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# Sustaining a Sense of Success: The Importance of Teacher Working Conditions During the COVID-19 Pandemic

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## Abstract

COVID-19 shuttered schools across the United States, upending traditional approaches to education. We examine teachers' experiences during emergency remote teaching in the spring of 2020 using responses to a working conditions survey from a sample of 7,841 teachers across 206 schools and 9 states. Teachers reported a range of challenges related to engaging students in remote learning and balancing their professional and personal responsibilities. Teachers in high-poverty and majority Black schools perceived these challenges to be the most severe, suggesting the pandemic further increased existing educational inequities. Using data from both pre-post and retrospective surveys, we find that the pandemic and pivot to emergency remote teaching resulted in a sudden, large drop in teachers' sense of success. We also demonstrate how supportive working conditions in schools played a critical role in helping teachers to sustain their sense of success. Teachers who could depend on their district and school-based leadership for strong communication, targeted training, meaningful collaboration, fair expectations, and recognition of their efforts were least likely to experience declines in their sense of success.

Keywords: Teachers, Working Conditions, COVID-19, Student Engagement, Organizational Change, School Leadership, Equity

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**Sustaining a Sense of Success: The Importance of Teacher Working Conditions During the COVID-19 Pandemic**

## Introduction

Public schools have long been characterized as inflexible and bureaucratic organizations where teachers' independence and autonomy are prized (Lortie, 1975). Teachers often work in isolation, learning from experience and refining their pedagogical practices in traditional classroom settings that have changed little over time. This schooling system functions, albeit imperfectly, during quiescent times. However, the limitations of this siloed, static culture are exposed when schools experience rapid organizational change. Now is such a time.

The public health crisis caused by the COVID-19 virus shuttered schools across the United States in March, upending traditional approaches to education. Schools and teachers were forced to pivot to fully remote instruction with virtually no warning or preparation time. This sudden and total change in how teachers delivered instruction, combined with the health threats and economic consequences of the pandemic, created a uniquely stressful and demanding context for teachers' work.

In this paper, we examine the challenges teachers faced while working from home at the start of the pandemic, between March and June 2020, and we explore the role that working conditions played in supporting their sense of success in this new remote setting. Doing so can inform schools' efforts to support teachers during what will be an extended period of non-traditional teaching. It can also inform broader efforts to institute lasting changes to how we organize and deliver public education. We focus our analyses around four central research questions (RQ):

*RQ1: What challenges did the pandemic and sudden change to emergency remote teaching present for teachers?*

*RQ2: How did these challenges differ across teacher and school characteristics?*

*RQ3: How did the pandemic and transition to emergency remote teaching affect teachers' sense of success?*

*RQ4: What role did working conditions play in sustaining teachers' sense of success during the transition to emergency remote teaching?*

We explore these questions using two waves of a working conditions survey from the fall and spring of the 2019-2020 school year. The surveys were administered to a large and diverse sample of teachers by Upbeat, a firm that supports school districts with teacher retention. For the spring administration, we used a retrospective survey design by asking teachers to answer items based on their experiences prior to the pandemic and to respond to additional questions specifically about teaching during the pandemic. Over 7,800 teachers working across 10 districts and 5 charter school networks completed the spring survey. Together, data from the fall and spring of the 2019-2020 school year allow us to conduct a range of descriptive analyses and to employ longitudinal growth models and value-added models to explore how teachers' sense of success changed over time and the degree to which working conditions moderated these changes.

Our findings suggest that the sudden move to remote teaching created substantial challenges for teachers' work and limited the degree to which students could engage in learning. Teachers at every career phase struggled with the shift to remote teaching, but often in different ways. Mid-career teachers – those most likely to have children at home – struggled to balance professional responsibilities with obligations at home. Veteran teachers were much more likely to report being uncomfortable using the technological tools required for teaching remotely.

Our data provide further evidence that remote instruction exacerbated existing inequities by severely and disproportionately limiting the learning opportunities for students from low-income and Black communities. Teachers estimated that, on average, only 60% of students were engaged in remote learning on a regular basis, with wide gaps in perceived engagement along racial and socioeconomic lines. Teachers working in high-poverty schools and in schools that serve a majority of Black students reported that their students were less likely to have the technology required to access online learning resources and, consequently, less likely to regularly engage in remote learning activities.

Not surprisingly, teachers experienced a precipitous drop in their self-reported sense of success during the pandemic relative to both fall baseline levels and retrospective reports from the spring before schools closed. We find that 53% of teachers reported a decline in their sense of success based on our retrospective survey data. Simultaneously, schools' efforts to support teachers during the crisis did appear to matter. Our exploratory analyses suggest that schools with more supportive remote working conditions were more successful at helping their teachers maintain a sense of success during the pandemic. Specifically, we find that teachers were less likely to experience declines in their sense of success when they worked in schools that communicated effectively, provided targeted professional development, recognized teachers' efforts, facilitated meaningful collaboration, and held fair expectations during the pandemic.

Our findings directly inform ongoing efforts to deliver high-quality educational opportunities to all students as the pandemic persists. They also contribute to the broader literature on teachers' working conditions and educational reform. We illustrate for the first time the large variability in teachers' self-reported working conditions within schools and over time. School work environments are not a monolith. Rather, they are shaped by a dynamic set of

organizational practices that can change over the course of the academic year and are experienced in different ways by teachers in the same school. We also highlight the importance of working conditions as a potential moderator in education interventions that necessitate organizational change. Schools with stronger working conditions are likely to be much more successful at supporting teachers to navigate organizational change during crisis and in future school change efforts.

## Prior Literature

### The Importance of Working Conditions in Schools

Over the last decade, studies capitalizing on new measures of work environments constructed from student, teacher, and principal responses to district and statewide surveys have demonstrated how professional contexts influence teachers' work. Researchers have consistently found that working conditions are strongly associated with teacher satisfaction and student academic growth. For example, Johnson, Kraft, and Papay (2012) analyzed data from the statewide Massachusetts Teaching Learning and Leading (MassTeLLS) survey and concluded that measures of school professional context explained a large portion of the apparent relationship between student demographic characteristics and both teacher satisfaction and career intentions. They also found that favorable working conditions predicted higher rates of academic growth, as measured by standardized tests, even in schools serving similar student populations. The working conditions that mattered most to teachers included the principal's leadership, collegial relationships, and the school's organizational culture.

Studies have repeatedly demonstrated that this combination of social working conditions influences teachers' satisfaction and ultimately affects their decisions about whether to stay or

leave their schools (see Simon & Johnson, 2015 for a review). For example, Ladd (2011) found that the quality of school leadership and planning time with colleagues predict school effectiveness, as measured by student achievement. Likewise, Jackson and Bruegmann (2009) found that students perform better on standardized tests when their teachers work in a school with more effective colleagues. Most recently, Viano and colleagues (2020) used an adaptive conjoint analysis survey design to show how teachers' career decisions are strongly influenced by consistent administrative support and enforcement of discipline—two "malleable processes" (p. 1) within administrators' locus of control.

*Working Conditions' Influence on Teachers' Sense of Success.* Teachers' working conditions have a profound influence on teachers' sense of success with students. In their seminal study of 50 new teachers in Massachusetts, Johnson and Birkeland (2003) found that, when making decisions about whether to stay in their schools, transfer to a different school, or leave the profession, the most important factor for teachers was whether they believed they could be effective with their students. Teachers described the myriad ways in which social working conditions either supported or thwarted their sense of success.

Decades of research has found that teachers' own perceptions of their effectiveness to be a factor of important consequence for students. Grounded in Rotter's (1966) locus of control theory and Bandura's (1977) social cognitive theory, a range of teacher efficacy constructs have been linked with student outcomes. Tshannen-Moran and colleagues (1998) review the literature on teacher self-efficacy and find evidence of strong positive associations between teacher self-efficacy and student achievement, motivation, and students' own sense of self-efficacy. Critical for our context, they find that teachers with greater self-efficacy are more persistent and resilient when faced with challenges and setbacks. At the school level, they find that teachers' efficacy is

a strong predictor of overall organizational climate. Others have since demonstrated the positive link between collective efficacy and a range of student outcomes (Goddard et al., 2004; Moolenaar et al., 2012).

*Working Conditions and Organizational Change*. The extent to which a school is supportive of teachers and well-functioning as an organization can greatly influence how effectively a school pivots during times of change. School leadership is especially critical during transitions because—as Bryk and colleagues reported—the most basic responsibility of principals is to ensure that schools "work properly" (Bryk et al., 2010, p. 62). Grissom and Loeb (2011) identified principals' organizational management skills as a predictor of student achievement and suggested that, without attention to organizational management, principals rarely produced overall school improvement. Likewise, Reinhorn, Johnson, and Simon (2017) found that principals of successful schools deliberately craft a professional culture that promotes continuous improvement for teachers.

Studies of large-scale school reforms provide insight into the power of working conditions in school improvement efforts. In their longitudinal investigation of Chicago elementary schools over fifteen years, Bryk and colleagues (2010) developed a framework of five "essential supports" that are correlated with school improvement: (1) a coherent instructional guidance system; (2) the school's professional capacity; (3) strong parent-community school ties; (4) a student-centered learning climate; and (5) leadership that drives change. Using survey data from principals, teachers, and students, the researchers found that schools with strong essential supports were ten times more likely to improve student performance on standardized tests than schools with weak supports.

## The Challenges of Teaching During Crisis

Organizational change in schools is not always well-developed and carefully planned in advance. When external crisis strikes, schools must shift their practices suddenly—often in ways that are impossible to anticipate. Teachers are "first responders in tragedy" (O'Toole & Friesen, p. 1), and schools are integral to both the first-line and long-term post-disaster response (L. Evans & Oehler-Stinnett, 2006; Wolmer et al., 2003). Studies of teachers following disasters demonstrate that teachers frequently endure the stress of supporting students' socioemotional and academic needs while tending to their personal trauma (Carlson et al., 2010; Kuriansky, 2013). Following Hurricane Katrina in New Orleans, for example, Lowery and Burts (2007) found that teachers described teaching under "survival circumstances" (p. 72)—coping with their own material losses and elevated rates of depression and fear while supporting students.

Crisis often disproportionately affects low-income communities and the schools that serve them (Evans, 2004; Simon & Evans, 2014). In ordinary times, Bryk (2010) described schools serving large proportions of children living under "extraordinary circumstances—neglect, abuse, homelessness, foster care, domestic violence" (p. 29) as facing a "three-strike" problem: they are highly-stressed organizations, existing in challenged communities, and confronting tremendous human need every day. Supporting students and their families in coping with additional stressors can exacerbate an already overwhelming teaching role (Bryk, 2010; Kraft, Papay, Johnson, Charner-Laird, Ng, & Reinhorn, 2015; Simon & Evans, 2014). As such, during crises, teachers frequently experience "role overload" (Kuntz et al., 2013) and a decreased sense of self-efficacy in their teaching (Seyle et al., 2013).

**Teachers' Experiences with "Emergency Remote Teaching" During COVID-19**

In March 2020, the COVID-19 virus sparked widespread, sustained disruption to schooling, shuttering school buildings and forcing instruction online within a matter of days.

Early reports on the transition to "emergency remote teaching" (Hodges et al., 2020) by Gallup and others suggest that the overwhelming majority of schools pivoted quickly to some form of remote instruction (Brenan, 2020; Hamilton et al., 2020). In a nationally representative survey of K-12 public school teachers and principals, a study by researchers at RAND found that by May, 99% of teachers reported facilitating remote instruction (Hamilton et al., 2020). For most public school teachers, this entailed mastering an entirely new set of pedagogical practices for teaching online (Trust & Whalen, 2020).

