration. Some school systems actually give more senior teachers priority over class assignments (Grissom, Kalogrides, & Loeb, 2015) but these findings suggest that school leaders should instead prioritise achieving the best subject match across all teachers. Where it is not possible to give teachers an assignment within their main subject area, perhaps due to staffing shortages, additional subject training should be provided as a matter of priority. This finding also suggests that subject knowledge enhancement courses, which are used in England to ‘top up’ teachers’ knowledge in subjects not covered in their degree, might help support retention.

Leadership and Management shows the strongest association with desire to move school and this finding is robust across all models. This finding is consistent with previous empirical research (Boyd et al., 2011; Kraft et al., 2016; Ladd, 2011). However, the rich measure of leadership derived from the TALIS data also provides a detailed characterisation of methods which can be utilised by school leaders looking to improve retention. For example, the manifest variables which load on the leadership latent variable (see Table 4) capture leaders influence on vision, culture and collaboration. This suggests that leaders should focus on providing clear direction and vision for the school, while also providing opportunities for teachers to participate in decision making and support each other. For example, leaders can model collaborative behaviours and provide protected periods in the school timetable to enable teachers to work together. Leaders should also be careful to engage in careful communication and consultation with staff in order to ensure that teachers can have their say in, and understand the rationale for, important decisions (Gold, 2003). In England, where a high proportion of headteachers participate in formal training before headship, policymakers might consider adapting the curriculum to include related content.

#### *Limitations and suggestion for future research*

These results should be interpreted with respect to three limitations of this data. First, the cross-sectional nature of the data means that I cannot rule out changes in working conditions preceding changes in turnover intentions or job satisfaction. Interpretation of the results in this paper therefore relies in part on theory and previous research that has explicitly tested for and ruled out this sort of reverse causality (Kraft et al., 2016). Second, there are also questions about mediation in the models. Table 5 shows that leadership has non-trivial correlations with four of the other working conditions latent variables. If the other working

conditions are mediators or mechanisms through which leadership affects job satisfaction and desire to leave, rather than just covariates, then the coefficients on the leadership variables can no longer be interpreted as *ceteris paribus* relationships. Third, the current study was only able to observe desire to move school, rather than actual job moves. While turnover intentions and observed turnover have been shown to be correlated in previous research (Ladd, 2011), the relationship between the two is not perfect.

To address these three limitations, future research should focus on acquiring panel data following schools over time. This would allow investigation of the relationship between working conditions and retention both within and between schools, as well as further tests for reverse causality, mediation and moderation. In the areas where good evidence currently exists across observational studies, it would be valuable to develop and trial leadership development programmes aimed at helping leaders work in ways that are more conducive to retention. Developing such programmes would also enable researchers to go beyond documenting conditional associations and directly test the causal impact of training aimed at developing certain leadership styles and behaviours.

### *Conclusion*

Despite some limitations, the present study makes several contributions to the literature. In particular, it identifies and characterises three important aspects of teacher working conditions - scope for progression, preparation for teaching assignments and leadership - which are robustly associated with teacher job satisfaction and desire to move schools. It is the first such study in the English context. These variables are directly within the control of school leaders and are indirectly affected by many government policies. The findings therefore provide actionable insights for those looking to improve staff satisfaction and retention.

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## Tables

Table 1: Descriptive statistics on teachers in the sample

	Mean	Standard Deviation	Min	Median	Max	Proportion
Age	39.2	10.3	22	38	76	-
Experience in teaching	12.4	9.3	0	10	42	-
Female	-	-	-	-	-	64%
Full time	-	-	-	-	-	87%
Permanent contract	-	-	-	-	-	94%

