How did the COVID-19 pandemic affect the wellbeing of teachers at work?

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The COVID-19 pandemic led to one of the biggest shocks to the education system the world has ever seen. Schools were shut, remote instruction became widespread and government policy seemed to be changing overnight. This paper explores how teachers' wellbeing at work responded to such events, utilising unique panel data collected at 75 timepoints spanning before, during and towards the conclusion (July 2022) of the pandemic in England. We find that the work-related anxiety of headteachers increased substantially throughout the pandemic – much more so than amongst more junior staff. Female teachers experienced a greater impact than men, particularly amongst those with young children at home. Independent schoolteachers were also more anxious than their state school counterparts, though only during the first lockdown. We illustrate how providing onsite instruction, live online lessons and working longer hours were all associated with raised levels of work-related anxiety during the first COVID wave. Our findings thus illustrate how the effects of the pandemic have been felt unevenly across the school workforce. We argue that this may have implications for retention of key individuals – such as senior leaders – as England transitions towards a post-pandemic world.

Key Words: Teachers, COVID-19, mental health, anxiety, workplace wellbeing, pandemic.

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1. Introduction

At the start of 2020, the COVID-19 pandemic sent shockwaves across the world. A deadly new virus was spreading from China to other countries, marking the beginning of one of the most remarkable periods in recent history. Almost every corner of life was affected, particularly education. Important national examinations were cancelled, schools were shut, remote learning was quickly introduced, and all with little idea about how long such changes would have to last. The working conditions of teachers were hence fundamentally changed overnight, with significant disruption from the pandemic lasting for the next two years.

Such events are likely to have had a major impact on educators' mental health, including their wellbeing at work. For instance, at the start of the pandemic, schoolteachers had to quickly come to terms with how to deliver effective remote instruction rather than face-to-face. They would also have to do so while potentially having their own children at home. Teachers then had to deal with the psychological challenges of returning to the classroom soon after the peak of each wave, despite concerns over whether it was safe to do so (NEU, 2020). They also faced the uncertainty over whether and when schools would shut again, how to implement ever-changing COVID-secure measures (testing, bubbles, face masks), coping with high levels of staff absence and the challenges of awarding pupils' grades in the absence of examinations. Teachers' mental health – including their anxiety about work – is likely to have suffered as a result.

A relatively small number of previous studies have investigated this issue. Conducting semi-structured interviews with 21 Swiss primary school teachers, Hascher, Beltman and Mansfield (2021) found "*high work-load, social distancing and feelings of lack of competence and self-efficacy were among the most aversive aspects of distance teaching.*" Drawing on cross-sectional data from 394 teachers in Ecuador, Hidalgo-Andrade, Hermosa-Bosano and Paz (2021) concluded that female teachers and those with caring responsibilities had higher levels of stress during the pandemic than male teachers and those without such responsibilities. Zadok-Gurman et al (2021) undertook a mindfulness intervention study with a group of 67 teachers during the pandemic in Israel. They found their intervention enhanced teachers' wellbeing, even during the stressful events of the pandemic. From a cross-sectional survey of 151 primary teachers in the United States conducted after the first wave, Chan et al (2021) reported most respondents were "emotionally exhausted", suffering from high levels of task

stress and feelings of job ambiguity. In contrast, a survey of 92 teachers in Germany conducted at two points during the 2019/20 academic year found that "depersonalization" and a lack of feeling of accomplishment increased during the first wave of the pandemic, but emotional exhaustion did not (Weißenfels, Klopp and Perels 2022). From 76 questionnaires returned by Turkish school teachers, Esici et al (2021) reported a mix of positive and negative effects of the pandemic, with increased anxiety described as "*the most intense of the negative effects*". In one of the few longitudinal studies on this issue, Nabe-Nielsen et al (2022) investigated the mental health of teachers at three timepoints (May, June, December 2020) during the early stages of the pandemic in Denmark. They found that the prevalence of poor mental health amongst teachers increased from 27% to 84% from May to December 2020. Based upon a cross-sectional survey with 399 teachers during school closures, Gutentag and Asterhan (2022) found teachers to report feeling higher levels of burnout relative to before the pandemic, with this related to levels of high work-family conflict. Using data from 274 teachers in Malaysia, Rosli and Bakar (2021) found school staff to have moderate levels of psychological wellbeing during the pandemic, with no difference between genders.

In England, survey data from 54 teachers collected during and following one of the lockdowns suggested that the pandemic's effect on organisation and workload were amongst the most important issues (Jellis, Williamson and Suto 2021). Yet the same authors also concluded that, overall, "*there was not a large change in any area that they felt affected their wellbeing*". Investigating the impact of the first six weeks of the lockdown on teachers, Kim and Asbury (2020) found that – after an initial period of uncertainty, they settled into the situation and were able to find a way forward. Similarly, in qualitative interviews with 24 teachers during the pandemic, Kim, Leary and Asbury (2021) identified six key themes impacting teachers in England - uncertainty, practical concerns, worry for pupils, importance of relationships, teacher identity, and reflections. Finally, using longitudinal data from interviews with 24 teachers conducted at three time points during 2020, Kim, Oxley and Asbury (2022) concluded that the mental health and wellbeing of teachers had declined during the pandemic, particularly amongst primary school leaders.