*Instructional Approaches & Academic Rigor.* Across school systems, the approach to and rigor of distance learning varied widely. Researchers at the Center on Reinventing Public Education found that just one-third of districts held teachers accountable for providing instruction, tracking student engagement, or monitoring students' academic progress (Gross and Opalka, 2020). Similarly, a nationally representative analysis of school websites by the Education Research Alliance for New Orleans found considerable variation in the degree of synchronous instruction, progress monitoring, equity of access and breadth of service provided by schools. They also found that the educational attainment of parents and other neighborhood adults was the strongest predictor of the extent of educational activities schools provided (Harris et al., 2020). Nearly two-thirds of teachers (64%) surveyed by EdWeek reported that there were "no consequences" for students who failed to meet standards during the coronavirus closures.

*The Experiences of Educators.* Multiple studies explored the experiences of educators as they implemented emergency remote instruction. Researchers at RAND found that nearly 90% of principals reported that students in their schools lacked internet access and 40% reported that, for teachers, access to technology and/or internet was a barrier. Roughly a third of principals (35%) reported that district policies related to the use of online tools (such as Zoom or Google

Suite) presented limitations (Hamilton et al., 2020). In addition, EdWeek (2020) found that 74% of teachers said their students current level of engagement was "much lower" or "somewhat lower" than it had been prior to the pandemic, and nearly a quarter of students were "essentially 'truant.'" Finally, the EdWeek survey also showed that morale for teachers, students, and administrators across the country plummeted during the early months of the pandemic. Interviews with 40 teachers across the country about their daily experiences found that teachers expressed concerns on three key themes: struggling to motivate students virtually; the loss of professional identity and burnout; and exacerbated inequities for students (Reich et al., 2020).

*Exacerbated inequalities.* Several studies have highlighted the stark disparities in student engagement between schools serving low-income students and students of color and those serving wealthier, whiter communities (Hamilton et al., 2020; Patrick & Newsome, 2020). For example, Educators for Excellence (2020) found that just 51% of teachers in high-poverty schools reported that most of their students participated daily in distance learning, in comparison with 84% of teachers in affluent schools. Bacher-Hicks, Goodman and Mulhern (2020) found similar patterns in their study of high frequency internet search data: in more populous regions with greater wealth and superior internet, more households sought out online learning resources.

Expectations for students living in poverty were also lower. A national survey of school leaders by researchers at American Institute for Research (2020) revealed that students in high-poverty districts were expected to spend far less time on instructional activities than were their peers in low-poverty districts. Teachers in such districts were also far less likely to hold synchronous classes or to provide live virtual instructional support. Further, 29% of leaders in high-poverty districts said that distance learning for elementary school students primarily involved content review rather than teaching new material compared to just 8% in low-poverty

districts. Further, many administrators who responded to open-ended items on the AIR survey voiced concerns about students with disabilities, English Language Learners, and children living in poverty. Researchers have expressed similar concerns that pandemic-induced closures will be most severe for low-income students (Bacher-Hicks et al., 2020; Chetty et al., 2020; Kuhfeld et al., 2020).

Little research has considered the role of working conditions in the transition to remote learning during the COVID-19 pandemic. Greenberg (2020) surveyed a small sample of schools supported by the Silicon Schools Fund, a California foundation led by the author, and found that the schools that experienced the greatest success with the implementation of emergency remote teaching were able to leverage their flexible, team-oriented cultures as they learned a new way to deliver instruction. We build on both the established literature on working conditions and the emerging body of research exploring teachers' experiences during the COVID-19 pandemic to explore how working conditions matter during times of organizational change.

## Data & Methods

### Data

*The Sample*

We draw on teacher surveys from the fall and spring of the 2019-2020 school year with a sampling frame that included all teachers in 206 schools across 15 districts throughout the southern, midwestern and eastern United States. Much of our analyses describe responses from the spring survey, which was administered by Upbeat in coordination with districts between April 27th and June 23rd, 2020. Recruitment emails emphasized the goal of amplifying teachers' perspectives about their working conditions and the confidential nature of the third-party survey.

A diverse sample of 7,841 teachers working across nine geographically-diverse states (GA, IL, LA, MI, NY, SC, TX, VA, VT) responded to the survey with an overall response rate of 81%. We combined these data with responses from a prior survey administered to the same schools in the fall before the pandemic, between September 3rd, 2019 and January 31st, 2020 (77% response rate). A total of 5,957 teachers responded to both the fall and spring survey waves, which we link using teachers' unique email addresses. Together, these surveys provide information on teacher self-reports of their own sociodemographic characteristics, as well as their experiences and perceptions before and during the COVID-19 pandemic. We compliment these survey data with school sociodemographic characteristics gathered from state departments of education and school websites.

As shown in Table 1, the respondents represent a diverse sample of teachers in traditional and charter public schools working across a wide range of student populations. Roughly 80% of teachers are female and average about 13 years of experience, closely approximating national averages (Taie & Goldring, 2020). Similarly, White, non-Hispanic teachers comprise three-quarters of the sample and 79% of the nation's public school teachers. Black teachers are oversampled relative to the national workforce, comprising 14% of the sample, but just 7% of the nation's teachers. Conversely, only 3% of our sample is Hispanic compared to 9% of the nation's teachers. Their schools served student populations that were, on average, 30% Black, 18% Hispanic, and 45% White, 54% low-income families and 14% students with disabilities.

We collected a range of data about the contexts and transition to remote learning for districts and charter management organizations in the sample (see Appendix Table A1). Districts transitioned to remote learning between March 13th, 2020 and April 13th, 2020. COVID-19 case counts were slightly lower in our sample, on average, than the nation as a whole, but infection

rates were rising more rapidly relative to other parts of the country.[1] At the start of remote learning, students in many districts worked on instructional packets distributed on the last day of in-person instruction. As state governors extended school closures, districts began working on long-term instructional methods. Most districts depended on Google Classroom and Google Meet or Zoom.

All of the districts we study took steps to ensure students could engage in remote learning including distributing devices and printed work packets to students. Some districts also deployed WiFi-enabled buses to neighborhoods or provided WiFi in school parking lots. Expectations of both teachers' and students' work varied across and within districts. Some districts required synchronous instruction, while others did not. In our sample, charter school networks typically required more face-to-face, remote instruction than did public schools. Some districts required teachers to provide weekly student feedback or host weekly office hours. All districts altered their grading policies, frequently in response to state guidance. In some districts, grading stopped altogether after closure, and final grades reflected pre-COVID-19 achievements.

*Instruments and Measures*

We draw on the Upbeat *Teacher Engagement* survey that we designed in partnership with Upbeat to capture teachers' perceptions about their work environments. The survey is centered on a range of constructs identified in the research literature as relevant for teachers' satisfaction, sense of success, and retention (Kraft, 2017). District and schools hire Upbeat to conduct the survey on their behalf. We augmented the *Teacher Engagement* spring survey with the *Teaching from Home* survey, which consisted of a parsimonious set of 14 items we designed to capture

[1] The COVID-19 county case count in our sample was 6.56 for every 100,000 residents on April 20th, slightly lower than the national average of 7.73. However, the Rt scores in the sample, a measure of how fast the virus was spreading, was 1.81, meaningfully higher than the national average of 1.22.

teachers' experiences and perceptions about their working conditions during emergency remote teaching. We developed these items by gathering practitioner feedback from Upbeat client districts, conducting cognitive testing and interviews, and then pilot testing the items (Dillman, Smyth, & Christian, 2009).

The spring survey combined both the *Teacher Engagement* survey and *Teaching from Home* survey. Teachers were prompted to answer the *Teacher Engagement* survey based on "experiences working at your school PRIOR to COVID-19 school closures." After completing these items, teachers were asked to respond to a set of questions about their "experience teaching remotely while schools are closed due to COVID-19." We included the clause "during this distance learning period" at the end of each item on the *Teaching from Home* survey to ensure teachers responded based on their recent experiences during the pandemic. The vast majority of items on the *Teacher Engagement* and *Teaching from Home* surveys asked teachers to use a four-choice Likert response scale to express their agreement or disagreement with a statement (Strongly Disagree, Disagree, Agree, Strongly Agree). We provide further details about the survey instructions and items in Appendix A.

Here, we highlight several items on the *Teaching from Home* survey that are central to our analyses. First, to understand challenges during remote learning, we included a series of questions about student access to technology and teachers' success in balancing responsibilities at work and at home, caretaking responsibilities, and comfort with technological tools for remote teaching. We also asked teachers to report on the percent of students regularly engaged during remote learning. The answer choices for this question were in quintiles and then coded to indicate the median value of each quintile (e.g., if a teacher reported that 41-60% of their students were engaged, this was coded as 50.5%). Second, to examine sense of success and how

it changed over time, we asked teachers if they felt successful teaching students in the three time periods discussed above: the beginning of the school year (fall *Teacher Engagement* survey), the spring prior to remote learning (spring retrospective *Teacher Engagement* survey), and the spring during remote learning (spring *Teaching from Home* survey).

Finally, to capture key elements of teachers' working conditions during and prior to the pandemic, we asked teachers to report on between seven and nine items related to five broad constructs at each period in time: professional development, communication, recognition, collaboration, and professional expectations.[2] We used these survey responses to generate three composite measures of working conditions through a principal component analysis (PCA) at the teacher-level in order to reduce the dimensionality of the data. Similar to prior analyses of teacher working conditions surveys (e.g., Kraft, Marinell, & Yee, 2016; Kraft & Papay, 2014), each of the first principal components from the three analyses weighted each item roughly equally, explained half of the total variance,[3] was the only component above the "breaking point," and was the only component with an eigenvalue greater than one. The items that contribute to each composite measure of working conditions have an alpha reliability of between 0.86 and 0.89 in each survey period.

We used the first principal component from our teacher-level PCA as a measure of teachers' individual perceptions of their own working conditions. Such an approach has been infeasible in most prior research because working conditions surveys are often anonymous, requiring aggregation at the school level. A variance decomposition shows that only 15% of the total variation in these individual working condition measures captured at three points in time

[2] As shown in Appendix Table A2, the five constructs remained constant across periods with some variation in question word choice.

[3] The first principal component explained 51% in the variance among these survey items in the fall, 53% in the spring before remote learning, and 55% in the spring after remote learning.

reflects stable differences across schools. Almost half (47%) of the variation is across teachers at the same school, demonstrating that teachers in the same school experience their working conditions in very different ways. Over a third (38%) is within individual teachers over time revealing that working conditions can vary meaningfully over the course of a single school year. This is consistent with findings from prior qualitative studies that have demonstrated substantial nuance and complexity in how teachers experience their working conditions (Forman et al., 2017; Griffin, 2018; Griffin & Tackie, 2016; Johnson, 2019; Kardos et al., 2001).

While teacher-specific measures of their working conditions are attractive from a conceptual standpoint, they introduce potential bias when examining self-reported outcomes. Teachers' own perceptions of their working conditions may be endogenously related to their sense of success due to, for example, teachers' overall satisfaction with their job. To guard against this threat, we also generated a "jackknife" working conditions measure that averages teacher-level scores of all teachers in a school but leaves out individual teachers' own perceptions. This peer-average measure serves to characterize the overall perception of working conditions and break the link between individual teachers' own perceptions of their working conditions and their self-reported sense of success. At the same time, this average measure fails to allow for any real differences in teachers' experience within the same school. We view our individual working conditions and peer-average working conditions measures as providing approximate upper and lower bounds of the relationships we explore. We standardized our individual and peer-average working conditions measures to have a mean of zero and variance of one in each survey period.

**Methodology**

To address our first two descriptive research questions, we report teachers' responses to the spring *Teaching from Home* survey overall and across a range of sociodemographic characteristics of teachers and schools. For ease of interpretation, we use a binary coding scheme to describe if a teacher agreed or strongly agreed to an item.