**Notes:** N=2028.

Table 2: Components of the teacher job satisfaction score

TALIS Variable	Question Wording	Mean Score	Standard Deviation
TT2G46A	The advantages of being a teacher outweigh the disadvantages	2.9	0.8
TT2G46B	If I could decide again, I would still choose to work as a teacher	3.0	0.8
TT2G46C	I would like to change to another school if that were possible	3.0	0.8
TT2G46D	I regret that I decided to become a teacher	3.3	0.7
TT2G46E	I enjoy working at this school	3.2	0.7
TT2G46F	I wonder whether it would have been better to choose another profession	3.0	0.8
TT2G46G	I would recommend my school as a good place to work	3.1	0.7
TT2G46J	All in all I am satisfied with my job	3.2	0.6

**Notes:** C, D and F are reverse scored, making a higher score “better” in all cases.

Table 3: Factor loadings

Variable	Leadership	Cooperation	Feedback	Progression	Prof Dev	Preparation	Discipline	Workload	Uniqueness
12A						0.77			0.43
12B						0.78			0.37
13A						0.70			0.40
13B						0.63			0.44
16								0.60	0.63
18A								0.49	0.73
18C								0.55	0.72
20A									0.85
20B									0.79
25A					0.61				0.66
25B					0.76				0.41
25C					0.73				0.43
25D					0.63				0.60
28B6				0.71					0.56
28C6				0.72					0.53
28D6				0.67					0.56
28E6				0.68					0.52
28F6				0.85					0.37
31A									0.83
31D									0.62
31E	0.33								0.58
31H									0.70
33A		0.39							0.82
33B		0.45							0.64
33C		0.42							0.73
33D		0.66							0.63
33E		0.76							0.48
33F		0.80							0.46
33G		0.61							0.66
33H		0.67							0.48
34D							0.82		0.34
34H							0.80		0.34
44A	0.79								0.35
44D	0.89								0.27
44E	0.91								0.25
27C	0.40								0.64
47C	0.98								0.18
47D	0.97								0.19
47E	0.33								0.79
47L			0.75						0.38
47M			0.91						0.19
47N			0.90						0.28

**Notes:** All factor loadings > 0.32, following Promax rotation. Leadership = Leadership/Management, Cooperation = Teacher Cooperation, Progression = Scope for Progression, Prof Dev = Professional Development, Preparation = Preparation for Teaching Assignment. See **Error! Reference source not found.**4 for question wording for each variable (not shown here for space reasons).

Table 4: Items which load on each factor

Factor	Wording of question which makes up that factor	TALIS Variable Code
Leadership/ Management	School provides staff with opportunities to participate in school decisions	44A
	I do not have the autonomy I need to do a good job as a teacher	47E
	Feedback provided based on a thorough assessment of teaching	31E
	The school has an effective school management team	47C
	The school management team give clear vision and direction	47D
	There is a collaborative school culture characterized by mutual support	44E
	There is a lack of employer support (for professional development)	27C
	The school has a culture of shared responsibility for school issues	44D
Teacher Cooperation	(How often) Teach jointly as a team in same class	33A
	(How often) Observe other teachers' classes and provide feedback	33B
	(How often) Engage in joint activities across different classes and age groups	33C
	(How often) Exchange teaching materials with colleagues	33D
	(How often) Engage in discussion about the learning of specific students	33E
	(How often) Work with other teachers to ensure common evaluations	33F
	(How often) Attend team conferences	33G
	(How often) Take part in collaborative professional learning	33H
Feedback	(Do you get) Feedback from student surveys about your teaching	28B
	(Do you get) Feedback following an assessment of your content knowledge	28C
	(Do you get) Feedback following a review of your students' tests scores	28D
	(Do you get) Feedback following self-assessment of your work	28E
	(Do you get) Feedback following surveys or discussions with parents	28F
Scope for Progression	I have scope to progress to a higher pay level	47L
	I have scope to progress into a leadership team role	47M
	I have scope to progress as a classroom teacher	47N
Professional Development	(To what extent does PD) include a group of colleagues from my school/subject	25A
	(To what extent does PD) include opportunities to use active learning methods	25B
	(To what extent does PD) include collaborative learning with other teachers	25C
	(To what extent does PD) occur over several occasions spread out over weeks	25D
Preparation	Were contents of subjects you teach included in your formal education/training	12A
	Was pedagogy of subjects you teach included in your formal education/training	12B
	(Do you feel prepared for) Content of the subjects you teach	13A
	(Do you feel prepared for) Pedagogy of the subjects you teach	13B
Discipline	(Can you) Control disruptive behaviour in the classroom	34D
	(Can you) Get students to follow classroom rules	34H
Workload	(How many hours did you spend on) Your job last week	16
	(How many hours did you spend on) Planning and lesson preparation last week	18A
	(How many hours did you spend on) Marking/correcting students work last week	18C