Despite these interesting insights, there remains some important gaps in the existing evidence base. Much previous work in this area has been qualitative, with the few quantitative studies typically involving a small sample of teachers. Relatedly, there is little in the way of longitudinal research examining how teachers' wellbeing changed as the pandemic progressed,

including in response to key events (such as lockdowns being announced). Likewise, no existing longitudinal study compares how the wellbeing of teachers changed during the pandemic in comparison to pre-pandemic levels. It has also not been possible for previous studies to robustly explore differences between key sub-groups (e.g. differences between classroom teachers and headteachers) due to the limited sample sizes available.

This paper seeks to address such issues by presenting evidence from unique panel data tracking teachers' work-related anxiety before, during and towards the end of the COVID-19 pandemic in England. Drawing on data from more than 10,000 teachers, we investigate changes in work-related anxiety across 75 timepoints over a three-year period (October 2019 to July 2022). The large sample means we can explore differences between state and independent school staff, classroom teachers and headteachers, those with and without children and across those working in state and independent schools. Moreover, the frequency of our data collection means we can link changes in work-related anxiety to important events, such as the announcement of lockdowns / school closures and subsequent reopening.

The paper specifically attempts to address five research questions. First, exactly how did teachers work-related anxiety vary during the pandemic in England, and how does this compare to pre-pandemic levels? The existing literature overviewed above is inconclusive on this point, with some studies reporting sizeable negative effects, while the evidence in others is more mixed. A strength of the data we have collected is that the sample of teachers is large and has been collected at many more timepoints than previous work. Such frequency of data collection is important given how rapidly things were changing over this period. We thus begin by asking:

Research Question 1. How did the work-related anxiety of teachers vary throughout the COVID-19 pandemic? How does this compare to teachers' pre-COVID anxiety levels?

Next, we turn to the seniority of teachers. Due to limited sample sizes, previous quantitative work in this area have largely treated "teachers" as a single, homogeneous group. Yet there is obviously substantial heterogeneity in teachers' roles, with some groups experiencing more challenges during the pandemic than others. It seems likely that school leaders were particularly affected, given they had overall responsibility for keeping pace with and delivering rapidly changing government policy (e.g. school closures, examination cancellations) while also having a duty of care to their staff. The wellbeing of senior staff is hence likely to have

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been acutely impacted by the pandemic, particularly at key timepoints. Our second research question explores this issue:

Research Question 2. How did the work-related anxiety of headteachers change throughout the pandemic, and in comparison to pre-COVID anxiety levels? How does this compare to more junior staff?

Our third research question turns to gender differences. Even before COVID, female teachers reported higher levels of anxiety than their male counterparts (Stengard et al 2022). But how did this change during the pandemic? Did the gender gap in work-related anxiety amongst teachers increase still further, or did it result in men and women feeling under equal strain? Few existing studies have explored this issue – including how it might also be related to gender differences in childcare responsibilities. For instance, with children being kept home from nursery and school, did this lead to extra work-related pressures amongst parents (e.g. due to having to juggle work and childcare responsibilities) and to what extent was the brunt of this felt by females? Our third question covers this topic by asking:

Research Question 3. Did work-related anxiety increase more for male or female teachers during the pandemic? How was this linked to their childcare responsibilities?

Fourth, we turn to school level differences. In the early stages of the pandemic, there may have been different expectations at different types of school. For instance, in independent schools where tuition fees are paid, parents may have expected live online lessons to be delivered by teaching staff, which may not have been the case at state schools. Similarly, schools with more socio-economically advantaged intakes may have more demanding parents, which could lead them to put more pressure of teaching staff to deliver live material. Research question 4 considers such issues by asking:

Research Question 4. Was there a particularly large increase in work-related anxiety amongst teachers working at certain types of school? Did this relationship change throughout the course of the pandemic?

Finally, how much anxiety teachers felt about work during the pandemic is likely to be related to their working conditions. If they were expected to be on-site giving in-person lessons to the

children of key workers – and hence exposed to the virus at work – they may have felt more anxious when infection levels were high (particularly during the first wave, when the pathology of COVID was poorly understood). On the other hand, schools – and managerial staff within schools – likely had different expectations surrounding the quantity and type of online content provided by staff which, given other pressures, might also have impacted teachers' anxiety levels. Our final question therefore considers how work-related anxiety was related to a specific set of working conditions at key points during the pandemic:

Research Question 5. How was work-related anxiety during the pandemic linked to working onsite or at home and provision of different instructional activities?