To explore how the COVID-19 pandemic and transition to remote learning affected teachers' sense of success, we adopt a longitudinal growth model (Singer & Willett, 2003) that combines both pre-post and retrospective survey design features. From a causal inference perspective, our growth model can be thought of as an interrupted time series (Shadish, Cook, & Campell, 2002). The core assumption of this approach is that teachers' sense of success would have remained relatively stable in the absence of the pandemic and that no other concurrent events affected teachers' sense of success. We examine both assumptions directly in our robustness section. Throughout these analyses we conceptualize "treatment" as the joint effects of the sudden transition to remote teaching and working coupled with the broader health, economic, and social effects of the COVID-19 pandemic during which this transition took place. Thus, our findings identify the effect of remote teaching combined with the broader challenges teachers faced in their professional and personal lives due to the pandemic.

Our longitudinal growth model captures how individual teachers' sense of success changed across three time periods: fall 2019, spring 2020 before remote teaching, and spring 2020 during remote teaching. This combined pre-post and retrospective study design provides two main benefits to the growth model analyses. First, the retrospective survey design captures teachers' perceptions during the time period just before remote learning, while avoiding potential response-shift bias in which an individual's frame of reference changes across survey administrations (Aucejo et al., 2020; Pratt, MacGuigan, & Katzev, 2000; Weixler, Harris &

Barrett, 2018). At the same time, there exists the concern that a retrospective survey design may lead to a halo effect in which teachers perceive the conditions during the pandemic as generally "bad," biasing their responses to be consistent with schools being generally worse (Cooper, 1981; Weixler, Harris & Barrett, 2018). The addition of the fall survey guards against this potential bias, as well as any recall bias associated with the challenges of remembering one's experiences retrospectively.

We specify a multilevel ordered logistic model within a longitudinal growth model framework to examine how teachers' odds of rating their sense of success higher (e.g., from Disagree to Agree) changed over the three time periods in a teacher-period panel dataset. We model the full range of changes in teachers' responses on the ordinal Likert scale because many of the changes we observe are between the two positive responses (Agree vs. Strongly Agree) given teachers' generally high ratings of their sense of success. For ease of interpretation, we present the structural elements as a latent-variable model:

$$Y_{jt}^{*} = \alpha_1(t = Remote) + \alpha_2(t = SpringPre) + \sigma X_j + \varphi Z_s + (\mu_j + \varepsilon_{jt}). \quad (1)$$

Here, $Y_{jt}^{*}$ is an unobserved latent measure of teacher *j*'s sense of success at time *t*. The ordered logistic model takes the observed ordinal measure $Y_{it}$ and estimates both the coefficients of the structural model as well as the cutpoints $\kappa_1$ through $\kappa_{m-1}$ such that

$$Y_{it} = m \quad \text{if } \kappa_{m-1} \leq Y_{jt}^{*} < \kappa_m \quad \text{for } m = 1 \; to \; D, \quad (2)$$

where *m* is a given Likert scale response option and *D*=4. The estimate of $\beta$ is our primary parameter of interest, representing the log odds that a teacher rated their sense of success as higher during the pandemic relative to the fall, and $X_j$ and $Z_s$ are vectors of teacher- and school-level control variables, respectively. $\mu_j$ captures teacher random effects and $\varepsilon_{jst}$ represents the idiosyncratic error term. Teacher-level controls include a series of indicator variables for teacher race, gender, and level of experience between early (less than five years), mid (between five and 15 years), and late (over 15 years) career teachers.[4] School-level control variables include student enrollment, student racial/ethnic demographics, the percent of English language learners, and the percent of students eligible for free- or reduced-price lunch (FRPL).

We next explore the role that teachers' working conditions during the pandemic played in moderating changes in their sense of success. To do this, we interact individual (or peer-average) working conditions with our indicator for the remote teaching period, *Remote*. Our latent-variable model takes the form:

$$Y_{jt}^{*} = \alpha_1(t = Remote) + \beta\big([t = Remote] * WC_{j,t=Remote}\big) + \alpha_2(t = SpringPre) + \sigma X_j + \varphi Z_s + (\mu_j + \varepsilon_{jt}). \quad (3)$$

Here, our parameter of interest, $\beta$, now represents the degree to which changes in individual teachers' sense of success during the pandemic were related to the quality of their remote working conditions (*WC*).

[4] We address missingness for our teacher experience measure by creating and including an additional indicator for when teachers failed to report their own experience level.

We complement our longitudinal modeling approach with a taxonomy of ordered logistic regression models within a value-added framework. These value-added models (VAMs) allow us to estimate whether teachers' sense of success during the pandemic is related to their remote working conditions, while controlling flexibly for teachers' self-reported sense of success in two prior periods and a range of teacher and school characteristics. In this analysis, the structural component of our latent-variable model takes the form:

$$Y^{*}_{j,t=Remote} = \sum_{m=1}^{4} \theta_m * 1(Y_{j,t=SpringPre} = m) + \sum_{m=1}^{4} \vartheta_m * 1(Y_{j,t=Fall} = m) + \beta(WC_{j,t=Remote}) + \sigma X_j + \varphi Z_s + \varepsilon_j. \quad (4)$$

Here, we include indicators for teachers' sense of success from the spring retrospective survey pre-COVID-19 (*SpringPre*) and the fall survey (*Fall*) as non-parametric controls for teachers' sense of success prior to the pandemic. Additional teacher and school-level controls are the same as described above. Across all our models we present results in terms of odds ratios and cluster our standard errors at the school level to account for the non-independence of teachers' error terms within schools.

## Findings

### What challenges did the pandemic and sudden change to remote teaching present for teachers?

Teachers' responses to the *Teaching from Home* survey reveal that they faced a range of challenges in pivoting to remote teaching during the COVID-19 pandemic. As shown in Table 2, teachers perceived that, on average, only 59% of their students were able to regularly engage in remote learning. One factor that likely contributed to this low level of engagement is limited

access to reliable, high-speed internet and internet-enabled devices. Overall, 26% of teachers reported that their students lacked the technological tools they needed for remote learning.

Teachers also reported concerns about their ability to manage their professional responsibilities and use online teaching tools. 40% agreed that caretaking responsibilities for children and/or dependent adults had made it difficult to do their job, and 16% of teachers reported that they were unable to balance their work with their other responsibilities at home. In addition, 8% of teachers were uncomfortable using the technological tools necessary to teach remotely.

**How did these challenges differ across school and teacher characteristics?**

*School Characteristics.* The low levels of perceived student engagement mask considerable variation across the schools in our sample. In Figure 1, we illustrate how average levels of perceived student engagement varied across schools. Roughly one in ten schools had less than 40% of students regularly engaged in remote learning, while approximately one in six schools had over 70% of students regularly engaged in remote learning.

We also find stark differences in perceived student engagement along racial and socioeconomic lines. As illustrated in Figure 2, teachers in high-poverty schools report that only 51% of students regularly engaged in remote learning, whereas their counterparts at low-poverty schools engaged at a much higher rate – 75%.[5] Figure 3 shows that in schools where a majority of students are Black, teachers reported that 47% of students regularly engaged in remote learning; at schools that enroll fewer than 10% of Black students, teachers reported that 71% of

[5] Consistent with federal guidelines, we define low-poverty as schools where less than 25% of students are eligible for FRPL and high-poverty as schools where over 75% of students are eligible for FRPL.

students regularly engaged in remote learning.[6] However, we find a much smaller difference in reported student engagement across schools based on the proportion of Hispanic students.

*Teacher Characteristics.* Disaggregating overall patterns in teachers' experiences reveals important differences in the challenges created by the pandemic and pivot to remote learning. Mid-career teachers particularly struggled to balance their work with the demands of their personal lives during the pandemic. In Figures 4 and 5, we show how challenges related to caretaking and balancing work and home responsibilities differed by experience and gender. Just over half (51%) of mid-career teachers reported that caretaking responsibilities made their job difficult, while 39% of early-career teachers and 35% late-career teachers reported these same concerns. These patterns likely reflect the greater likelihood that mid-career teachers have school-age children at home with them. Late-career teachers also report being less comfortable teaching online. As shown in Figure 6, 13% of teachers with 20-29 years of experience and 22% of teachers with 30 years of experience or more were not comfortable using online teaching tools, compared to only 6% of teachers with less than 10 years of experience and 7% of teachers with 10-19 years of experience.

**How did the pandemic and transition to remote teaching affect teachers' sense of success?**

We find that the pandemic and the pivot to remote teaching resulted in a sudden and steep drop in teachers' sense of success. As we show in Figure 7, the percentage of teachers who agreed or strongly agreed that they felt successful increased slightly from 92% in the fall to 96% in the spring prior to the pandemic, but then fell dramatically to 73% during the crisis. This drop in overall agreement rates actually understates the full decline in teachers' sense of success given, for example, that it fails to capture those teachers who went from strongly agreeing to

[6] These results are quite similar even when we limit our sample to only include Black teachers.

only agreeing they felt successful. Overall, 53% of all teachers who completed the spring survey reported that their sense of success declined during remote teaching relative to just before the pandemic (see Figure 8). Of those reporting declines, roughly one in four reported a decline of more than one response level (e.g., moving from Strongly Agree to Disagree).

We formally model the longitudinal changes to teachers' sense of success using an ordered logistic regression model and report the results in Table 3. Interpreting our results from Table 3, we find the odds that teachers' sense of success *increased* (e.g., Agree to Strongly Agree) dropped by 85% during the pandemic relative to the fall. Said in a more intuitive way, we find an almost 7-fold rise (or a 678% increase) in the odds that teachers' sense of success *decreased* in the spring remote teaching period relative to the fall.[7] We can also characterize this decline as a change in the continuous, latent measure of teachers' sense of success. Our estimate suggest that teachers' sense of success dropped by approximately 0.9 standard deviations relative to the fall.[8]

**What role did working conditions play in sustaining teachers' sense of success during the transition to remote teaching?**

We find that teachers' working conditions during the pandemic played an important role in sustaining their sense of success. We begin by providing graphical intuition for the role of remote work conditions in mitigating the decline in teachers' sense of success. In Figure 9, we show how the percent of teachers who agreed or strongly agreed that they feel successful changed differentially based on the quintile of individual working conditions teachers reported during the pandemic. Although teachers whose schools struggled to provide strong remote

[7] This estimate is derived by taking the inverse of odd ratios (see Long & Freese, 2014; p. 338)
[8] This translation involves using sample estimates to approximate $\sigma_{y*}$ the standard deviation of the latent continuous measure of teachers' sense of success and standardizing the untransformed log-odds estimate of $\beta$ (Long & Freese, 2014; p.333).

working conditions reported lower levels of success prior to the pandemic, they also experienced meaningfully larger declines in their sense of success on average.

*Growth Model Estimates*. We formally model changes across the full spectrum of teachers' sense of success using a longitudinal growth model. As shown in Table 3 columns 3 and 4, we find that teachers with one standard deviation higher individual working conditions during the pandemic have more than twice the odds of their sense of success *increasing* during remote teaching compared to a teacher with remote working conditions one standard deviation lower. Alternatively, we can say that teachers working in schools with better remote working conditions were substantially less likely to experience a decline in their sense of success. We estimate that teachers at the 25$^{th}$ percentile of individual working conditions experienced a 10-fold increase in the odds that their sense of success *decreased* during remote learning, while teachers at the 75$^{th}$ percentile of individual working conditions experienced only a 4-fold increase. Our estimates are nearly identical with and without controls for teacher and school characteristics to the model. When we substitute individual working condition measures with peer-averages (columns 5 and 6), we find that this positive, statistically significant relationship persists but is attenuated: teachers in a school with one standard deviation higher peer-average working conditions have 15% greater odds that their sense of success *increased* compared to teachers with peer-average working conditions one standard deviation lower.