**Notes:** For space reasons, not all questions are reproduced in full. Only questions with loadings  $>|0.3|$  are shown.

Table 5: Pairwise correlations between the eight working conditions latent variables

	F1	F2	F3	F4	F5	F6	F7	F8
F1: Leadership	1.00							
F2: Collaboration	<b>0.34</b>	1.00						
F3: Feedback	<b>0.54</b>	<b>0.42</b>	1.00					
F4: Scope for Progression	<b>0.41</b>	0.44	0.28	1.00				
F5: Prof Development	<b>0.40</b>	0.25	0.29	0.19	1.00			
F6: Preparation	0.19	0.24	0.25	0.16	0.16	1.00		
F7: Discipline	0.00	0.05	0.01	0.14	-0.20	0.13	1.00	
F8: Workload	-0.22	<b>0.35</b>	0.06	0.01	-0.12	0.12	-0.11	1.00

**Notes:** Pairwise correlations highlighted in bold have an absolute value greater than 0.3.

Table 6: Modelling job satisfaction

	(1) Variables Entered Individually	(2) Variables Entered Together	(3) Full Imputation	(4) School Dummies	(5) Colleague Reported Measures
FSM (%)	-0.003 (0.003)	-0.004 (0.002)	-0.007 (0.004)	-0.005 (0.015)	-0.002 (0.004)
Leadership <sup>a</sup>	0.548*** (0.028)	0.379*** (0.034)	0.463*** (0.026)	0.377*** (0.037)	0.159** (0.059)
Collaboration <sup>a</sup>	0.237*** (0.026)	0.026 (0.031)	0.029 (0.031)	0.055 (0.034)	0.013 (0.06)
Scope for Prog. <sup>a</sup>	0.464*** (0.024)	0.183*** (0.029)	0.212*** (0.026)	0.180*** (0.034)	-0.078 (0.074)
Feedback <sup>a</sup>	0.21*** (0.025)	-0.045* (0.025)	-0.018 (0.031)	-0.055** (0.026)	0.047 (0.057)
Prof. Dev. <sup>a</sup>	0.207*** (0.026)	-0.022 (0.025)	-0.047* (0.026)	0.020 (0.028)	-0.078 (0.059)
Preparation <sup>a</sup>	0.178*** (0.028)	0.041* (0.025)	0.055** (0.022)	0.026 (0.027)	0.111** (0.049)
Discipline <sup>a</sup>	0.086** (0.026)	0.073*** (0.024)	0.113*** (0.023)	0.073*** (0.024)	-0.036 (0.051)
Workload <sup>b</sup>	-0.509*** (0.024)	-0.305*** (0.033)	-0.141*** (0.019)	-0.287*** (0.037)	-0.03 (0.029)
R Squared	-	0.41	0.40	0.50	0.04
N	-	1,510	2,028	1,510	758
Demographics	Y	Y	Y	Y	Y
School Dummies	-	-	-	Y	-
Colleague Report	-	-	-	-	Y

**Notes:** Demographic controls include in the model: female (dummy), age (years), full time (dummy), experience in teaching (years), pupils female (%), pupils ethnic minority (%), academy school (dummy). FSM = Free School Meals. Prof. Dev. = professional development. Each column is a separate ordinary least squares regression. Colleague report involves measuring working conditions  $W$  for teacher  $i$  in department  $j$ , using the mean of working conditions reported by other teachers in their department  $\bar{W}_{i \neq i, j}$ . Numbers in parentheses are standard errors. \*\*\* =  $p < 0.01$ , \*\* =  $p < 0.05$ , \* =  $p < 0.1$ . <sup>a</sup> = Z score. <sup>b</sup> = measured using question 47H “My workload is unmanageable” on a scale from Strongly Disagree (1) to Strongly Agree (4).