2. Data and methodology

Data

The data we use were collected via the Teacher Tapp survey app (https://teachertapp.co.uk/). Each day at 15:30, teachers in England who have downloaded this app receive a notification asking them to answer three short questions. Typically, around 5,000-8,000 teachers respond. As many of the same individuals respond each day, it provides longitudinal information about teachers over time. Although the sample is self-selecting – and should hence be considered a convenience rather than probabilistic sample – the demographic characteristics of respondents is broadly in line with the population of teachers in England (see Teacher Tapp 2020 for further details). Survey weights are also provided to further enhance the representativeness of the data across the key demographic characteristics of school type, phase, job role, age and gender. Descriptive characteristics of our analytic sample are presented in Table 1.

<< Table 1 >>

Prior to the COVID-19 pandemic, we commissioned Teacher Tapp to ask teachers about their work-related anxiety at multiple points during the 2019/20 academic year. Our intention was to explore how teachers work-related anxiety varied within and across different school terms (including school holidays). After the COVID-19 pandemic reached England, a decision was made to extend the data collection period. We consequently we have information about teachers work-related anxiety at 75 selected timepoints between October 2019 and July 2022, covering the period before, during and towards the end of the COVID-19 pandemic.

Specifically, on 75 Tuesday afternoons between October 2019 and July 2022 the Teacher Tapp panel were asked:

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"On a scale where 0 is 'not at all anxious' and 10 is 'completely anxious', overall, how anxious did you feel <u>about work</u> today?"

This question is based on the general anxiety question developed by the UK Office for National Statistics (ONS), which is widely used in high-profile national surveys[1] to measure wellbeing across the population (ONS 2015). It has hence been subject to extensive validation and is now in widespread use (ONS 2012; Benson et al 2019). A minor adaption we have made is to add "<u>about work</u>" to the question, given our particular interest in teachers' wellbeing in the workplace. To avoid possible day-of-week effects, teachers always responded to this question on a Tuesday afternoon[2]. Appendix A provides the full list of dates when this question was asked, along with the distribution of responses. The mean anxiety score across all timepoints on this 0-10 anxiety scale is 3.7 with a standard deviation of 2.8.

A total of 26,394 teachers answered our work-related anxiety question at least once over our study period. However, as we are most interested in changes in responses over time, we restrict our main analytic sample to the 13,199 teachers who responded to the question on at least 10 out of the 75 occasions[3]. Of course, even after making this restriction, different teachers (and a different number of teachers) respond at different timepoints, due to either choosing to not answer the question, dropping out of the Teacher Tapp panel or leaving the teaching profession completely. Hence, to test the robustness of our key results, alternative estimates are provided in Appendix C where the sample is restricted to only those teachers who responded to the work-related anxiety question on at least 60 occasions (80% of the total). This leads to little change in the substantive conclusions drawn.

A range of other information is available about the Teacher Tapp sample. This includes key background information (e.g. age, gender, children at home, job role) and the school in which they work (e.g. percent of disadvantaged pupils, state/independent sector, Ofsted inspection

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[1] A list of surveys that use this question can be found at https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/methodologies/surveysusingthe4officeforna tionalstatisticspersonalwellbeingquestions

[2] When testing this question for day-of-week effects, we found that work-related anxiety of teachers peaked Monday afternoon and then gradually fell through to Saturday afternoon, before rising again (Teacher Tapp, 2019).

[3] Estimates from our regression models are based on fewer observations – between 2,000 and 4,000 teachers – as these require pre-COVID anxiety scores to also be available. Hence our regression models tend to use long-standing members of the Teacher Tapp cohort.

rating). Moreover, at a smaller number of specific points during the pandemic, teachers have been asked other questions about their work environment as well. For instance, teachers were asked about the learning activities they had done that day, number of hours worked and how often during the pandemic they were onsite (at school). Further details about these questions – including the dates they were asked - can be found in Appendix A. Responses to these questions are used to provide further background context about teachers working lives during the pandemic, and how the different instructional activities they were undertaking were linked to their anxiety levels.

Methodology

To provide a simple descriptive overview we begin by plotting average anxiety scores over our three-year study period, highlighting how this relates to key points during the pandemic in England. This is first done for the sample as a whole, and then for particular subgroups (e.g. headteachers, male versus female teachers). Appendix E presents alternative figures corresponding to the percent of teachers with "high" anxiety levels (scores of seven and above on the 0-10 scale) at each timepoint[4].

These graphs are supplemented by a set of OLS regression models exploring between group differences in average anxiety scores during four key stages of the pandemic:

- Stage 1 (mid-March – August 2020). When the virus first came to England and the first lockdown was in place.
- Stage 2 (September 2020 – August 2021). Schools fully reopened in September 2020. A second four-week lockdown occurred in November 2020, though schools remained open. A third national lockdown – including school closures – occurred between January and March 2021, after which schools and society began to reopen.
- Stage 3 (September 2021 – February 2022). Schools returned after the summer holidays, with widespread vaccination now complete. The Omicron wave led to disruption between December 2021 and February 2020; schools remained open though many were impacted by staff and student absences.
- Stage 4 (February – July 2022). Society had largely returned to normality following the Omicron wave.