*VAM Estimates*. Results from our value-added specification reported in Table 4 are quite similar to our findings from longitudinal growth models. We again find that the odds that teachers' sense of success *increased* are more than double for a one standard deviation higher level of individual working conditions during the pandemic (Panel A). We also find that the odds of teachers' sense of success *increasing* are roughly 30% greater for a one standard deviation

higher level of peer-average remote working conditions (Panel B). This is equivalent to a 0.4 standard deviation increase in teachers' sense of success for every standard deviation increase in individual working conditions and a 0.13 standard deviation increase in peer-average working conditions during the pandemic. Our estimates are quite robust to the inclusion or exclusion of a range of controls, including indicators for prior levels of reported success in both the fall and spring before remote learning, teacher and school characteristics, and prior ratings of teachers' working conditions.

We provide further intuition about the relationships between teachers' individual working conditions and their sense of success during the pandemic in Figure 10. Here we plot the predicted probabilities of positive or negative responses to the sense of success item, conditional on the full set of indicators for prior sense of success and other controls (Table 4 column 4). These conditional probabilities illustrate the strong association between individual working conditions and teachers' sense of success during the pandemic even after controlling for their prior levels of self-reported success and other covariates. We see the probability of feeling successful (Agree or Strongly Agree) during remote learning increases from 25% at the low end of the remote working conditions distribution to 90% at the top end of the distribution.

**Extensions**

Our primary analyses focus on the relationship between teachers' remote working conditions and changes in teachers' sense of success. We extend these analyses by exploring how working conditions measured in the fall and spring *prior* to the pandemic relate to changes in teachers' sense of success. We find some evidence that working conditions prior to the pandemic are related to changes in teachers' sense of success, but to a much lesser degree than remote working conditions. Results from our growth model presented in Appendix Table A3

show largely positive (odds ratios greater than 1) but imprecise estimates for the interactions with fall and spring in-person working conditions. Results from VAM models shown in Appendix Table A4 are uniformly positive and at least marginally significant for these earlier measures of working conditions as predictors of teachers' changes in their sense of success. This overall pattern of findings makes sense given that schools with stronger working conditions in the fall were more likely, but not guaranteed, to have stronger working conditions in the spring during the pandemic (individual $r$=0.48; peer-average $r$=0.68; see Appendix Table A5).

**Robustness Tests**

We examine the robustness of the descriptive patterns and effects on teachers' sense of success in several ways. First, our findings, particularly the differential levels of student engagement across schools and the sudden drop in teachers' sense of success, could reflect the influence of George Floyd's murder and the subsequent international uprising in response to racial injustice and police violence. However, 91% teachers responded to the spring *Teacher Engagement* and *Teaching from Home* surveys before May 25$^{th}$ when Floyd was killed. All of our findings remain quite consistent when we restrict our sample to include only those response before May 25$^{th}$.

Second, attributing the large drop in teachers' sense of success to the pandemic and transition to remote teaching assumes that their sense of success would have remained unchanged in the absence of this treatment. It is difficult to know for sure how teachers' sense of success might have evolved in this counterfactual scenario. One approach would be to project the small upward trend in teachers' sense of success between the fall and spring prior to the pandemic. If this trend were sustained, as we might expect given the improvement of teachers' experience on the job (Kraft & Papay, 2014), our estimates would understate the full effect of the

pandemic and remote teaching on teachers' sense of success. Alternatively, we might assume teachers' sense of success would fall as the end of the school year neared and they experienced burnout (Parker et al., 2012). We specify our growth model such that our estimate of the decline in teachers' sense of success is relative to the fall, implicitly assuming a counterfactual decline in their sense of success back to their baseline levels (possibly because of burnout). Ultimately, end-of-year burnout for teachers would need to be implausibly large, multiple orders of magnitude larger than the gains teachers made from fall to spring, to even come close to calling into question the conclusion that the pandemic had a large negative causal effect on teachers' sense of success.

Finally, one mid-sized suburban district in the south constitutes 61% of our sample and 102 of 206 total schools (see Appendix Table A1). It is possible this district is driving the overall patterns we find. However, when we remove this district from the sample our results remain broadly similar. If anything, reported challenges appear even more daunting with this mid-sized suburban district removed from our sample. For example, in a restricted sample, reported student engagement is notably lower (52% vs. 64% in removed district), perceived challenges with student use of technology are greater (32% vs. 22%) and teacher discomfort with technology is higher (10% vs. 8%). Despite reporting more challenges, slightly fewer teachers in the restricted sample reported a decline in their sense of success (50%) compared to the mid-sized suburban district (54%).

## Discussion

In this paper, we examine the experiences of teachers during the early months of the COVID-19 pandemic—a period of unprecedented and remarkably rapid organizational change.

Our findings reveal that teachers across the U.S. faced immense challenges during this time. The pivot to emergency remote teaching resulted in a sudden, massive drop in teachers' sense of success. Teachers struggled to find a balance between their professional and personal responsibilities. They scrambled to master new technology. And, often despite dedicated efforts by districts and schools to distribute technology and provide internet access, teachers reported that large proportions of their students remained disengaged in remote learning—due, in part, to their continued lack of access to technology.

Although teachers in every career phase, life stage, geographic region, and school-type were challenged by the transition to emergency remote teaching, hardships differed in type and in magnitude. Consistent with prior research, however, our findings highlight the critical importance of school organizational practices to teachers' work. A schools' working conditions during the pandemic mattered greatly for sustaining teachers' sense of success. We find that teachers who could depend on strong communication, fair expectations, and a recognition of effort from the top, along with targeted professional development and facilitated, meaningful collaboration with colleagues, were least likely to experience a dip in their sense of success.

Teachers working in low-income communities and communities of color that have been disproportionately affected by the virus have faced the most profound challenges (Oppel Jr. et al., 2020). Early evidence suggests that the pandemic has already exacerbated existing educational inequality (Bacher-Hicks et al., 2020; Chetty et al., 2020; Kuhfeld et al., 2020). We provide further evidence that learning was deeply obstructed for Black students and for those with limited family income. Teachers estimated that, on average, only half of students in high-poverty and/or majority Black schools regularly engaged in remote learning. In addition, our data shed light on the more subtle ways in which students are shortchanged: by attending schools with

dysfunctional work environments that are unable to support teachers to adapt their practice during challenging times of sudden change. When teachers cannot do their work, students ultimately suffer (Kraft, Marinell, & Yee, 2016).

**Implications for Policy & Practice**

Policymakers and practitioners can take concrete action to ensure that, as the pandemic persists, schools are better set up to support teachers' work, and in turn, students' learning. The shift to emergency remote teaching was sudden and messy, but catastrophe *can* be a catalyst for positive change. Building and sustaining strong work environments for teachers—whether remote or in-person—should be central to the approach in every locale. However, strong working conditions will not develop in response to state or district mandates. To ensure that policies translate into teaching and learning, policymakers must focus on capacity-building (McDonnell & Elmore, 1987) in schools, in districts, and in state education offices intended to support the schools' work.

This study furthers our understanding of where capacity-building efforts might focus. First, principals need support in solving what Heifetz and colleagues (2009) call "technical problems"—those challenges that "have known solutions that can be implemented by current know-how" (p. 19). For example, equipping students with the necessary technology and internet access or ensuring childcare for teachers' children. Without solutions to these hard, but solvable, problems, principals and teachers simply cannot do their jobs. Easing the process of addressing technical problems can allow principals to focus their limited time and energy in solving "adaptive challenges"—those that require leaders to "build new ways of being and responding beyond the current repertoires of available know-how." (p. 2) Responding to such challenges

depends on courageous leadership, as it requires improvisation, experimentation, and engagement of stakeholders affected by the work.

Once schools can focus on addressing adaptive challenges, principals can concentrate on strengthening the working conditions that influence teachers' work and affect a school's ability to engage in organizational change. To start, principals can narrow their efforts by defining their school's "malleable processes" (Viano et al., 2020, p.1)—those within their locus of control. Encouragingly, our results suggest that what schools do during the pandemic to support teachers' matters most. Schools might begin by addressing the processes that our study highlights as important to teachers in times of change, such as developing systems for strong communication and for recognizing teachers' efforts. In addition, they might work with teachers to solicit and set expectations for work, determine training that teachers need, and design structures for formal and informal collaboration. By investing in these aspects of working conditions, schools will be better prepared to navigate organizational change. Weathering such change—especially during an ongoing and unpredictable crisis—depends on a culture where both organizational systems and interpersonal relationships exist and can support the improvisation and swift action required.

As part of this work, schools need support to address those problems that influence the work of teachers and students but fall outside of the school's locus of control. For example, as our results indicate, teachers in schools with mostly Black students or students living in poverty reported much lower rates of student engagement in remote learning. Although access to technology and internet likely contribute to this finding, policymakers, practitioners, and researchers must not overlook the intersectionality of economic disadvantage, racism, and other powerful out-of-school factors that constrain teachers' work and students' opportunities to learn (Brody et al., 2006; Duncan & Brooks-Gunn, 1997; Mays et al., 2007; Seaton & Yip, 2009).

## Conclusion

Our study demonstrates that now—more than ever—school organizational practices matter. Teachers overwhelmingly enter the profession because they want to make a difference in the lives of students—especially for those who have been long underserved (Kraft et al., 2015). Yet, too often teachers find themselves in contexts where they feel isolated and their working conditions impede their teaching. When this happens—and teachers cannot achieve a sense of success—they leave (Johnson & Birkland, 2003). We build on this work by documenting the enormous challenges that teachers faced during the onset of the COVID-19 pandemic, a time of unprecedented and rapid organizational change. We find that teachers experienced a precipitous drop in their sense of success during this sudden pivot to emergency remote teaching—and as their most vulnerable students struggled to engage in remote learning. Yet, supportive working conditions during remote learning played a protective role: in schools where teachers experienced stronger working conditions, they also reported much lower declines in their sense of success than their peers in schools with weaker working conditions.

The pandemic has sparked enormous transformations for schools and teachers' practices. To weather this ongoing storm, schools need to provide the supports that educators require to succeed in this new, evolving context. Teachers do not work in a vacuum. Efforts to enact both temporary and lasting change in schools must attend to the organizational conditions that make teachers' work and students' learning possible.

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## Tables

Table 1. Sample Characteristics

| | Average | 25th Percentile | 75th Percentile |
|---|---|---|---|
| | | Panel A: Teachers | |
| Experience | 13.1 | 5.0 | 19.0 |
| Female | 0.81 | | |
| Asian | 0.01 | | |
| Black | 0.14 | | |
| Hispanic/Latinx | 0.03 | | |
| White | 0.75 | | |
| Multi-racial | 0.01 | | |
| n | 7,841 | | |
| | | Panel B: Schools | |
| Asian Students | 0.01 | 0.00 | 0.01 |
| Black Students | 0.30 | 0.14 | 0.36 |
| Hispanic/Latinx Students | 0.18 | 0.07 | 0.19 |
| White Students | 0.45 | 0.16 | 0.64 |
| Multiracial Students | 0.02 | 0.00 | 0.03 |
| Low-Income Students | 0.54 | 0.37 | 0.67 |
| Students with Disabilities | 0.14 | 0.14 | 0.15 |
| Elementary Schools | 0.47 | | |
| Middle Schools | 0.20 | | |
| High Schools | 0.22 | | |
| Mixed Grades School | 0.11 | | |
| n | 206 | | |
| | | Panel C: Districts | |
| Student Enrollment | 50,942 | 9,797 | 75,577 |
| State Rt on Announcement of School Closure | 1.81 | 1.71 | 2.08 |
| New Cases per 100,000 Residents | 6.56 | 4.10 | 4.10 |
| Urban | 0.07 | | |
| Suburban | 0.84 | | |
| Rural | 0.10 | | |
| Traditional School District | 0.94 | | |
| n | 15 | | |

Notes: School and district averages are weighted by the number of teachers in the sample. Teacher characteristics are based on teacher reports on the *Teaching from Home* survey. School characteristics are culled from the Common Core of Data, State Departments of Education, and individual school websites. Low-Income Students refers to students receiving free or reduced price lunch. District characteristics are based on the Common Core of Data triangulated with district websites and rt.live. See Table A1 in the appendix for further information on school districts.