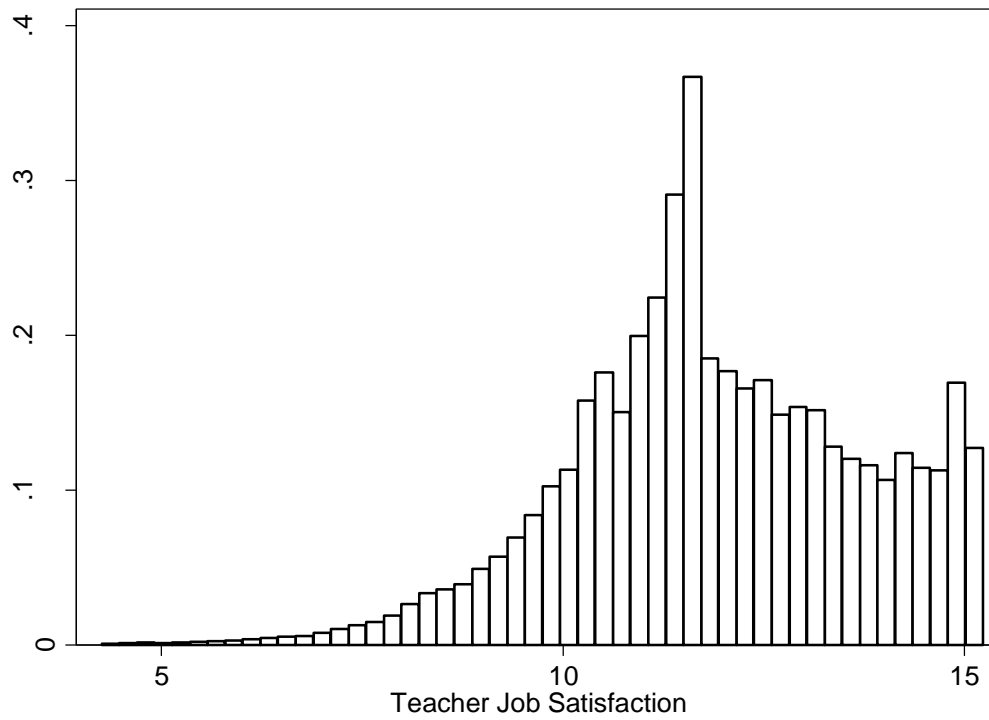
Table 7: Modelling desire to move school

	(6) Variables Entered Individually	(7) Variables Entered Together	(8) Full Imputation	(9) School Dummies	(10) Colleague Reported Measures
FSM (%)	1.091*** (0.007)	1.008 (0.007)	1.017 (0.025)	0.814** (0.024)	1.002 (0.007)
Leadership <sup>a</sup>	0.317*** (0.021)	0.393*** (0.031)	0.512*** (0.029)	0.565*** (0.052)	0.698** (0.102)
Collaboration <sup>a</sup>	0.647*** (0.032)	0.946 (0.064)	1.004 (0.031)	0.902 (0.095)	0.995 (0.111)
Scope for Prog. <sup>a</sup>	0.415*** (0.034)	0.723*** (0.076)	0.879*** (0.029)	0.88 (0.097)	1.212 (0.186)
Feedback <sup>a</sup>	0.684*** (0.04)	1.072 (0.083)	0.994 (0.039)	1.122 (0.098)	0.966* (0.116)
Prof. Dev. <sup>a</sup>	0.664*** (0.047)	1.016 (0.085)	1.018 (0.04)	1.005 (0.099)	1.052 (0.14)
Preparation <sup>a</sup>	0.731*** (0.037)	0.87** (0.047)	0.936** (0.027)	0.817** (0.049)	0.755** (0.085)
Discipline <sup>a</sup>	1.02 (0.082)	1.030 (0.071)	1.004 (0.027)	1.137 (0.09)	0.857 (0.114)
Workload <sup>b</sup>	1.87*** (0.127)	1.20** (0.1)	1.005 (0.023)	1.01 (0.099)	0.99 (0.058)
Enjoy Working at This School <sup>b</sup>				0.146*** (0.025)	
R Squared		0.14	0.14	0.89	0.04
N		1,508	2,028	1,505	785
Demographics	Y	Y	Y	Y	Y
School Dummies				Y	
Colleague Report					Y

