Modelling the relationships between teacher working conditions, job satisfaction and turnover intentions

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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 derived 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, as well as 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 findings identify managerially controllable variables which school leaders can use to improve retention.

1. Introduction

Teacher shortages are a common problem in public school systems in economically advanced countries (Dolton, 2006). In the Teaching and Learning International Survey 2013, for example, over a third of respondents worked in schools in which the head reported difficulties recruiting staff (OECD, 2014). One important reason for such shortages is declining levels of teacher retention (Sims, 2018), which are in turn predicted by low job satisfaction (Skaalvik and Skaalvik, 2011). Shortages are also a recurring problem, periodically increasing in severity as economic upswings draw graduates into higher-paid work in the private sector (Dolton, 2006; Chevalier, Dolton & McIntosh, 2007). Widespread shortages of teachers in recent years have prompted organisations including the UN, World Bank and the OECD to warn that action is required in order to address teacher shortages (Figazzolo, 2012; World Bank, 2013; Schleicher, 2011).

Teacher shortages are concerning for a number of reasons. High teacher turnover in a school is associated with reduced pupil attainment (Gibbons, Scrutino, & Telhaj, 2018). Teacher turnover damages pupil attainment both because the teachers who leave tend to be replaced by teachers who are initially less effective, and through the wider disruption caused in the school, including the need for school leaders to spend time and resources recruiting replacements (Ronfeldt, Loeb, & Wyckoff, 2013). Where turnover is the result of low job satisfaction or stress among teachers, there are often significant personal and emotional costs for staff (Johnson, 2004). Understanding the determinants of teacher job satisfaction and retention is therefore important.

Researchers have recently made a number of important advances in this respect. For example, psychologists have begun to pin down the processes through job demands lead teachers to become burned out and quit (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Hakanen, Bakker, & Schaufeli, 2006; Fernet, Austin, Trepanier, & Dussault, 2013). Education researchers, working at a lower level of abstraction, have begun to identify the concrete characteristics of schools that protect teachers against this and therefore improve retention. This strand of the literature has so far established that school leaders play a play a critical role in determining whether teachers are satisfied at work (Malinen & Savolainen, 2016) and remain at their school (Kraft, Marinell, & Shen-Wei Yee, 2016).

Despite the progress made, the existing literature still has important limitations. Foremost among these is the narrow *scope* of working conditions considered. The need to manage respondent burden in surveys understandably places constraints on questionnaire length and often means that researchers are left with less than twenty items to measure all aspects of working environment (e.g. Collie et al., 2012; Skaalvik & Skaalvik, 2009). This limits the number of aspects of working environment which can be linked to teacher job satisfaction and retention. It also raises concerns about unmeasured, which could cause 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 leadership and management requires researchers to identify "managerially controllable variables" which have "direct action implications" (p.23). This requires going beyond the identification of broad theoretical frameworks in order to home in on the specific aspects of working environment that leaders should focus on in order to improve job satisfaction or retention.

The current research aims to make progress in this direction. It does so by utilising an exceptionally rich set of over 40 working conditions items from the Teaching and Learning International Survey (TALIS), which were administered to secondary school teachers in England in 2013. Exploratory factor analysis is employed to derive a set of eight underlying working conditions factors, several of which have not yet been investigated in published research. These are combined with data on demographic information about the teachers and their students in order to model the relationship between working conditions and both job satisfaction and working conditions.

The findings extend the existing literature by identifying new correlates of job satisfaction. In particular, this is the first paper to establish links between scope for progression and turnover intentions among teachers. It is also the first to establish a link between preparation for teaching assignments and teacher job satisfaction. The paper also provides a more detailed characterisation of a leadership style which is strongly associated with reduced turnover intentions: providing clear direction and vision for the school, while also providing opportunities for teachers to participate in decision making, exercise sufficient autonomy over their own work, and support each other.

2. Literature and Conceptual Framework

This section reviews theories from psychology which seek to explain why teachers decide to leave their jobs and then uses this conceptual framework to organise a review of the empirical literature on the links between concrete aspects of teachers working conditions, job satisfaction and retention.

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 - anything that requires sustained physical or psychological effort - and resources - anything which facilitates learning and goal achievement (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). Where demands exceed resources over a sustained, employees experience a loss of energy and commitment at work, and eventually leave (Alarcon, 2011; Crawford, Lepine, & Rich, 2010). Research with teachers has shown that where demands exceed resources, teachers become less satisfied with their work and more likely to leave (Bogler & Nir, 2015; Hakanen, Bakker, & Schaufeli, 2006).