Table 2. Teachers' Perceptions of the Challenges with Remote Teaching During the Pandemic by Teacher and School Characteristics

Panel A. Teacher Characteristics

| | Average | Male | Female | Early Career | Mid-Career | Late Career | Asian | Black | Hispanic | White |
|---|---|---|---|---|---|---|---|---|---|---|
| Percent of Students Engaged | 59.4 | 57.5 | 60.0 | 59.3 | 62.4 | 57.8 | 55.5 | 51.3 | 61.3 | 61.4 |
| Lack of Student Access to Technology | 26.4 | 21.7 | 26.9 | 27.0 | 22.4 | 28.3 | 24.0 | 26.6 | 28.4 | 25.2 |
| Balancing Work & Home Responsibilities | 15.6 | 11.7 | 16.4 | 15.1 | 19.1 | 13.9 | 12.0 | 15.2 | 22.6 | 15.2 |
| Caretaking Responsibility | 40.0 | 42.5 | 39.5 | 38.4 | 50.3 | 34.9 | 34.7 | 34.1 | 46.7 | 40.9 |
| Discomfort with Technological Tools | 8.8 | 7.4 | 9.2 | 6.9 | 6.0 | 10.8 | 5.3 | 8.8 | 10.3 | 8.5 |
| n | 7,841 | 1,380 | 6,358 | 1,162 | 2,319 | 4,363 | 75 | 1,073 | 261 | 5,898 |

Panel B. School Characteristics

| | Average | <10% Black | Majority Black | <10% Hispanic | Majority Hispanic | Low Poverty | High Poverty | Elementary | Middle | High |
|---|---|---|---|---|---|---|---|---|---|---|
| Percent of Students Engaged | 59.4 | 71.1 | 47.1 | 61.5 | 60.0 | 74.5 | 51.2 | 60.4 | 56.0 | 59.4 |
| Lack of Student Access to Technology | 26.4 | 19.4 | 34.4 | 23.4 | 33.3 | 12.2 | 36.7 | 29.8 | 20.5 | 24.5 |
| Balancing Work & Home Responsibilities | 15.6 | 19.6 | 14.1 | 16.0 | 14.4 | 16.5 | 14.1 | 14.7 | 16.6 | 15.7 |
| Caretaking Responsibility | 40.0 | 41.3 | 37.5 | 40.9 | 40.1 | 43.3 | 36.8 | 40.3 | 39.6 | 41.3 |
| Discomfort with Technological Tools | 8.8 | 10.5 | 7.0 | 8.7 | 7.7 | 8.2 | 8.6 | 9.8 | 6.3 | 7.8 |
| n | 7,841 | 1,088 | 1,326 | 4,100 | 699 | 971 | 1,645 | 3,659 | 1,563 | 1,742 |

Notes: We display the overall and subgroup averages for student engagement and other reported challenges. The Percent of Students Engaged is the average of teacher reports of the percent of students regularly engaged during remote learning. Answer choices for this question were in quintiles and then coded to indicate the median of each quintile. Other reported challenges are based on dichotomous variables indicating if teachers reported each construct as a challenge. Teacher experience was divided into three subgroups based on the years of experience: early career (less than five years), mid-career (between 5 and 15 years), and late-career (over 15 years). Consistent with federal guidelines, we define low-poverty as schools where less than 25% of students are eligible for free- or reduced-price lunch (FRPL) and high-poverty as schools where over 75% of students are eligible for FRPL.

Table 3. Longitudinal Growth Analysis of Teachers' Sense of Success Moderated by Remote Working Conditions

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Remote Learning | 0.148*** | 0.147*** | 0.150*** | 0.150*** | 0.146*** | 0.146*** |
| | [-30.16] | [-30.28] | [-28.89] | [-28.97] | [-30.30] | [-30.38] |
| Spring, in Person | 1.717*** | 1.717*** | 1.686*** | 1.685*** | 1.714*** | 1.714*** |
| | [13.10] | [13.11] | [13.03] | [13.03] | [13.10] | [13.10] |
| Remote Learning* Individual Working Conditions | | | 2.069*** | 2.071*** | | |
| | | | [15.31] | [15.49] | | |
| Remote Learning* Peer-Average Working Conditions | | | | | 1.168*** | 1.146*** |
| | | | | | [3.11] | [2.90] |
| n(Observations) | 17,871 | 17,871 | 17,871 | 17,871 | 17,871 | 17,871 |
| n(Teachers) | 5,957 | 5,957 | 5,957 | 5,957 | 5,957 | 5,957 |
| Teacher and School Controls | | Yes | | Yes | | Yes |

Notes: * p<.05, ** p<0.01, *** p<0.001. Each column displays results from a separate ordered logistic regression of sense of success regressed on remote learning and, in panels 3-6, working conditions. Estimates are reported as proportional odds ratios. Robust standard errors are clustered at the school level and t-statistics are reported in brackets. Teachers' sense of success is measured by ordinal questions on the *Teacher Engagement* and *Teaching from Home* surveys. Working conditions are measured by a PCA on a series of questions regarding professional development, communication, recognition, collaboration, and professional expectations from the *Teaching From Home* survey. Control variables include teacher race, gender, and level of experience, as well as school enrollment, student racial/ethnic demographics, the percent of English Language Learners, and the percent of students eligible for free or reduced priced lunch.

Table 4. Value-Added Models of the Relationship Between Remote Working Conditions and Changes in Teachers' Sense of Success

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Panel A: Individual Working Conditions | | | |
| Remote Working Conditions | 2.727*** | 2.285*** | 2.250*** | 2.407*** |
| | [22.99] | [18.32] | [18.44] | [17.60] |
| | Panel B: Peer-Average Working Conditions | | | |
| Remote Working Conditions | 1.310*** | 1.180*** | 1.153*** | 1.305*** |
| | [6.15] | [4.15] | [3.96] | [4.37] |
| n | 5,957 | 5,957 | 5,957 | 5,957 |
| Lagged Success Indicators | | Yes | Yes | Yes |
| Teacher and School Controls | | | Yes | Yes |
| Lagged Working Conditions Indicators | | | | Yes |

Notes: * p<.05, ** p<0.01, *** p<0.001. Each cell displays results from a separate ordered logistic regression of sense of success regressed on remote working conditions. Estimates are reported as proportional odds ratios. Robust standard errors are clustered at the school level and t-statistics are reported in brackets. Teacher sense of success is measured by ordinal questions on the *Teacher Engagement* and *Teaching from Home* surveys. Working conditions are measured by a PCA on a series of questions regarding professional development, communication, recognition, collaboration, and professional expectations from the *Teacher Engagement* and *Teaching from Home* surveys. See Table 3 for a list of control variables.

## Figures

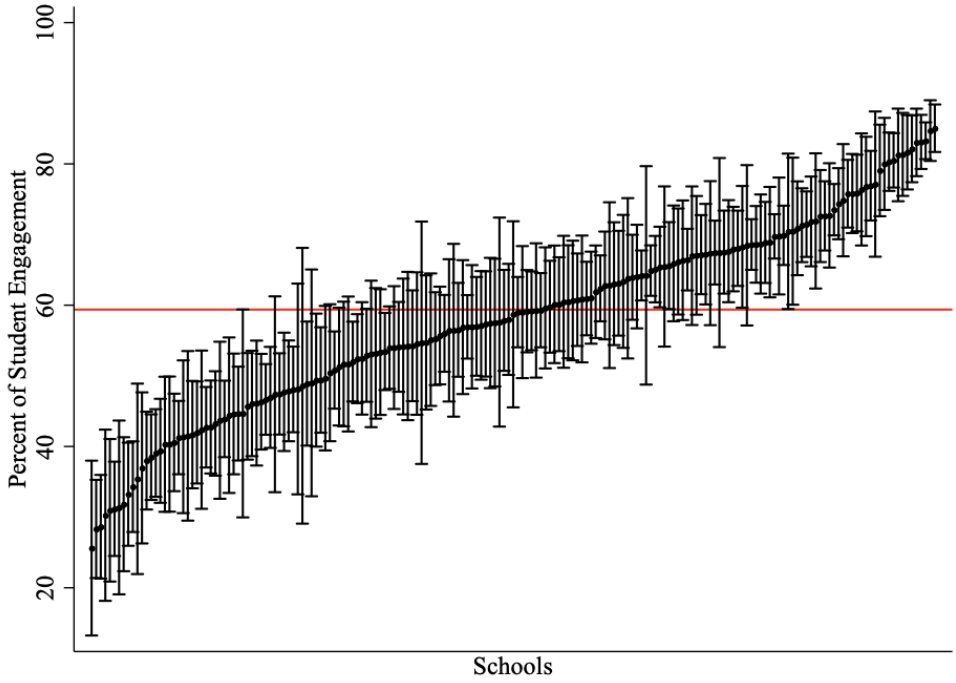


**Figure 1.** Variation in Average Student Engagement in Remote Learning Across Schools

Notes: Means (solid line) and 95% confidence intervals (dashed lined) are reported for each school (n=206). The overall average (red line) across schools is 59%.

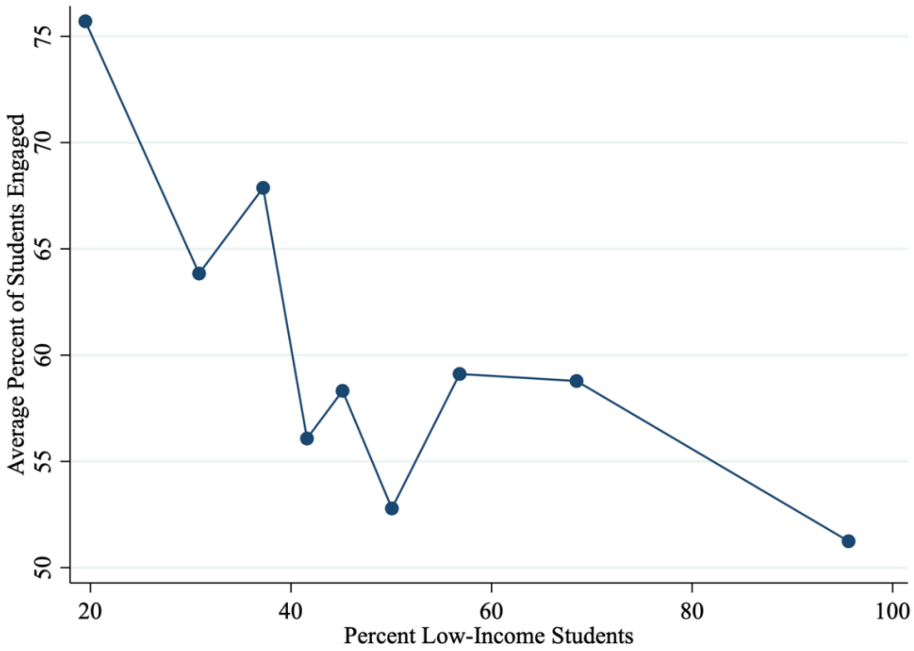


**Figure 2.** Differences in Student Engagement in Remote Learning by the Percent of Students from Low-Income Families in a School