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[4] This follows the cut-off used by the ONS (ONS 2021).

Appendix B provides further details covering key points in England's COVID-19 pandemic, focusing on factors that would have impacted schools. For each of these four stages, we calculate average work-related anxiety scores for each teacher[5]. This provides a measure of their average level of work-related anxiety during each stage of the pandemic. These are then used as the outcome in our regression models exploring between-group differences. Specifically, our models investigating differences in work-related anxiety levels between teachers with different characteristics are of the form:

$$Anx = \alpha + \beta.G + \gamma.J + \delta.C + \tau.A + \tau.S + \theta.Pre + \varepsilon \qquad (1)$$

Where:

Anx = Average anxiety score during the stage of the pandemic under investigation.

G = A binary variable capturing teacher gender (reference group = male).

J = A set of dummy variables capturing job role (reference = classroom teacher).

C = A set of dummy variables capturing the age of the youngest child at home (reference = No children).

A = A set of dummy variables capturing the teacher age group.

S = A vector of school characteristics, including primary/secondary phase, Ofsted rating and state/independent sector.

Pre = Average anxiety score before the pandemic (October 2019 – early March 2020). Includes both a linear and quadratic term.

ε = Random error term.

Separate models are estimated for each of the four stages of the pandemic listed above. Note that these models control for the pre-pandemic anxiety levels of teachers. Estimates will hence capture whether there was a bigger difference in anxiety levels between groups than during the pre-pandemic period. For instance, the β parameter will reveal whether female teachers were more anxious about work than their male counterparts, over and above the "usual" gender difference in anxiety levels observed prior to the pandemic. A similar interpretation holds for the γ, δ and τ parameters with respect to differences in work-related anxiety between teachers in different job roles, with different family circumstances and of different ages. Sample weights

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[5] This is also done for the Pre-pandemic period in our data, spanning October 2019 to February/early March 2020.

are applied when estimating these models, with standard errors adjusted to account for potential heteroskedasticity.

Analogous models are estimated to explore differences in work-related anxiety amongst teachers working in different types of school. These models hold all the characteristics of teachers included in equation 1 constant, with school-level covariates included for school phase, Ofsted inspection rating and percent of pupils eligible for FSM. A separate model is estimated with respect to state versus independent school differences, with primary/secondary phase the only other school control[6].

Turning to our last research question – exploring the link between activities at work during the pandemic and anxiety levels – we estimate a series of OLS regression models:

$$Anx_t = \alpha + \beta.Work\_cond_t + \gamma.T + \tau.S + \theta.Pre + \varepsilon \qquad (2)$$

Where:

Anx_t = The work-related anxiety score of the teacher at time t.

$Work\_cond_t$ = The working activity being considered at time t (e.g. whether working at home or onsite at school at time t).

T = A vector of teacher characteristics including their age, job role, gender and whether the age of their youngest child at home.

S = A vector of school characteristics, including primary/secondary phase and state/independent sector.

Pre = Average anxiety score before the pandemic (October 2019 – early March 2020). Includes both a linear and quadratic term.

ε = Random error term.

Separate models are estimated for each timepoint. The parameter of interest from the model presented in equation (2) is β. This captures the association between the instructional activity in question (e.g. whether the teacher was working at home or onsite) and their work-related anxiety level. The controls for teacher, school and pre-pandemic anxiety levels attempt to control for potential confounding stemming from certain types of teachers (e.g. those with

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[6] This is due to the other school characteristics (e.g. FSM quartiles) not being available for independent schools.

higher anxiety levels prior to the pandemic) being more or less likely to experience a certain working condition (e.g. working on site) during the pandemic.

3. Results

Research Question 1. How did the work-related anxiety of teachers vary throughout the COVID-19 pandemic?

Figure 1 presents average work-related anxiety scores of teachers throughout the pandemic. The dashed vertical lines illustrate the two periods where schools across the country were shut to most pupils (other than to the children of key workers) and remote learning was taking place. A numeric key has been added to selected peaks/troughs, with details on how this corresponds to important events provided in the figure notes. Appendix B provides further details as to how important milestones during the pandemic in England match with the survey dates.

<< **Figure 1** >>

In the pre-COVID period, the average work-related anxiety score amongst the Teacher Tapp panel was quite stable, fluctuating between 3 to 4 out of ten. The only notable dip was during the February 2020 half-term break (point 1 in the graph). A similar pattern is replicated throughout this period; unsurprisingly, teachers feel much less anxious about work during school holidays.