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) states 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 individuals' sense of autonomy or competence to be particularly detrimental (Fernet, Austin, Trepanier, & Dussault, 2013; Skaalvik & Skaalvik, 2009). Conversely, job resources in the form of support from colleagues (connection with others) 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 children (Hanushek, Kain, & Rivkin, 2004; Scafidi, Sjoquist, & Stinebrickner, 2005). 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 (Skaalvik & Skaalvik, 2011; Bogler & Nir, 2015; Vekeman, Devos & Valcke & Yves Rosseel, 2018) and retention (Boyd et al., 2011; Kraft et al., 2016; Ladd, 2011; Weiss, 1999). In general, the interpersonal connections within schools appear to bolster job satisfaction (Reeves, Pun, & Chung, 2017; Skaalvik & Skaalvik, 2011) and protect against turnover (Simon & Johnson, 2015). In terms of job demands, existing research suggests that teachers with unmanageably large workloads, or asked to teach many different classes have lower job satisfaction (Skaalvik & Skaalvik, 2011) and are 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 relationships have a protective effect, while inappropriate workload is a risk factor. The present study aims to address these limitations by using richer data and more detailed measured of working conditions to answers the following two research questions:

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

3. Data and Methods

Data

Addressing these two research questions requires rich, teacher-level survey data covering a wide range of working conditions, as well as data on relevant control variables, such as pupil demographic characteristics. TALIS is 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 TALIS data covers over thirty different countries. In this paper however, I restrict the sample to TALIS teachers in England. This has two advantages. First, it allows the use of seven additional working conditions variables derived from questions that were asked exclusively in the England version of the TALIS questionnaire.[1] Second, it allows me to link in extra data on TALIS respondents in England from the School Workforce Census (SWC) dataset, including objective school-level measures of pupil disadvantage, the proportion of pupils from ethnic minority backgrounds and the region and rural-urban status of the school. Design and non-response weights are applied to all estimates in this research using the `REPEST` command in the STATA software (Avvisati & Keslair, 2016), making the data representative of secondary teachers in England at the time. The final dataset contains 2,060 teachers across 154 schools and over 40 working conditions variables.

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 made up of eight different items from question 46, all relating to teachers' evaluations of their job (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 1 shows the means (2.9-3.3) and standard deviations (0.6-0.8) of the 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.

-Table1-

-Figure1-

The second outcome measure for this study is teachers' desire to move to another school. This 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. It is worth noting that this item also makes up part of the job satisfaction score, but it is used separately here because it is of specific interest. This question has a mean (reversed) score of three (equivalent to responding Disagree) and standard deviation of 0.8.

Working Conditions Variables

Existing research has not settled on a dominant conceptualisation of working conditions. I therefore use 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 to account for this (Preacher & MacCallum, 2003). Table 2 shows the factor loadings after rotation, which show 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. I therefore retain the first eight factors, which between them explain 94.5% of all the variation captured in the 42 TALIS working conditions variables.

-Table2-

-Figure2-

I give each of the eight factors a name based on my own interpretation of what unifies the variables which 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. Example items include “The school management team give clear vision and direction” and “I do not have the autonomy I need to a good job as a teacher”.

- Teacher Cooperation (α = 0.76) is formed of eight questions relating to the way in which teachers engage in shared work with a common goal. Example items include (How often do you) “exchange teaching materials with other teachers” and “Attend team conferences”.
- Feedback (α = 0.70) is formed of five questions relating to the way in which teacher receive advice aimed at improving their instruction. Example items include including (How often to do you get) “feedback following a review of your students test scores” and “feedback following self-assessment of your work”.
- Scope for Progression (α = 0.84) is formed of three questions relating to whether teachers can develop their skills and career. Example items include “I have scope to progress as a classroom teacher” and “I have scope to progress into a leadership team role”.
- Effective Professional Development (α = 0.74) is formed of four questions relating to the way in which teacher training is structured and designed. Example items include (to what extent does professional development) “include opportunities to use active learning methods” and “occur over several occasions spread out over weeks”.
- Preparation for Teaching Assignments (α = 0.69) is formed of four questions relating to whether teachers have been trained in the subjects which they have been assigned to teach. Example items include (Do you feel prepared for the) “content of the subjects you teach” and “pedagogy of the subjects you teach”.
- Discipline (α = 0.77) is formed of two questions relating to whether students comply with expected standards of behaviour. Examples include (can you) “control disruptive behaviour in the classroom” and “get students to follow classroom rules”.
- Workload has an alpha of 0.5 indicating inadequate reliability. It is therefore replaced with a single variable measuring whether teachers feel their workload is unmanageable on a four-point Likert scale from Strongly Disagree to Strongly Agree.