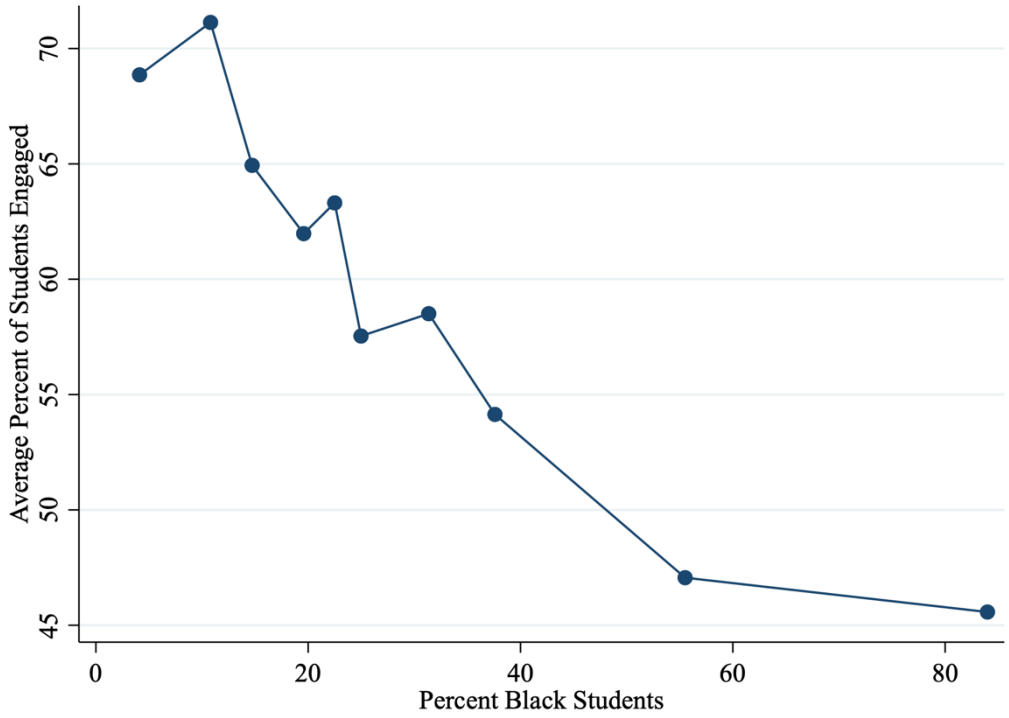


**Figure 3.** Differences in Student Engagement in Remote Learning by the Percent of Black Students in a School

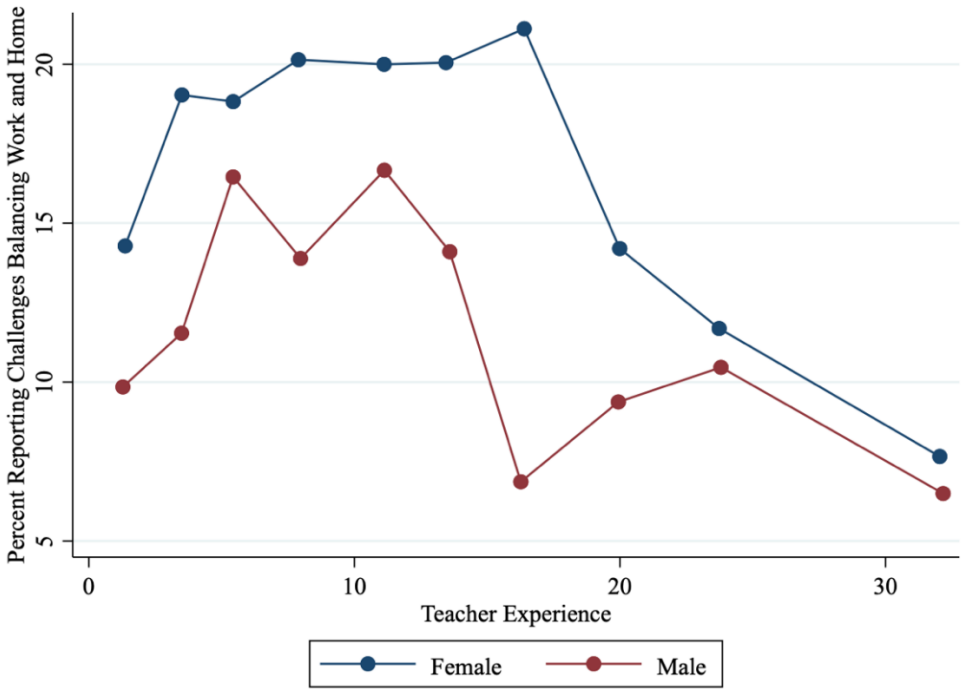


**Figure 4.** Challenges Balancing Work and Home Responsibilities by Teacher Experience and Gender

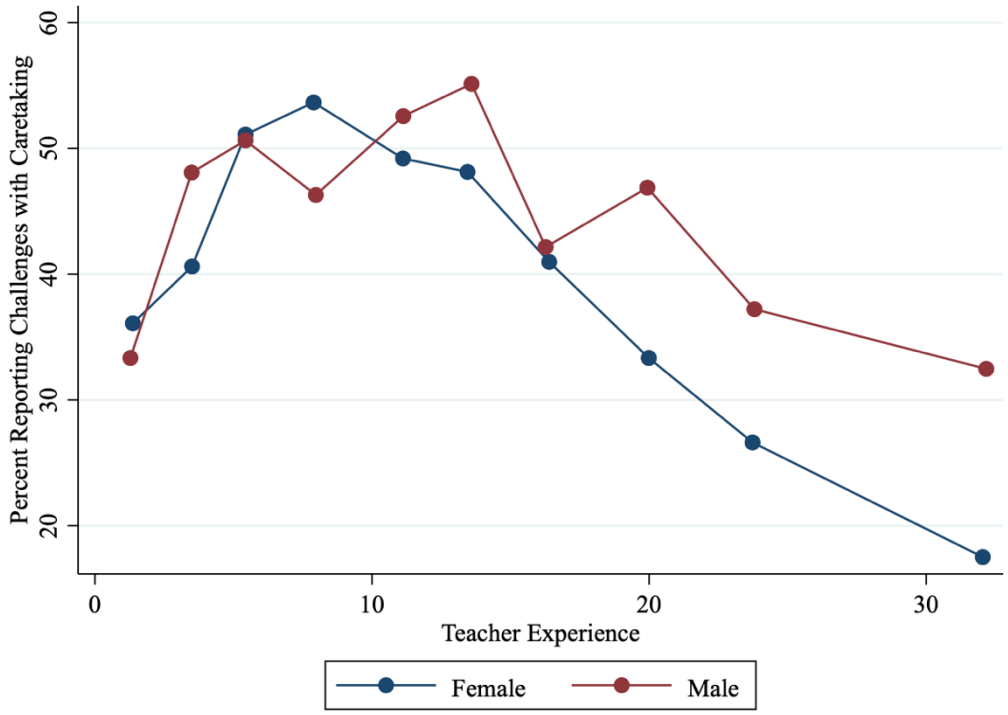


**Figure 5.** Challenges with Caretaking Responsibilities by Teacher Experience and Gender

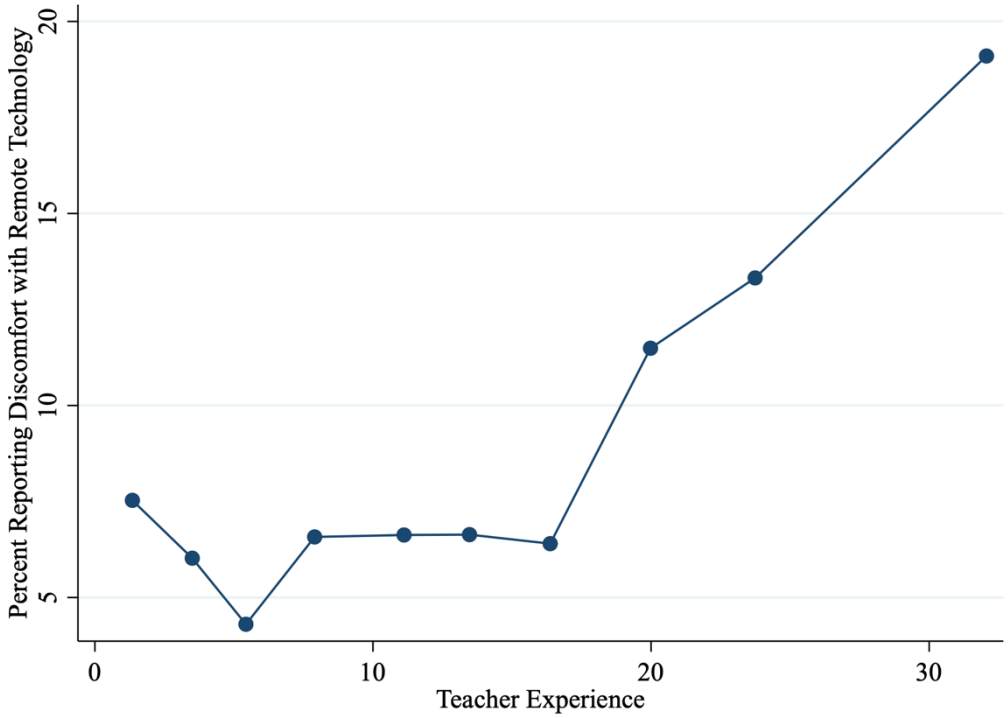


**Figure 6.** Challenges with Technology for Remote Learning by Teacher Experience

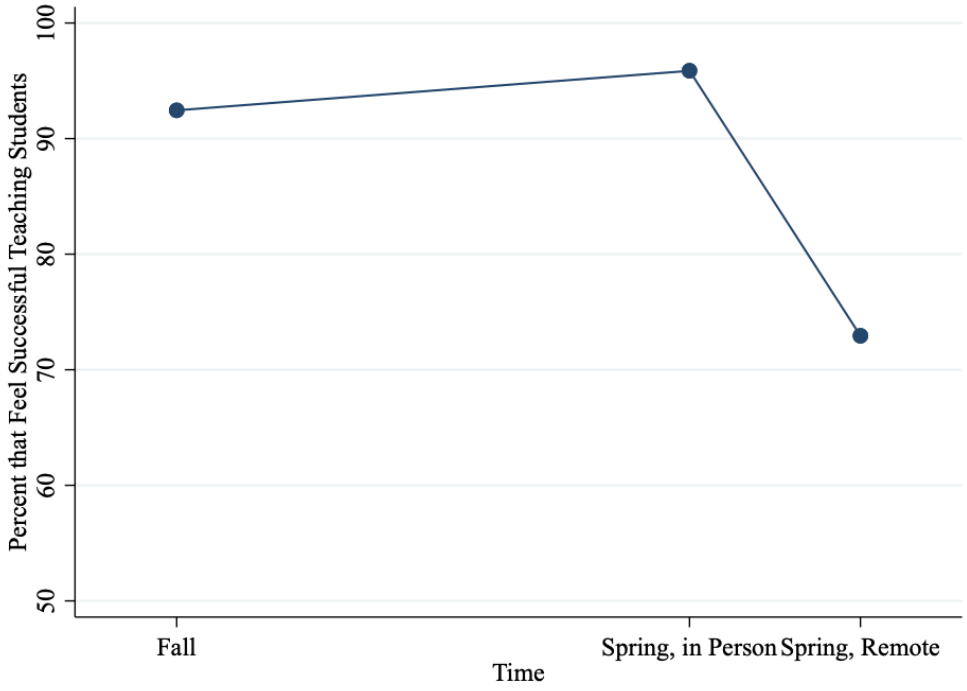


**Figure 7.** Changes in Teachers' Sense of Success Before and After Remote Learning

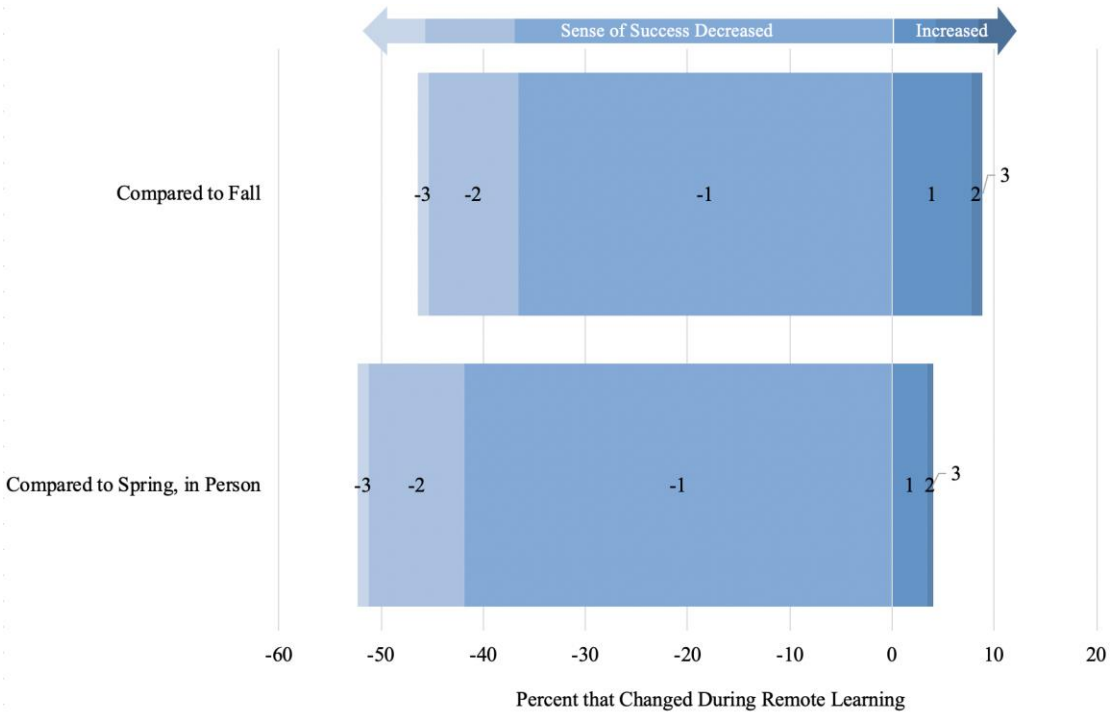


**Figure 8.** Changes in Likert Response Values of Teachers' Sense of Success During Remote Learning

Notes: Value labels on bars indicate the change in the Likert response values of sense of success during remote learning. The x-axis indicates the percent of teachers reporting each level of change.

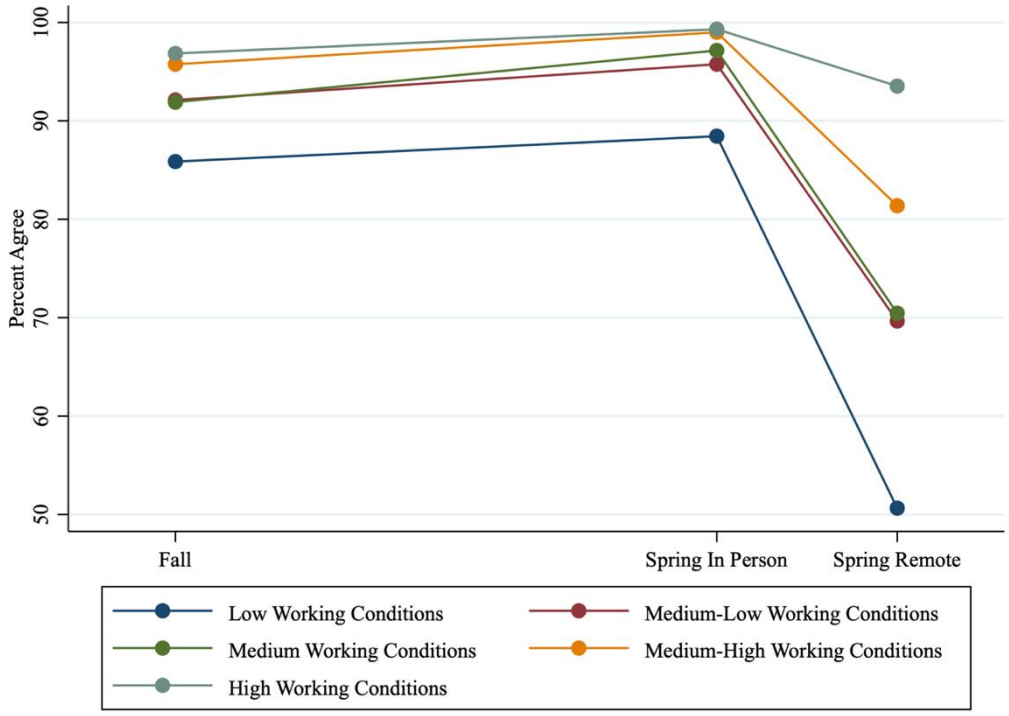


**Figure 9**. Changes in Teachers' Sense of Success by Quintile of Individual Working Conditions during Remote Teaching

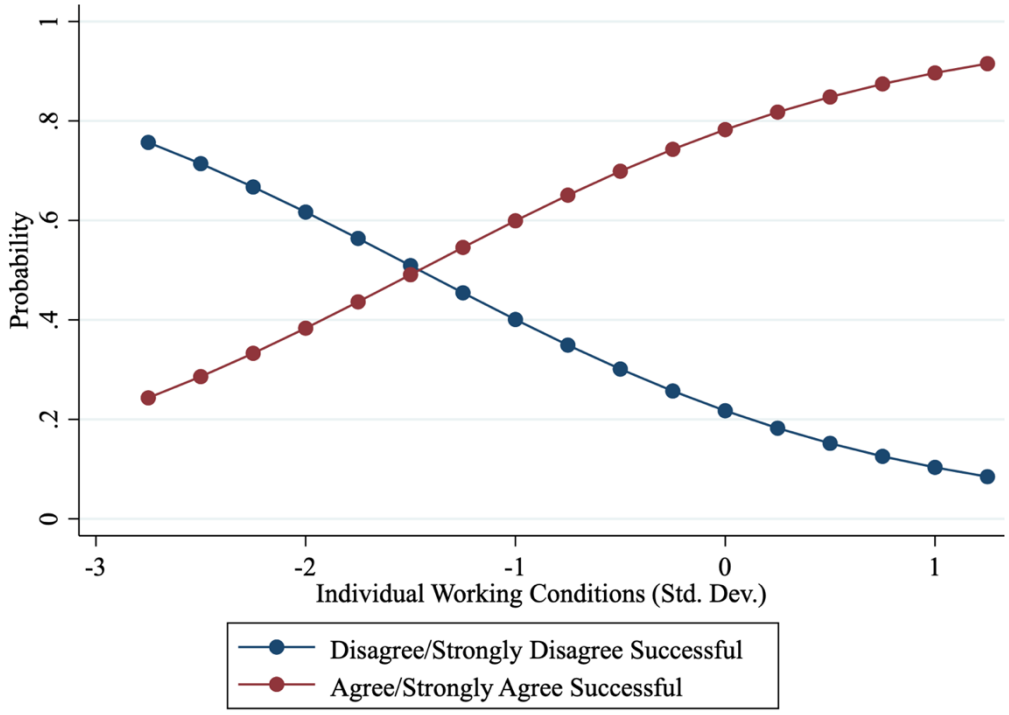


**Figure 10.** Conditional Predicted Probabilities of Teachers' Sense of Success by Individual Working Conditions During Remote Teaching

Appendix A:

## Introductory Text for Spring Upbeat Engagement Survey

Please answer the following questions based on your experiences working at your school PRIOR to COVID-19 school closures. We will ask you a set of questions at the end of the survey regarding your experience teaching remotely while schools are closed due to COVID-19.

## Remote Teaching Survey

Please answer the following questions based on your recent experiences teaching remotely while schools are closed due to COVID-19.

Student Engagement