**Notes:** Demographic controls include in the model: female (dummy), age (years), full time (dummy), experience in teaching (years), pupils female (%), pupils ethnic minority (%), academy school (dummy). FSM = Free School Meals. Prof. Dev. = professional development. Each column is a separate ordered logistic regression. Colleague report involves measuring working conditions  $W$  for teacher  $i$  in department  $j$ , using the mean of working conditions reported by other teachers in their department  $\bar{W}_{i \neq j}$ . Numbers in parentheses are standard errors. \*\*\* =  $p < 0.01$ , \*\* =  $p < 0.05$ , \* =  $p < 0.1$ . <sup>a</sup> = Z score. <sup>b</sup> = measured using question 47H “My workload is unmanageable” on a scale from Strongly Disagree (1) to Strongly Agree (4).

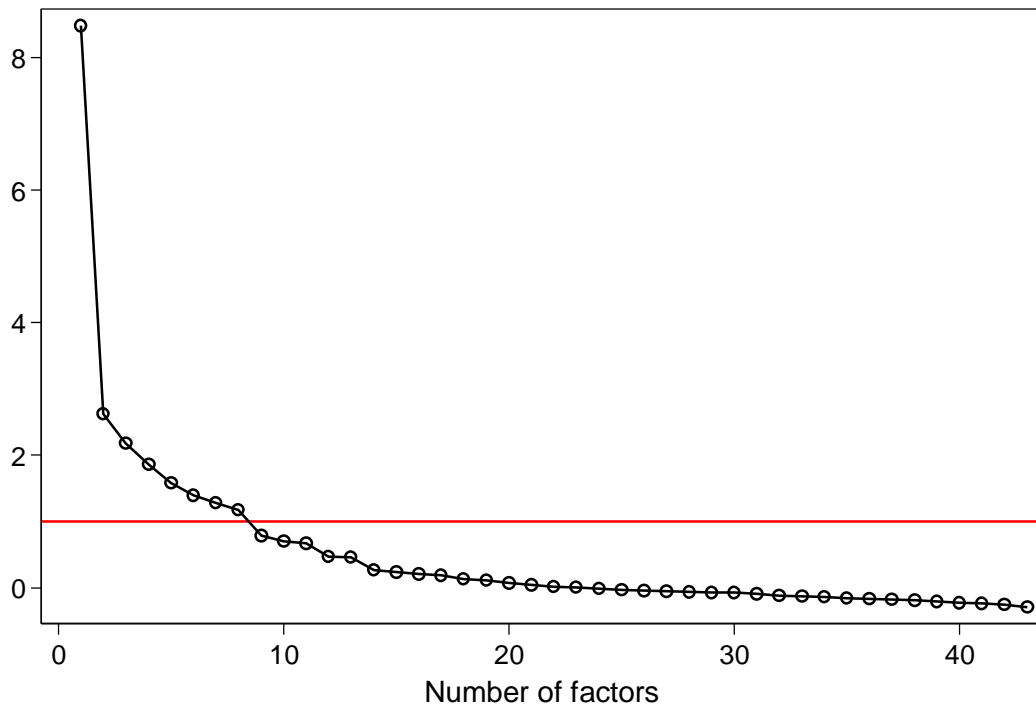
## Figures

Figure 1: Histogram of the teacher job satisfaction variable



