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Exceptional Circumstances: Changes in Teachers' Work Characteristics and Well-Being During COVID-19 Lockdown

Katharina J. E. Hilger[1, 2, 3], Susanne Scheibe[2], Anne C. Frenzel[3], and Melanie M. Keller[1]
[1] Department of Physics Education, IPN—Leibniz Institute for Science and Mathematics Education
[2] Department of Psychology, University of Groningen
[3] Department of Psychology, Ludwig Maximilian University of Munich

The COVID-19 pandemic extensively changed the work life of many employees. Teachers seemed particularly challenged, confronted with sudden remote teaching due to school closures. Drawing on the job demands–resources (JD-R) model, we investigated (a) changes in seven work characteristics (job demands: emotional demands, interpersonal conflict, workload; job resources: autonomy, social support, feedback, task variety) and three job-related well-being indicators (fatigue, psychosomatic complaints, job satisfaction), (b) how changes in work characteristics correlated with well-being, and (c) the impact of two individual difference factors (caretaking responsibilities, career stage). Data were collected in two waves (just prior to and a few months into the COVID-19 pandemic) across Germany from 207 teachers with an average work experience of 6 years (range: 1–36 years). Using latent change score (LCS) modeling, we found significant, small-to-medium-sized decreases over time for both job demands and resources as well as fatigue, with variability in the magnitude of changes. Decreases in job demands correlated with decreases in fatigue and psychosomatic complaints, whereas decreases in job resources correlated with decreases in job satisfaction. Teachers with caretaking responsibilities and more experienced teachers were more vulnerable to the crisis as they experienced a smaller or no decrease in job demands in concert with diminished job resources. These findings reveal the double-edged consequences of the COVID-19 pandemic for teachers' work life.

Impact and Implications
This study suggests to provide more resources and support to caregiving and less experienced teachers, as these two groups seemed to have been hit more severely during the COVID-19 pandemic-induced transition from in-class to remote teaching in terms of higher demands, lower resources, and lower well-being.

Keywords: job demands, job resources, well-being, COVID-19, teacher

When the World Health Organization (WHO, 2020) declared the emergence of the coronavirus disease (COVID-19) a worldwide pandemic in March 2020, many governments called a lockdown to slow down the spread of the virus, closing educational institutions and requesting employees to work from home. Imposing these measures changed the work life of many employees, likely influencing work characteristics such as job demands and job resources, and job-related well-being (Blustein et al., 2020; Kniffin et al., 2021; Restubog et al., 2020). An occupational group that was especially affected were teachers whose work mainly focuses on the direct interaction with students. Suddenly, they were expected to deliver high-quality teaching using video calls and to maintain good relations with their students remotely. Two groups of teachers may have faced an even bigger challenge. First, teachers with additional care responsibilities, having to supervise the homeschooling of their own kids, and second, less experienced early career teachers (so-called trainee teachers; Williams, 2020). Scholars, therefore, reasoned that the new work conditions of remote teaching would increase strain symptoms in teachers such as fatigue and psychosomatic complaints (Hodges et al., 2020; Kerres, 2020); yet, empirical evidence on the psychological and psychosomatic implications for teachers due to the sudden school closures is lacking to date.

Although there is some empirical evidence on the occupational health consequences of earlier pandemic crises for healthcare and frontline workers (Brooks et al., 2018; Lee et al., 2018), the scope of school closures in 2020 is unprecedented in modern history. Understanding how the COVID-19 pandemic affected teachers' work life is crucial. For modern societies, a continuous, well-functioning and high-quality educational system is imperative. Thus, the well-being of primary actors in it, teachers, is essential.

Katharina J. E. Hilger https://orcid.org/0000-0003-2366-1832
Susanne Scheibe https://orcid.org/0000-0003-1001-6199
Anne C. Frenzel https://orcid.org/0000-0002-9068-9926
Melanie M. Keller https://orcid.org/0000-0003-0877-9779

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Correspondence concerning this article should be addressed to Katharina J. E. Hilger, Department of Physics Education, IPN—Leibniz Institute for Science and Mathematics Education, Olshausenstraße 62, 24118 Kiel, Germany. Email: hilger@leibniz-ipn.de

Insights into how they experienced the sudden changes due to the lockdown is needed in order to be prepared to support teachers in subsequent waves of COVID-19 and possibly future pandemics as well as ensuing school closures in the future.