The biggest spike in teachers' work-related anxiety throughout the pandemic occurred on 17/03/2020 (point 2). This was the day after the then Prime Minister (Boris Johnson) issued work from home guidance and advised against non-essential travel. Yet, despite COVID spreading rapidly, no announcement was made at this point about schools. (This did not occur until the day after the survey question was asked – 18/03/2020 – when it was announced schools would close from 20/03/20). It is hence likely the large spike at this point was due to teachers' concerns about the spread of the virus in the workplace.

However, after this large spike, teachers work-related anxiety was slightly lower than "normal" (the pre-pandemic period) for the remainder of the 2019/20 academic year. There were again notable dips during school holidays (points 3, 5 and 7) along with a small peak when plans to reopen schools were announced (point 4). But, otherwise, the work-related anxiety of teachers between March and August 2020 – including the period when remote instruction was taking place – was slightly lower than usual.

One possible explanation for this result is that school leaders may have erred towards making low demands of teachers during this period, recognising their need to balance work with their wellbeing and family responsibilities.

This situation changed, however, at the start of the 2020/21 academic year (point 8). This coincides with when schools fully reopened, at the time leading to concerns this would help the virus spread, and with no vaccine yet available. Also, teachers were expected to cope with materially different educational conditions since efforts to reduce mixing of students led to changes in class and classroom assignments and other timetabling arrangements. Work-related anxiety levels during September-December 2020 (~4.5 out of 10) were thus notably higher than during the comparable pre-pandemic quarter in 2019 (~3.75 out of 10).

The final major spike in work-related anxiety amongst teachers occurred at the start of January 2021 (survey date 05/01/2021). Throughout the December 2020 Christmas holidays, the UK government insisted schools would continue to be open in the new year. Many pupils and teachers had started to return to classrooms the preceding day (04/01/2021) only for the government to perform a dramatic U-turn. A third nationwide lockdown was announced, schools would be returning to online instruction until at least mid-February and national examinations were once again cancelled. This spike (point 9) therefore likely reflects the immediate work-related challenges that such sudden announcements from government bring.

However, from this point onwards, the work-related anxiety of teachers remained broadly stable. There were the usual troughs during school holidays (points 10-14) but, otherwise, average work-related anxiety scores remained around the same level (just above four out of ten) through to the end of July 2022. This suggests that, following the final national lockdown and widespread vaccination, work-related anxiety of teachers largely returned to "normal" (pre-pandemic) levels – including during the disruption caused by the Omicron wave (December 2021-February 2022).

Research Question 2. How did the work-related anxiety of headteachers change throughout the pandemic and in comparison, to pre-COVID anxiety levels? Does this differ compared to more junior staff?

Figure 2 turns to differences between classroom teachers (solid grey line) and headteachers (dashed black line).

Before the pandemic, the work-related anxiety of headteachers was only slightly above that of classroom teachers; prior to March 2020, the dashed black line in Figure 2 is only slightly above the solid grey. Yet, when the pandemic hit England (first vertical red dashed line) the situation changed dramatically. Whereas class teachers were generally feeling slightly less anxious about work in the second and third quarter of 2020 than during the pre-pandemic period, school leaders were feeling more anxious - particularly at certain time points (e.g. when plans to reopen schools were announced in May 2020 - corresponding to point 4 in the Figure 2). This likely reflects the managerial responsibilities of senior staff, having to swiftly implement a raft of changes to comply with COVID protocols, coping with uncertainty in government policy and managing the wellbeing of staff.

The difference in work-related anxiety levels between teachers and headteachers continued throughout the 2020/21 academic year; particularly during the first half when there was great uncertainty surrounding whether schools would remain open and the need to implement COVID bubbles and testing regimes. The difference in their work-related anxiety during this period reached around one full point on the 0-10 scale (an average of ~4 for teachers versus ~5 for headteachers). Indeed, at its peak in January 2021, two-thirds of headteachers in England felt highly anxious about work (compared to 42% of class teachers). Yet what is perhaps even more notable is that this difference in anxiety levels between headteachers and classroom staff continued after widespread vaccination and into the 2021/22 academic year. Specifically, while the anxiety of classroom teachers by this point had returned to "normal" pre-pandemic levels, it remained elevated for school leaders. This includes during the return of schools in September 2021 following the summer holidays, and the subsequent Omicron wave between December 2021 and February 2022. It is likely this difference was driven by, on the one hand, school leaders attempting to return to "business as usual", while on the other having to deal with the lasting fallout of the pandemic (e.g. managing increased behavioural issues and learning loss), along with continued high absence levels (amongst both students and staff). Moreover, although the gap between headteachers and classroom staff narrowed following the Omicron wave (point 13 in Figure 2 onwards) a difference in their work-related anxiety – which was not there prior to the pandemic - remained.

The top panel of Table 2 formalises these results by presenting estimates from our regression models. These compare average work-related anxiety scores during four stages of the pandemic across teachers, middle leaders, senior leadership team members and headteachers. As these models control for differences in pre-pandemic anxiety levels (along with other background characteristics) the estimates illustrate whether differences between these groups are bigger than "usual".