Table 3 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, but also include several not previously investigated such as scope for progression

and preparation for teaching assignments (Boyd et al., 2011; Ladd, 2011; Kraft et al., 2016). Table 4 shows the pairwise correlations for the eight factors, which are generally low.

-Table3-

-Table4-

Analytical Approach

In order to understand the conditional association between the different working conditions and job satisfaction and retention, I use regression analysis. Job satisfaction is a continuous variable and is therefore modelled using ordinary least squares regression. Desire to move schools is an ordered categorical variable and is therefore modelled using ordered logistic regression. I run one version of each model using multiple imputation by chained equations to account for missing data on the covariates. This maintains sample size but involves assuming that the data which is missing is not related to the values of the missing data.

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 this setting, individual common source bias could result from the affective state of the teachers at the time they respond to the survey. For example, if a teacher is having a particularly bad day when they respond to the TALIS questionnaire, this 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 estimate of the relationship. 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 this setting 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 Desire to Move School

Table 5 shows the results from modelling teachers' desire to move school based on their personal characteristics, the characteristics of their school and the working conditions in their school. 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 1 shows the relationship between each of the variables when they are entered into the model one-by-one. As with all models in Table 5, the findings in Column 1 are all 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 2, which includes all seven of the working conditions variables entered into the model simultaneously, the coefficient on FSM drops substantially and is no longer statistically significant. Four of the coefficients on the working condition variables reach statistical significance at conventional levels. The strongest relationship is with leadership. A one standard deviation in the quality of leadership reported by a teacher is associated with a 61% reduction in the odds that a teacher is one category higher (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, and 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 – all show almost zero association with desire to move school.

The number of observations included in the model in Column 2 drops to 1,508 because of missing data on the covariates. Column 3 runs the same model with all missing data imputed. The results are qualitatively similar, though the strength of the associations does reduce slightly.

-Table5-

I run two additional specifications of my model in Table 5 to test for common source bias. Column 4 includes school fixed effects and a measure of happiness at work in order to try to capture individual-level time-varying affective state at the point a teacher responded to the survey. The coefficients on leadership and preparation are fairly stable and both remain statistically significant at the 5% level or higher. However, the association with scope for progression and workload become weaker and are no longer statistically significant. Column 5 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 2 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.

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 teacher 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 correlation 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-

Modelling Job Satisfaction

Table 6 repeats the analysis in Table 5 but using job satisfaction (z scored) as the outcome variable. 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. Unlike desire to move school, FSM does not show any relationship with job satisfaction when entered into the model with demographic characteristics in Column 6.

In Column 7, 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 8), school fixed effects (Column 9), and the use of colleague reported working conditions (Column 10).

In Column 7 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 8 and 9, the coefficients remain broadly stable and statistically significant at the 5% level. However, in Column 10 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 7, 8 and 9, but changing in magnitude and no longer being statistically significant at conventional levels in the model in Column 10. The coefficient on preparation is positive and fairly stable (between 0.03 and 0.1) across all models. However, it is not statistically significant at conventional levels in the model in Column 9, which is consistent with the presence of school-level common source bias.

-Table6-

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 environment which are related to these outcomes, in order to move beyond high-level psychological theories of teacher retention and identify "direct action implications" for school leaders looking to improve retention (Shrivastra and Mitroff, 1984; p.23). This section discusses how and to what extent this goal has been achieved.

To my knowledge, this is the first paper using teacher survey data to establish a link between whether teachers feel prepared for the subject they teach and turnover intentions. As can be seen from Table 3, 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. The association between preparation and desire to move school is robust across all five of the models presented and is also fairly strong. In the models which account for common-source bias, a one SD increase the extent to which teachers report being prepared is associated with an 18-25% reduction in the odds of wanting to move school more. 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 what these theories can tell us, in that it has direct action implications for school leaders. In particular, it 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. In certain school systems, it may also require changes to contractual arrangements that give more senior teachers priority over assignments (Johnson, 2007). Where this is not possible, for example due to staffing shortages, additional subject training should be bought in to prepare teachers for the challenge of teaching outside their subject. For example, subject-specific professional development has been shown to increase retention of science teachers, particularly those early in their career (Allen & Sims, 2017).