The central aim of the present study was hence to examine how work characteristics and job-related well-being changed for teachers due to school closures brought about by the COVID-19 pandemic. We investigated this question by building on the job demands–resources (JD-R) model, which proposes a dual process of job demands predicting job strain (health impairment process) and job resources predicting job engagement (motivational process; Bakker & Demerouti, 2007). Specifically, we examined two preregistered research questions[1]: First, how work characteristics (i.e., job demands and resources) changed for teachers when transitioning to remote teaching; and second, how changes in work characteristics related to changes in strain and engagement. We further explored potential differential impacts for teachers differing in caretaking responsibility and career stage. We report results from a two-wave survey study involving German school teachers conducted in January/February 2020 (teaching prior to the COVID-19 pandemic school closures) and May 2020 (teaching during the school closures due to the COVID-19 pandemic). The present study thereby provides much-needed evidence on teachers' psychosocial work conditions and well-being during the COVID-19 pandemic.

Changes in Work Characteristics

In mid-March 2020, German schools experienced a nationwide shutdown leading to teachers as well as their students moving from in-class settings to remote teaching. During this time, students were provided with learning materials either via online platforms, email, or mail. The frequency of interaction varied from school to school, depending on the availability and familiarity of teachers with Information and Communication Technology (ICT) for teaching purposes (König et al., 2020). Before the COVID-19 pandemic, the German school system was characterized by a rather low use of ICT and only very limited digital schooling. Schools seemed unable to integrate new digital technologies into usual teaching and learning routines and schools' infrastructure (Delcker & Ifenthaler, 2020). At the end of April 2020, German schools were partially opened again for graduating students and students of parents working in system-relevant professions, such as healthcare. However, the majority of teaching remained remote due to strict hygiene regulations. The reopening was subject to large regional and institutional variations as the organization of the education system is within the responsibility of the 16 German federal states.

Such a sudden introduction of novel technologies, a different work structure, or altered work contents changes the nature of work (Parker, 2014). In this sense, the switch to remote teaching due to the COVID-19 pandemic constituted a redesign of teachers' work. Such redesign in form of a new work environment may have an effect on prior work demands and resources. Some work demands may be reduced or even disappear, such as emotional demands to continuously regulate emotions in front of students (for a review, see Sutton et al., 2009) or dealing with student misbehavior (e.g., Aldrup et al., 2018). In contrast, other demands may rise, such as an increased workload due to the usage of unfamiliar or not widely accessible digital tools (König et al., 2020). Similarly, the switch to remote teaching due to the COVID-19 pandemic may change work resources. For example, collegial exchange providing social support and feedback may mainly be disabled due to the work from home. In contrast, teachers may experience increased work autonomy with regard to the flexibility in how and when to communicate with their students.

We investigated the subsequent seven work characteristics that describe aspects of work in terms of demands and resources, which have been further considered as particularly important predictors of job well-being (JD-R model; Bakker & Demerouti, 2007). Regarding demands, we investigated three work characteristics: emotional demands (the extent to which individuals have to invest emotional effort into their work; Grandey et al., 2013), interpersonal conflict (the extent to which individuals experience conflict at work), and workload (the extent to which individuals work high amounts, extensively long, and/or under time pressure; Spector & Jex, 1998). Regarding resources, we investigated four work characteristics: autonomy (the freedom of how work has to be performed), social support (the extent to which coworkers provide assistance), feedback from others (the extent to which other organizational members evaluate work performance), and task variety (the extent to which individuals perform different types of tasks at work; Humphrey et al., 2007).

Due to the unprecedented shift from in-class to remote teaching brought about by the COVID-19 related lockdowns and school closures, we expect significant changes in teachers' work characteristics. However, given the novelty of school closures in modern history, we can only speculate about the directionality of changes regarding work characteristics. Consequently, we refrained from specifying the direction of expected change, but posed:

> *Hypothesis 1:* Job demands (emotional demands, interpersonal conflict, workload) and job resources (job autonomy, social support, feedback, task variety) change from prepandemic time (first-quarter 2020) to the early month of the pandemic (May 2020).

Changes in Job-Related Well-Being and Relation to Work Characteristics

Work context characteristics, such as job tasks, roles, and work structures (summarized under the umbrella of "work design"), have a strong impact on workers' attitudes, behavior, and well-being (Grant & Parker, 2009). Depending on different effects on job-related well-being, work characteristics can be broken down into two categories: job demands and job resources (Demerouti et al., 2001). Work characteristics that require continuous physical, cognitive, or emotional effort constitute job demands and should therefore be associated with costs for well-being such as the experience of fatigue and psychosomatic complaints. There is consistent evidence that job demands are positively associated with fatigue and psychosomatic complaints (e.g., Chen et al., 2011; Santa Maria et al., 2018; Yin et al., 2016), and negatively with job satisfaction (e.g., Liu & Ramsey, 2008; Simbula, 2010). The chronic experience of such job demands has been further associated with exhaustion, potentially leading to additional physical and psychological health impairments (Bakker & Demerouti, 2007; Sonnentag & Frese, 2012). Some work

[1] The preregistration document is available online at https://aspredicted.org/blind.php?x=ua5wq3

characteristics have been deemed especially demanding due to their association with reduced well-being and health (Lim et al., 2008; Ritvanen et al., 2006; Spector & Jex, 1998), such as emotional work demands (Bakker & Demerouti, 2017), quantitative workload (Xie et al., 2008), and interpersonal conflict (e.g., Bruk-Lee & Spector, 2006; Volmer et al., 2012).