<< **Table 2** >>

Table 2 confirms that average anxiety levels of headteachers were much higher than for class teachers throughout the pandemic, over and above pre-pandemic anxiety levels. This difference was greatest following the first lockdown (a difference of ~1.4 points on the 0-10 anxiety scale) but remained at ~0.7 points even following the Omicron wave in the latter part of the 2021/22 academic year. Interestingly, the gap between headteachers and other senior leadership team members is also large and statistically significant, indicating that the pandemic has taken the greatest toll on the most senior of staff. Indeed, differences in work-related anxiety between class teachers, middle leaders and the senior leadership team (excluding the headteacher) were quite modest during the pandemic, particularly outside the first lockdown. Similar findings are obtained when we restrict the sample to only those teachers who responded to the work-related anxiety questions on at least 60 occasions (see Appendix Table C1).

Table 3 provides some further insight into this issue by documenting differences in average working hours between headteachers and classroom teachers. During the first lockdown, headteachers were working around 20 hours more than classroom teachers per week. However, this was being driven by classroom teachers tending to work fewer hours than usual, rather than headteachers working more. For instance, between April and June 2020, class teachers were working an average of around 25-30 hours per week, compared to around 47 hours during a "normal" academic year[7]. It is therefore perhaps unsurprising that the work-related anxiety dropped amongst this group during the first lockdown, given that their average working week was on average 15-20 hours shorter than usual. However, from September 2020 onwards, the working hours of class teachers returned to their pre-COVID levels (around 45 hours per week). Headteachers were continuing to work around 10 hours more per week than class teachers, but this difference is close – according to TALIS 2018 data - to pre-pandemic norms. Since relative

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[7] Authors' calculations using the TALIS 2018 data for England.

working hours of headteachers (over and above class teachers) were not materially higher from September 2020 onwards, this suggests it was the nature of the atypical challenges they were being asked to address that is the most likely explanation for their significantly raised anxiety levels.

<< **Table 3** >>

Research Question 3. Did work-related anxiety increase more for male or female teachers during the pandemic? How was this related to childcare responsibilities?

Figure 3 begins by presenting average work-related anxiety scores for male (solid grey line) and female (dashed black line) teachers.

<< **Figure 3** >>

Even before the pandemic, women had higher levels of work-related anxiety than men (equivalent to around 0.5 points on the 0-10 scale). Yet Figure 3 also illustrates how the gender "anxiety gap" grew further during the pandemic. It is most noticeable throughout the 2020/21 academic year (between points 8 and 11 in Figure 3) and during the first half of the 2021/22 academic year, until the end of the Omicron wave (i.e. between points 12 and 13). However, post-Omicron (i.e. after point 13) the size of the gender gap in work-related anxiety largely returned to pre-pandemic levels.

These descriptive patterns are formalised in the second panel of Table 2. During the first three stages of the pandemic – between March 2020 and February 2022 – the work-related anxiety of female teachers was ~0.3-0.4 points higher than for male teachers on the 0-10 anxiety scale. These figures are conditional on teacher and school characteristics, as well as average pre-COVID anxiety levels. In other words, the gender gap in work-related anxiety was around 0.3-0.4 points above "normal" (pre-COVID) throughout this two-year period. Post February 2022, however, the gender gap in teacher anxiety returned to pre-COVID levels.

How might this increased gender gap in work-related anxiety be linked to childcare responsibilities? Before answering this question, Figure 4 documents the trend in average work-related anxiety scores by age of youngest child at home (no children, under 5, primary-age child) without separating the results by gender. Somewhat surprisingly, differences between these groups are relatively muted. Outside of the first lockdown (dashed red lines) there is little clear difference between the "no children" and "under 5" groups throughout the

period. Moreover, although the average anxiety levels of those with primary age children tend to be higher than the other two groups during the pandemic (which was not the case beforehand), the difference – outside the first lockdown – was relatively small.

<< Figure 4 >>

However, in Table 4 we illustrate how anxiety levels varied when looking at the combination of gender and age of youngest child at home. All estimates refer to differences in average work-related anxiety scores, adjusting for teacher/school characteristics and pre-COVID anxiety levels, compared to men with no children as the reference group. This is complemented by Appendix D which visually illustrates the trends over time.

<< Table 4 >>

The first notable point is that, during March-August 2020 and September-August 2021, men with children under age 5 were no more anxious about work than men without children. Moreover, between September 2021 and February 2022 (encompassing the Omicron wave) their anxiety levels were around 0.5 points _lower_ than in comparison to this reference group. The situation is rather different for female teachers with pre-school children. During the first wave (March – August 2020) they were more anxious about work than men with no children and men with an under 5 (difference of around 0.6 points). A similar difference is observed for the 2020/21 academic year and, to some extent, during the first half of 2021/22[8]. Table 4 thus provides evidence – supported by Appendix D – that, amongst teachers with pre-school children, it was mainly women who became more anxious about work.