This research is the first to show that teacher reports of scope for progression are associated with job satisfaction. As can be seen from Table 3, 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. 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 is a feature of both the school and the individual. 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. The correlation is also fairly strong and consistent across these models, with a one SD increase in scope for progression being associated with an 18-21% SD increase in job satisfaction. This finding is broadly consistent with the predictions of Self-Determination Theory, that teachers who feel competent because they are recognised for their good work through additional training or promotion are more likely to feel satisfied and motivated.

As with preparation, the finding that scope for progression is related to job satisfaction also takes us beyond the predictions of high-level theoretical frameworks by homing in on specific actions that school leaders can take to increase job satisfaction. For example, it suggests that leaders should design performance review and promotion criteria to give teachers a clear sense of what they need to do to advance. Management hierarchies within schools can also be designed to provide opportunities to take on additional responsibilities in a gradated way, in order to provide a sense of progression between or in lieu of major promotions. Providing middle or senior leadership apprenticeship opportunities (see Bush, 2011) can also help in this respect. Leaders can also utilise non-promotion forms of progression, such as providing professional development that leads to accreditation of additional skills. Finally, leaders should also 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).

The quality of leadership consistently emerges as having the strongest association with both job satisfaction and desire to leave and this finding is robust across all models presented. The manifest variables which load on the leadership latent variable (see **Error! Reference source not found.** 3) capture leaders influence on vision, culture and collaboration, among other

things. This finding is also broadly consistent with the predictions of the Job Demands-Resources model, which suggests that setting a clear direction will reduce the job demands placed on employees by reducing ambiguity, and that creating a culture of mutual support among staff will help bolster the job resources which they can draw upon in their work. The emphasis on providing opportunities to participate in decision making is also consistent with the predictions of Self Determination Theory that teachers are more likely to remain in their jobs if their need for autonomy is accommodated.

This research is not the first to identify a correlation between survey measures of leadership style and turnover (Boyd et al., 2011; Ladd, 2011; Kraft et al., 2016; Weiss, 1999) or job satisfaction (Skaalvik & Skaalvik, 2011). Nevertheless, combining the findings with those from existing studies does help further triangulate and extend our knowledge of the specific characteristics or styles of leadership associated with these outcomes. First, I replicate the finding from Ladd (2011) and Kraft et al. (2016) that leadership which clearly articulates a vision for the school is associated lower (intended) turnover. Second, I replicate the finding from Ladd (2011) and Boyd et al. (2011) that leadership which consults with and empowers teachers is associated with lower (intended) turnover. Third, I replicate the finding from Kraft et al. (2016) and Weiss (1999) that leadership that encourages teacher collaboration is associated with reduced (intended) turnover. As well as corroborating these prior findings, I extend existing research (e.g. Bogler, 2011; Skaalvik & Skaalvik, 2011) by showing for the first time that leadership that articulates a clear vision, while also consulting teachers and helping them work together is associated with increased job satisfaction. This combination of direction setting and enabling leadership behaviours is consistent with other research focus specifically on the types of leadership that are the best predictors of teacher job satisfaction and commitment to their schools (Nguni, Sleegers, & Denessen, 2006; Bogler, 2001). These findings offer further pointers towards managerially controllable variables which school leaders can focus on in order to address retention. For example, leaders can create protected to time to enable teachers to work together and take care to engage in discussions with staff prior to taking important decisions.

Limitations and Suggestion for Future Research

These results should be interpreted with respect to the limitations of this data. In particular, 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 using panel data that has explicitly tested for and ruled out this sort of reverse causality (Kraft et al., 2016). As well as potential reverse causality, there are also questions about mediation in the models. Table 4 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 in my regression can no longer be interpreted as ceteris paribus relationships. A final limitation is that I am 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.

Future research should therefor focus on acquiring panel data following schools over time. This would allow investigation of the relationship between a wider set of working conditions and retention both within and between schools, as well as further tests for reverse causality, mediation and moderation. Acquiring yet more specific information on the concrete actions leaders can take to improve retention may also require the development of new survey instruments, which carefully measure a greater range of leadership *behaviours*. Finally, in the areas where we currently have good evidence across observational studies, it may be worth developing and trialling leadership training interventions aimed at helping leaders work in ways that are more conducive to retention. One example of such an intervention is the McREL Balanced Leadership programme, which has been shown to improve teacher retention (Jacob, Goddard, Kim, Miller, & Goddard, 2015). Developing such interventions would also enable researchers to go beyond documenting conditional associations and directly test the causal impact of the leadership behaviours identified in the literature.