1. What percent of your students are regularly engaging in learning activities during this distance learning period?

0% to 20%  21% to 40%  41% to 60%  61% to 80%  81% to 100%

Communication

2. My **district** has communicated clear guidelines to teachers about remote teaching in all of the phases of this distance learning period.

3. Administrators at my **school** have communicated with teachers in a clear and timely way during this distance learning period.

Collaboration

4. Teachers at my school are collaborating regularly with each other during this distance learning period.

Work/life balance

5. My **school** administrators' expectations about how much work I can accomplish have been fair during this distance learning period.

6. I have been able to balance my work with my other responsibilities at home during this distance learning period.

7. Caretaking responsibilities for children and/or dependent adults have made it difficult to do my job during this distance learning period.

Self-efficacy

8. I have felt successful at supporting my students' academic development during this distance learning period.
9. I have felt successful at supporting my students' social/emotional well-being during this distance learning period.
10. I am comfortable using the technological tools required for remote teaching during this distance learning period.

Recognition

11. I have felt appreciated by my school administration during this distance learning period.

Resources

12. My students have had the technological tools they need to engage in virtual learning during this distance learning period.

Professional Development

13. My district has provided helpful professional development for teaching remotely during this distance learning period.
14. My district has provided helpful professional development for how I can support my students' social/emotional well-being during this distance learning period.