The second key feature of Table 4 concerns those with primary age children. During the first stage of the pandemic (March-August 2020) both male and female teachers in this group felt the impact, with average anxiety levels increasing amongst both in comparison to the male-no children reference group (over and above pre-pandemic norms). During this period, teachers were expected to have their own children at home with them, and to thus juggle childcare and teaching responsibilities. This situation changed come the 2020/21 academic year, including during the second period when schools were mostly shut and remote learning was taking place (though, unlike the first lockdown, teachers were able to send their children to school or to childcare services so that they could teach remotely). During this and subsequent periods, only female teachers with primary age children had significantly elevated work-related anxiety

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[8] Between September 2021 and February 2022, females with an under 5 had average anxiety scores almost 0.9 points higher than male teachers with an under 5, conditional on the factors controlled in the model.

scores. This, along with the descriptive results presented in Appendix D, points towards a pattern where - amongst teachers with primary age children – work-related anxiety increased by more amongst females than males (at least at some key time points).

Research Question 4. Was there a particularly large increase in work-related anxiety amongst teachers working at certain types of school? Did this relationship change during the pandemic?

Table 5 presents the association between a range of school characteristics and teachers work-related anxiety, controlling for teacher demographics and pre-COVID anxiety levels. Most differences are small and/or do not reach statistical significance at conventional thresholds. This holds true at most timepoints for the difference between primary and secondary schools[9], schools with different inspection ratings and those with different socio-economic intakes. The one exception is the difference between independent and state schools during the first lockdown. Between March and August 2020, the average work-related anxiety score of state schoolteachers was around 0.6 points below that of teachers working in independent schools (having accounted for pre-COVID differences). Appendix D further demonstrates how (a) state schoolteachers had higher levels of work-related anxiety than independent schoolteachers before the pandemic; (b) this situation reversed during the first lockdown and (c) after which, the anxiety levels of these two groups remained similar for the rest of the pandemic.

<< **Table 5** >>

Table 6 provides a potential explanation for this result, illustrating differences in the learning activities independent and state schoolteachers were doing during the first (top panel) and second (bottom panel) set of school closures. Those working in independent schools were early adopters of live online lessons; most (~60%) were providing this during the first lockdown compared to only a few (~5%) working in state schools. Independent schoolteachers were also much more likely than their state school counterparts to be spending the first lockdown creating remote learning resources for pupils and interacting with them via video calls. They were also working around ten hours more per week (see Appendix Table C5 for further details). These longer working hours of independent schoolteachers – and their more rapid response to alternative ways of work – are thus likely related to why they felt more anxious about work than their state school counterparts during England's first lockdown.

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[9] One exception is that, between September 2020 and August 2021, average anxiety scores of secondary teachers were around 0.2 points above those of primary teachers.

<< Table 6 >>

Interestingly, the gap in instructional activities and working hours between state and independent school staff narrowed during the second period of school closures in England in early 2021 (see Table 6). Although those working in independent schools were still more likely to be holding live lessons and video calls with pupils, those in state schools were now more likely to be developing distance learning resources (with average working hours now also similar – see Appendix Table C5). This is consistent with the fact that work-related anxiety levels remained similar amongst these two groups for the rest of the pandemic (i.e. after the first lockdown).

Research Question 5. How was work-related anxiety during the pandemic linked to working onsite and provision of different remote instructional activities?

Table 7 presents estimates of the association between working onsite (at school) at various points during the pandemic and teachers work-related anxiety. Figures refer to the difference in average anxiety scores for teachers working on site zero or one day that week (reference group) versus two days or more, conditional on the other factors included in the model.

<< Table 7 >>

During the first wave of the pandemic, working on site at school (to teach the children of key workers, for instance) was associated with an increase in teachers' work-related anxiety. The difference was particularly large on 24th March 2020 – standing at more than one point on the 0-10 scale – soon after the first lockdown was announced, and schools were shut to most pupils. Yet a difference of around 0.2 – 0.6 anxiety points occurred until at least mid-June 2020, after which schools began to gradually start re-opening. In contrast, there was essentially no association between working onsite and anxiety at the two time points where we have data available during the second period when schools were shutdown (26/01/2021 and 02/02/2021). We thus conclude that, overall, working onsite during the pandemic was associated with an increase in work-related anxiety amongst teachers, but only during the initial wave.

Table 8 turns to how the work-related anxiety of teachers was related to three instructional activities they could have undertaken during the pandemic (delivering online lessons, creating learning resources and holding video calls with pupils). Estimates refer to differences in mean anxiety scores associated with the teacher performing that activity during the week in question.

The upper/lower panel of Table 8 refers to survey dates during the first/second period of school closure.