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Tables

Table 1: 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 2: Factor loadings

Variable	F1	F2	F3	F4	F5	F6	F7	F8	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. F1 = Leadership, F2 = Collaboration, F3 = Feedback, F4 = Scope for Progression, F5 = Prof Development, F6 = Preparation, F7 = Discipline, F8 = Workload. See **Error! Reference source not found.** for question wording for each variable (not shown here for space reasons).

Table 3: 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
Effective 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 4: Pairwise correlations between the eight working conditions latent variables

	F1	F2	F3	F4	F5	F6	F7	F8
F1: Leadership	1.00							
F2: Collaboration	**0.34**	1.00						
F3: Feedback	**0.54**	**0.42**	1.00					
F4: Scope for Progression	**0.41**	0.44	0.28	1.00				
F5: Prof Development	**0.40**	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	**0.35**	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 5: Modelling desire to move school

	(1) Variables Entered Individually	(2) Variables Entered Together	(3) Full Imputation	(4) School Dummies	(5) Colleague Reported Measures
FSM (%)	1.091***	1.008	1.017	0.814**	1.002
	(0.007)	(0.007)	(0.025)	(0.024)	(0.007)
Leadership [a]	0.317***	0.393***	0.512***	0.565***	0.698**
	(0.021)	(0.031)	(0.029)	(0.052)	(0.102)
Collaboration [a]	0.647***	0.946	1.004	0.902	0.995
	(0.032)	(0.064)	(0.031)	(0.095)	(0.111)
Scope for Prog. [a]	0.415***	0.723***	0.879***	0.88	1.212
	(0.034)	(0.076)	(0.029)	(0.097)	0.186
Feedback [a]	0.684***	1.072	0.994	1.122	0.966*
	(0.04)	(0.083)	(0.039)	(0.098)	(0.116)
Prof. Dev. [a]	0.664***	1.016	1.018	1.005	1.052
	(0.047)	(0.085)	(0.04)	(0.099)	(0.14)
Preparation [a]	0.731***	0.87**	0.936**	0.817**	0.755**
	(0.037)	(0.047)	(0.027)	(0.049)	(0.085)
Discipline [a]	1.02	1.030	1.004	1.137	0.857
	(0.082)	(0.071)	(0.027)	(0.09)	(0.114)
Workload [b]	1.87***	1.20**	1.005	1.01	0.99
	(0.127)	(0.1)	(0.023)	(0.099)	(0.058)
Enjoy Working at This School [b]				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. = effective 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 $\overline{W}_{i\neq i,j}$. Numbers in parentheses are standard errors. *** = p< 0.01, ** = p< 0.05, * = p< 0.1. [a] = Z score. [b] = measured using question 47H "My workload is unmanageable" on a scale from Strongly Disagree (1) to Strongly Agree (4).