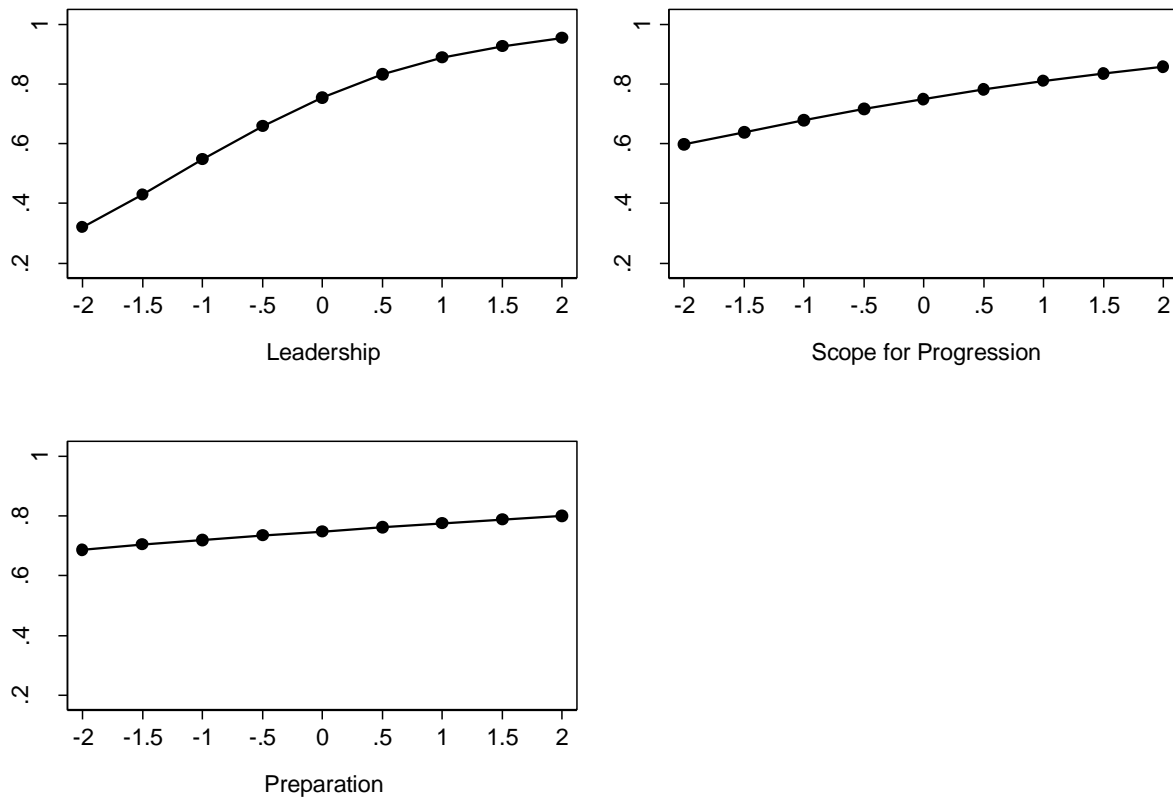
**Notes:** N = 112,120. The Job Satisfaction variable is calculated using confirmatory factor analysis and rescaled to have a mean 10 and standard deviation of 2 across the international sample. For more detail see Desa et al. (2014).

Figure 2: Eigenvalues for each marginal factor in the EFA



**Notes:** The red line indicates an eigenvalue of one.

Figure 3: Predicted margins that a teacher wants to remain at their current school



**Notes:** Shows the predicted margins from a logistic regression of whether or not a teacher wants to stay in their school (dummy) and the seven working conditions variables, plus the demographic and school variables included in Model 2 of Table 7. All other variables in the model are evaluated at the mean (continuous variables) and mode (dummy variables). The x axes show z scores and the y axes shows probabilities.