<< **Table 8** >>

All three activities were linked to higher anxiety scores amongst teachers when schools were first shut. For instance, those teachers who delivered live online lessons between March and July 2020 had average work-related anxiety scores around half a point higher than those who did not[10]. A similar finding holds for teachers who created new learning resources during the first wave, with their work-related anxiety scores around 0.3 points higher[11]. Although estimates for holding video calls with pupils are more mixed, they again point towards an association with higher anxiety levels. This is complemented by additional analysis presented in Appendix Table C7, illustrating how each 10 hour increase in working hours during the pandemic was linked to around a 0.3 point increase in work-related anxiety scores. It hence seems that teachers whose working patterns changed quickly in response to the pandemic saw the greatest immediate increase in their anxiety levels.

It is again interesting that the associations observed in the lower panel – corresponding to the second period when schools were shut down – are much weaker. The estimates for delivering online lessons and holding video calls with pupils are small and not statistically significant at conventional thresholds. On the other hand, an association between creating learning resources and increased anxiety levels is still apparent during this period (around a 0.3 difference in average scores) but only soon after school closures were announced (i.e. during January 2021). Thus, consistent with the findings presented in Table 7, a link between changing working conditions and teachers work-related anxiety was only clearly present during the initial COVID wave.

4. Conclusions

The COVID-19 pandemic led to very sudden changes to the working conditions of teachers. Many had to quickly transition to remote instruction during the initial lockdown, potentially at the same time as having to care for their own children at home. Such disruption continued on-

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[10] This is consistent with the findings presented under research question 4, where teachers working in independent schools were found to be much more likely to deliver online lessons, but who also saw more elevation in their anxiety scores.

[11] Appendix Table C6 illustrates how such differences remain intact even when both these variables are included in the model simultaneously

and-off for the next two years, with educators having to deal with a combination of exam cancellations, COVID testing, COVID "bubbles", ever changing government policy and dealing with pupils learning loss. Such challenges are likely to have impacted some teacher's mental health, including their wellbeing at work.

A relatively small number of previous studies have investigated this issue. Most have been limited by their small-scale, cross-sectional nature, with few longitudinal investigations exploring changes in the wellbeing of teachers at different time points, including in comparison to before the pandemic started. This paper thus contributes to the existing literature by using large scale longitudinal data tracking how the work-related anxiety of teachers varied before, during and towards the conclusion of the COVID-19 pandemic in England. In doing so, we present a uniquely detailed insight into the link between the pandemic and the wellbeing of teachers in the workplace.

Our findings suggest that, after an initial sharp peak just before schools were first shutdown, average teacher work-related anxiety fell during the first wave of the pandemic. This may be related to the fact that teachers were working, on average, around 10 hours less than usual per week. However, the work-related anxiety of teachers then rose above pre-COVID levels throughout the 2020/21 academic year, with headteachers and female teachers – most notably those with young children –amongst the most affected. We also find evidence that the work-related anxiety of teachers during the first wave of the pandemic was associated with whether they were delivering direct instruction on-site or at home, if they were providing live lessons and the total number of hours worked.

Such findings should be considered given the limitations of our study. First, the Teacher Tapp panel is a self-selecting sample rather than a random draw from the teacher population. This is true of most studies into the COVID-19 pandemic, given the obvious challenges with conducting fieldwork during such a difficult period. Second, there is some attrition from our sample, with not all teachers responding to the work-related anxiety question at each time point. Appendix C does illustrate, however, that our key findings remain largely intact when restricting the sample to those who responded on the vast majority (≥ 80%) of occasions the work-related anxiety question was asked. Third, our analysis has focused specifically on the work-related anxiety of teachers. Although anxiety is correlated with other aspects of mental health (e.g. depression, stress, happiness), these may have been impacted by the pandemic in

subtly different ways. See Allen, Jerrim and Sims (2020) for further evidence on this issue, including how alternative dimensions of wellbeing amongst teachers were impacted during the first wave of the pandemic. Fourth, our data refers to the situation in England. Although other countries experienced similar disruption to their education system - and enacted similar policy responses (e.g. school closures, remote instruction) –some specific issues may have impacted the work-related anxiety of teachers in England more than elsewhere (e.g. the timing and frequency of government U-turns, combined with the relatively high autonomy of headteachers to interpret guidance locally). Finally, as we use observational data, it is prudent to treat our estimates as conditional associations, rather than necessarily capturing cause and effect.

Nevertheless, looking forward, what might our findings imply for education policy in the post-COVID world? One great concern for the education sector must now be the ability of schools to recruit and retain its best headteachers. That said, whilst many heads have clearly experienced a tumultuous few years, with many experiencing prolonged periods of heightened anxiety, recently asked Teacher Tapp questions indicate no rise in their intention to leave the profession (Allen et al., 2022). Of more worry, deputy and assistant heads now appear more reluctant to seek headship, with the share who say they want to become a head one day falling from 56% pre-pandemic to 48% post-pandemic. In our English education system, with very high levels of school autonomy, perhaps government needs to reflect on how to give better guidance and support to school leaders during these extremely difficult periods of time.

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