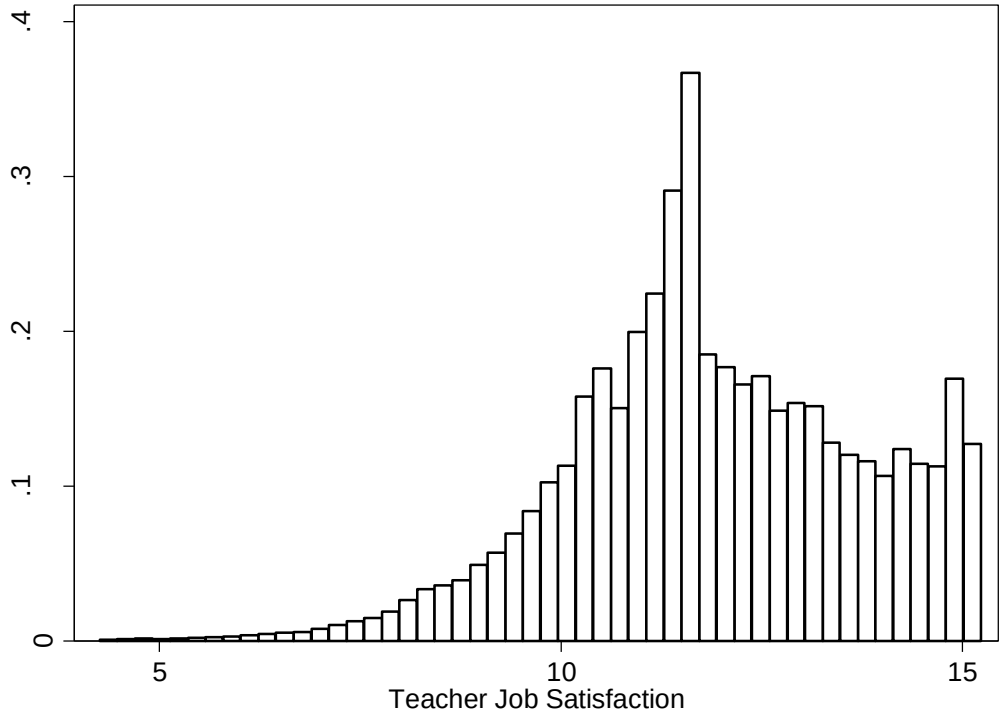
Table 6: Modelling job satisfaction

	(6) Variables Entered Individually	(7) Variables Entered Together	(8) Full Imputation	(9) School Dummies	(10) Colleague Reported Measures
FSM (%)	-0.003	-0.004	-0.007	-0.005	-0.002
	(0.003)	(0.002)	(0.004)	(0.015)	(0.004)
Leadership [a]	0.548***	0.379***	0.463***	0.377***	0.159**
	(0.028)	(0.034)	(0.026)	(0.037)	(0.059)
Collaboration [a]	0.237***	0.026	0.029	0.055	0.013
	(0.026)	(0.031)	(0.031)	(0.034)	(0.06)
Scope for Prog. [a]	0.464***	0.183***	0.212***	0.180***	-0.078
	(0.024)	(0.029)	(0.026)	(0.034)	(0.074)
Feedback [a]	0.21***	-0.045*	-0.018	-0.055**	0.047
	(0.025)	(0.025)	(0.031)	(0.026)	(0.057)
Prof. Dev. [a]	0.207***	-0.022	-0.047*	0.020	-0.078
	(0.026)	(0.025)	(0.026)	(0.028)	(0.059)
Preparation [a]	0.178***	0.041*	0.055**	0.026	0.111**
	(0.028)	(0.025)	(0.022)	(0.027)	(0.049)
Discipline [a]	0.086**	0.073***	0.113***	0.073***	-0.036
	(0.026)	(0.024)	(0.023)	(0.024)	(0.051)
Workload [b]	-0.509***	-0.305***	-0.141***	-0.287***	-0.03
	(0.024)	(0.033)	(0.019)	(0.037)	(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: All notes are identical to Table 5, expect that in Table 6 each column is a separate ordinary least squares regression.