# Appendix Tables

Table A1. Sample District Characteristics

| School District | State | Urbanicity | Date of School Closure | Remote Learning Start Date | New COVID-19 Cases (per Capita) on April 20th | State COVID-19 Rt | # of Survey Respondents | Remote Learning Plans |
|---|---|---|---|---|---|---|---|---|
| District A | NY | Urban | March 15th | March 23rd | 53.4 | 1.56 | 15 | *Specific Teacher Instruction:* Teachers across county were in their respective school buildings Tuesday, March 17th to begin remote teaching training and to begin rolling out material by March 23rd. *Delivery Form:* Google Classroom and instructional packets; District distributed devices to students. *Grading Policy:* Elementary and Middle schools switched to a "meets standards"/ "needs improvement" grading style. High school students received standard grading but had the option of changing courses to Pass/Fail. |
| District B | IL | Urban | March 13th | March 16th | 18.4 | 2.18 | 73 | *Specific Teacher Instruction*: Teachers were expected to deliver 2 hour lessons to students on Google Classroom and to host office hours for students. *Delivery Form:* Google Classroom and instructional packets; District distributed devices to students. *Grading Policy:* District implemented Pass/Fail policy. |
| District C | IL,<br>MI | Urban | March 13th | March 16th | 18.4<br>18.6 | 2.18<br>1.33 | 242 | *Specific Teacher Instruction:* Beginning March 27th, teachers spent Fridays collaboratively planning at-home learning lessons. Teachers also facilitated virtual morning meetings with their classrooms and held one-on-one sessions with their students. *Delivery Form:* Google Classroom, Zoom, Seesaw, and printable weekly learning packets; District distributed devices to students. *Grading Policy:* Work completed by students could only improve their grades. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| District D | SC | Rural | March 15th | March 17th | 0.9 | 1.71 | 194 | *Specific Teacher Instruction:* Teachers expected to provide students with feedback on instructional packets.<br>*Delivery Form:* Google Classroom and instructional packets; District distributed devices and also deployed Wi-Fi-enabled buses starting March 26th.<br>*Grading Policy:* Work completed during initial two weeks of closure were not included in report cards of the third quarter. |
| District E | VA | Rural | March 13th | March 19th | 0 | 2.14 | 58 | *Specific Teacher Instruction:* March 16th was a designated Teacher Workday. This day was taken to prepare instructional plans in the case schools were closed for an extended period of time. During closure, teachers were expected to hold virtual office hours.<br>*Delivery Form:* Instructional packets were available every two weeks for pick-up; District distributed devices to students.<br>*Grading Policy:* All grading stopped during school closure. Final grades represent grades prior to school closure. |
| District F | SC | Suburban but mix | March 15th | March 18th | 4.1 | 1.71 | 4,784 | *Specific Teacher Instruction:* Teachers were tasked with uploading materials to eLearning sites and to have availability for virtual student meetings and calls.<br>*Delivery Form:* Google Classroom and instructional packets; District distributed devices to students.<br>*Grading Policy:* Students were mostly graded on engagement and participation during e-Learning. Engagement is measured by work completion, phone calls, Google Meets or any other form of engagement with the teacher. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| District G | TX | Suburban | March 19th | March 23rd | 3.6 | 1.75 | 402 | *Specific Teacher Instruction:* Phase 1 of the Instructional Continuity Plan involved teachers posting resources/assignments on the eLearning website. Phase 2 included teachers posting assignments and instructions on Google Classroom, Echo, and other online sources. Unlike phase 1, these assignments are not optional.<br>*Delivery Form:* Google Classroom, Echo, and other eLearning sources at discretion of schools; District distributed devices to students.<br>*Grading Policy:* Grades K-12 will have a Pass/Fail/Incomplete grading system. |
| District H | GA | Suburban | March 13th | March 16th | 5.9 | 2.08 | 1,034 | *Specific Teacher Instruction:* Teachers to provide both digital and on paper instructional packets for students to work on. They will continue to provide assignments and accept them until May 15th.<br>*Delivery Form:* Google Classroom and instructional Packets; District distributed devices to students.<br>*Grading Policy:* Grades will only be recorded if they improve a student's grade. |
| District I | VA | Rural | March 13th | April 13th | 2.7 | 2.14 | 319 | *Specific Teacher Instruction:* Teachers provided students with preliminary instructional plans on March 13th, which included an instructional packet of 10 days worth of academic content. On March 27, faculty members met with principals via ZOOM to discuss remote learning. Teachers are expected to communicate and provide feedback to students a minimum of once per week.<br>*Delivery Form:* Google Classroom and instructional packets; District distributed devices to students.<br>*Grading Policy:* Elementary students' work will not be graded; feedback on assignments will be provided. Secondary students are encouraged to complete assignments. If not, assignments will be made up during remediation time during the 2020-2021 academic school year. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| District J | VT | Rural | March 15th | March 18th | 0 | 1.14 | 190 | *Specific Teacher Instruction:* On March 16th, there was a delayed two hour opening for students. Teachers and staff arrived earlier to begin planning in case of a long-term school closure. Under guidance of Agency of Education, teachers were tasked to initially plan work of "maintenance of education." By April 13th, teachers switched to "Continuance of Education." Teachers were tasked with creating a planning document ahead of April 13th, which had to be submitted to their principals.<br>*Delivery Form:* Google Classroom and instructional packets; District distributed devices to students.<br>*Grading Policy:* Schools in district released individual grading plans. |
| District K | LA | Suburban | March 13th | March 16th | 35.5 | 2.22 | 385 | *Specific Teacher Instruction:* Each school developed their own requirements and schedule for teachers. During phase III of remote learning, which began April 20th and April 27th depending on grade level, teachers were expected to provide students with mandatory work and provide feedback. Unlike prior phases, phase III emphasizes the continuance of learning and made all assignments mandatory for students.<br>*Delivery Form:* Google Classroom and instructional packets; District distributed devices to students.<br>*Grading Policy*: |
| District L | IL | Urban | March 13th | March 16th | 18.4 | 2.18 | 99 | *Specific Teacher Instruction:* Teachers were tasked with tracking and monitoring student engagement on a weekly basis.<br>*Delivery Form:* Google Classroom and instructional packets; District distributed devices to students.<br>*Grading Policy:* Grades entered during remote learning can only improve students' grades. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| District M | IL | Urban | March 13th | March 18th | 18.4 | 2.18 | 35 | *Specific Teacher Instruction:* Each day teachers will offer a three hour window check-in for students and parents to ask questions about assignments. *Delivery Form:* Google Classroom and instructional packets; Districts distributed devices to students. *Grading Policy:* Grading protections in place to ensure students with limited access to technology and supports are not penalized. |
| District N | IL | Urban | March 13th | | 18.4 | 2.18 | 29 | No information available |
| District O | IL | Urban | March 13th | April 13th | 18.4 | 2.18 | 21 | *Specific Teacher Instruction:* Teachers expected to hold office hours for students. *Delivery Form:* Google Classroom and instructional packets; District distributed devices to students. *Grading Policy:* For the third quarter, teachers can grade and count student work as long as it improves the student's grade. No student will receive a fourth quarter grade that falls below their third quarter grade. If the Q4 grade is below the Q3 grade, students will receive a Pass (P). If the student failed their courses, they received an incomplete. |

Notes: To find districts' remote learning information, we first looked at district websites. We then proceeded to search for articles from local news outlets. If data on the above indicators were still missing, we checked district Facebook and Twitter accounts. As a last resort, we contacted districts directly via email and phone. Dates of school closure announcements refer to the initial school closure announcement made by the state's governor. The Rt scores listed correspond to the day of the initial closure announcement. Rt scores indicate how quickly the virus is growing. When Rt is less than 1, this means that the spread of the virus is slowing down. Rt scores greater than 1 mean that the virus is spreading quickly. The number of cases in each county are listed per 100,000 residents. Per capita numbers are from April 20th, 2020, which, at the time, was considered a peak day in the United States. All per capita numbers were obtained from CovidActNow, while Rt scores were retrieved from rt.live.

Table A2. Working Conditions Constructs and Questions by Period

| Construct | Fall *Teacher Engagement* Survey | Spring *Teacher Engagement* Survey | Spring *Teaching From Home* Survey |
|---|---|---|---|
| Professional Development | My school offers support to help teachers improve. | My school offers support to help teachers improve. | My district has provided helpful professional development for teaching remotely during this distance learning period. |
| | The professional development at my school has helped me to improve my work. | The professional development at my school has helped me to improve my work. | My district has provided helpful professional development for how I can support my students' social/emotional well-being during this distance learning period. |
| | This year, I've had opportunities to learn and develop as a professional. | This year, I've had opportunities to learn and develop as a professional. | |
| Communication | The expectations for the role that I was hired for were made clear during the interview and hiring process. | The expectations for the role that I was hired for were made clear during the interview and hiring process. | My district has communicated clear guidelines to teachers about remote teaching in all of the phases of this distance learning period. |
| | My Principal communicates a clear vision for teaching and learning for the school. | My Principal communicates a clear vision for teaching and learning for the school. | Administrators at my school have communicated with teachers in a clear and timely way during this distance learning period. |
| Recognition | The administration at this school lets me know when I do good work. | The administration at this school lets me know when I do good work. | I have felt appreciated by my school administration during this distance learning period. |
| | Teachers are recognized publicly when they do outstanding work. | Teachers are recognized publicly when they do outstanding work. | |
| | The administration at this school notices how hard I work. | The administration at this school notices how hard I work. | |
| Collaboration | How often do you talk with other teachers about best practices in your work? | How often do you talk with other teachers about best practices in your work? | Teachers at my school are collaborating regularly with each other during this distance learning period. |
| Professional Expectations | The work/life balance at my school is fair to teachers. | The work/life balance at my school is fair to teachers. | My school administrators' expectations about how much work I can accomplish have been fair during this distance learning period. |

Table A3. Longitudinal Growth Analysis of Teachers' Sense of Success Moderated by Working Conditions Measured at Three Time Periods

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Remote Learning | 0.148*** | 0.152*** | 0.150*** | 0.147*** | 0.148*** | 0.146*** |
| | [-29.89] | [-28.60] | [-28.97] | [-30.33] | [-29.98] | [-30.38] |
| Spring, in Person | 1.712*** | 1.696*** | 1.685*** | 1.717*** | 1.716*** | 1.714*** |
| | [13.04] | [13.08] | [13.03] | [13.09] | [13.11] | [13.10] |
| Remote Learning*Individual WC (Fall) | 1.061 | | | | | |
| | [1.29] | | | | | |
| Remote Learning*Individual WC (Spring, in Person) | | 1.381*** | | | | |
| | | [7.21] | | | | |
| Remote Learning*Individual WC (Spring, Remote) | | | 2.071*** | | | |
| | | | [15.49] | | | |
| Remote Learning*Peer-Average WC (Fall) | | | | 0.992 | | |
| | | | | [-0.18] | | |
| Remote Learning*Peer-Average WC (Spring, in Person) | | | | | 1.028 | |
| | | | | | [0.58] | |
| Remote Learning*Peer-Average WC (Spring, Remote) | | | | | | 1.146*** |
| | | | | | | [2.90] |
| n(Observations) | 17,871 | 17,871 | 17,871 | 17,871 | 17,871 | 17,871 |
| n(Teachers) | 5,957 | 5,957 | 5,957 | 5,957 | 5,957 | 5,957 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |

Notes: * p<.05, ** p<0.01, *** p<0.001. Each column displays results from a separate ordered logistic regression of sense of success regressed on remote learning and the interaction between remote learning and working conditions. Estimates are reported as proportional odds ratios. Robust standard errors are clustered at the school level and t-statistics are reported in brackets. Teachers' sense of success is measured by ordinal questions on the *Teacher Engagement* and *Teaching from Home* surveys. Working conditions are measured by a PCA on a series of questions regarding professional development, communication, recognition, collaboration, and professional expectations from the *Teacher Engagement* and *Teaching from Home* surveys. See Table 3 for a list of control variables.

Table A4. Value-Added Models of the Relationship Between Working Conditions Measured at Three Time Periods and Changes in Teachers' Sense of Success

| | Fall | Spring, in Person | Spring, Remote |
|---|---|---|---|
| | Panel A: Individual Working Conditions | | |
| Working Conditions | 1.237*** | 1.483*** | 2.250*** |
| | [6.33] | [10.46] | [18.44] |
| | Panel B: Peer-Average Working Conditions | | |
| Working Conditions | 1.070+ | 1.104* | 1.184*** |
| | [1.79] | [2.54] | [4.39] |
| n | 5,957 | 5,957 | 5,957 |
| Lagged Success Indicators (VAM) | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes |
| Lagged Working Conditions Indicators | No | No | No |

Notes: + p<.10, * p<.05, ** p<0.01, *** p<0.001. Each cell displays results from a separate ordered logistic regression of sense of success regressed on working conditions at each time period. Estimates are reported as proportional odds ratios. Robust standard errors are clustered at the school level and t-statistics are reported in brackets. Teachers' sense of success is measured by ordinal questions on the *Teacher Engagement* and *Teaching from Home* surveys. Working conditions are measured by a PCA on a series of questions regarding professional development, communication, recognition, collaboration, and professional expectations from the *Teacher Engagement* and *Teaching from Home* surveys. See Table 3 for a list of control variables.

Table A5. Correlation Matrix of Working Conditions Indicators

| | Fall Individual Working Conditions | Spring Individual Working Conditions, in Person | Spring Individual Working Conditions, Remote | Fall Peer-Average Working Conditions | Spring Peer-Average Working Conditions, in Person | Spring Peer-Average Working Conditions, Remote |
|---|---|---|---|---|---|---|
| Fall Individual Working Conditions | - | | | | | |
| Spring Individual Working Conditions, in Person | 0.640*** | - | | | | |
| Spring Individual Working Conditions, Remote | 0.475*** | 0.690*** | - | | | |
| Fall Peer-Average Working Conditions | 0.352*** | 0.340*** | 0.260*** | - | | |
| Spring Peer-Average Working Conditions, in Person | 0.339*** | 0.369*** | 0.305*** | 0.883*** | - | |
| Spring Peer-Average Working Conditions, Remote | 0.264*** | 0.312*** | 0.362*** | 0.681*** | 0.824*** | - |

Notes: *** p<.001. Estimates are Pearson correlation coefficients. Working conditions are measured by a PCA on a series of questions regarding professional development, communication, recognition, collaboration, and professional expectations from the *Teacher Engagement* and *Teaching From Home* surveys.