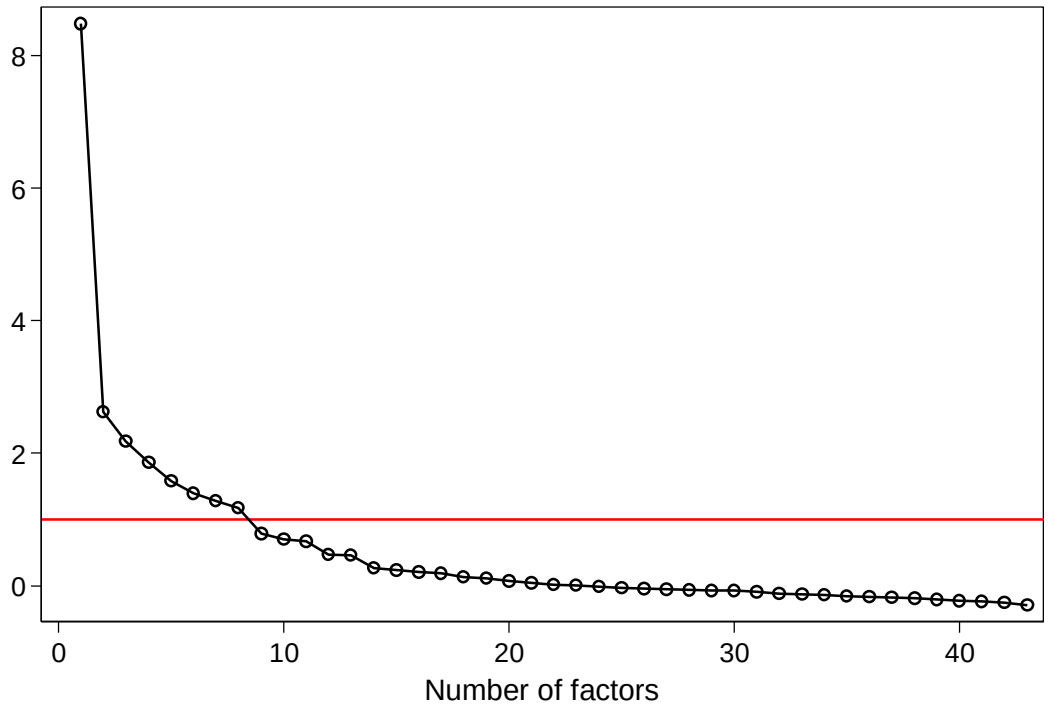
Figures

Figure 1: Histogram of the teacher job satisfaction variable



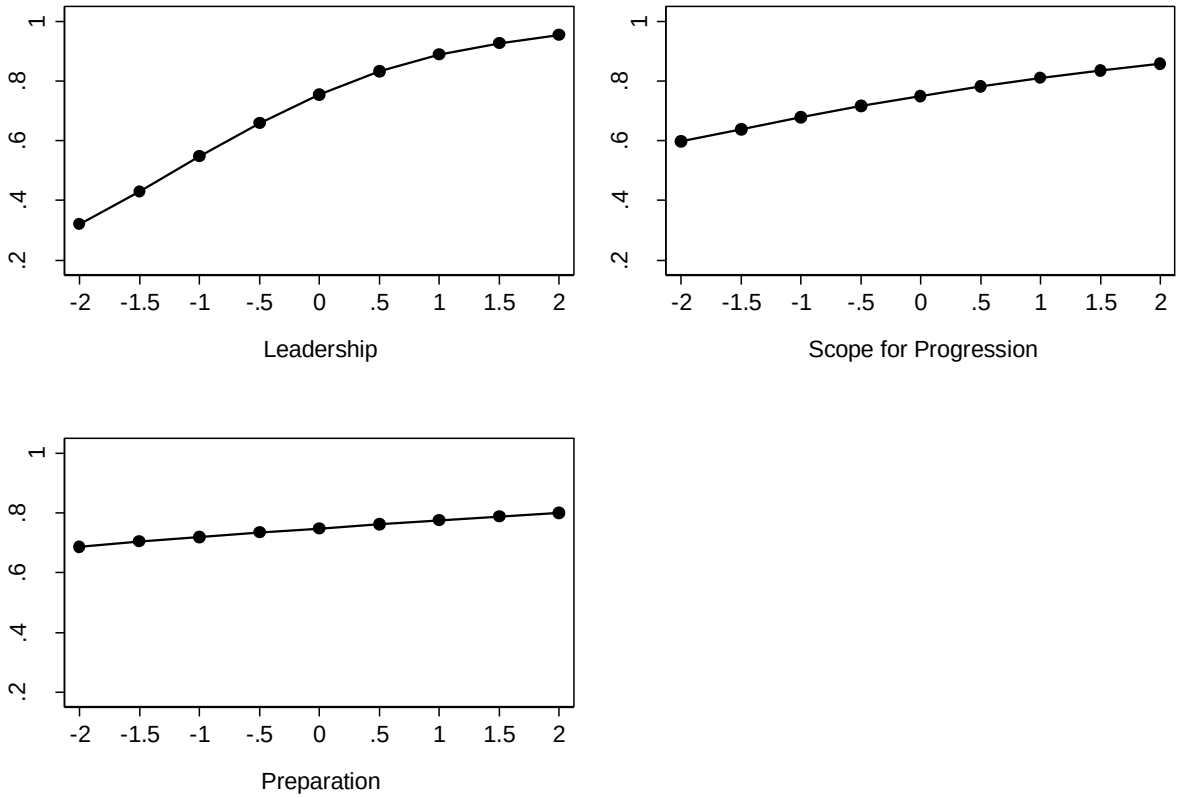
Notes: N = 112,120. The Job Satisfaction variable is calculated using confirmatory factor analysis and rescaled to have a mean 10 and standard deviation of 2 across the international sample. For more detail see Desa et al. (2014).

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 5. 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 show probabilities.