In contrast, work characteristics that motivate and engage employees are referred to as job resources, and should thus benefit well-being for example in form of increased job satisfaction. Such job resources also buffer the negative effect of job demands, reduce their impact, and hence enhance well-being (Bakker, 2011). The absence of job resources is linked to disengagement (Bakker et al., 2005). Job resources including autonomy, social support from supervisor and colleagues, feedback, and task variety have been positively related to mental and physical health (see De Lange et al., 2004; Hakanen et al., 2007; Landsbergis et al., 2001; Xie et al., 2008) as well as to job satisfaction (e.g., Bakker & Demerouti, 2007; Humphrey et al., 2007).

The JD-R model proposes a dual process, including a health impairment process where job demands predict job strain and thus reduced well-being, and a motivational process where job resources predict job engagement and thus enhanced well-being (Bakker & Demerouti, 2007). Thus, we expect that to the extent that teachers' job demands increase during the COVID-19 school closures, they will experience a concurrent decrease in job-related well-being. Similarly, we expect that as teachers' job resources decrease, a concurrent decrease in job-related well-being will occur. In keeping with earlier studies, we considered three standard indicators of job-related well-being: job satisfaction (the positive evaluation of one's work based on past experiences; Spector, 1997) indicating positive well-being, and fatigue (the experience of cognitive, affective, and physical exhaustion after a day of work; Frone & Tidwell, 2015) as well as psychosomatic complaints (physical manifestations of experienced strain; Fahrenberg, 1994) indicating negative well-being. In line with prior findings, we hypothesized the following for teachers transitioning from in-class teaching to the COVID-19 implied remote teaching:

> *Hypothesis 2:* Changes in job demands due to remote teaching, including emotional job demands, interpersonal conflict, and workload, are negatively related to changes in job satisfaction, and positively related to changes in fatigue and psychosomatic complaints.

> *Hypothesis 3:* Changes in job resources, including autonomy, social support, feedback, and task variety, are positively related to changes in job satisfaction, and negatively related to changes in fatigue and psychosomatic complaints.

Potential Differential Impact Due to Care Responsibilities and Career Stage

The closure of schools, childcare and elderly care facilities put an additional load on teachers with caretaking responsibilities. This group had to coordinate their obligations as caregiver to elderly or small children and as home instructor to school-aged children within their own families, on top of managing the new work situation of providing remote teaching to their students. The school closures due to the COVID-19 pandemic may therefore have led to an unfavorable shift of work characteristics (e.g., higher increases in job demands and higher reductions in job resources) for teachers with caretaking responsibilities compared to teachers without such responsibilities. Although evidence is lacking on work and family dynamics during pandemic-related lockdowns, it is reasonable to expect increased time-based conflict (time spent on one area decreases time left for another), strain-based conflict (strain experienced in one area spills over to the other area), as well as energy-based conflict (fatigue resulting from experiences in one area impacts performance in the other area; Rudolph et al., 2020) for those with caretaking responsibilities. For instance, time-based, strain-based, and energy-based conflicts may have made the work more demanding for teachers with caretaking responsibilities (i.e., establishing new work routines in less time) which could restrict the access to job resources even further (e.g., less autonomy about when to perform work tasks). In addition, work-to-family conflict (i.e., work interfering with family) and family-to-work conflict (i.e., family interfering with work) may have impacted well-being negatively (Nohe et al., 2015).

On the other hand, teachers with caretaking roles may also experience work–family enrichment rather than conflict, where positive experiences in one role spill over to the other role (Greenhaus & Powell, 2006). Possibly, teachers with caretaking responsibilities may be able to compensate for the lack of social contact and the more distanced relationship with students by the increased time spent with household members. McNall et al. (2010) meta-analysis showed that such work–family enrichment is further associated with increased job satisfaction as well as physical and mental well-being. One could, therefore, also speculate that teachers with caretaking responsibilities experience less dramatic changes in their work characteristics and job-related well-being after shifting to remote teaching.

Moreover, the transition to remote teaching may have had a differential impact depending on the respective career stage and hence work experience a teacher possesses. Trainee teachers in Germany have just begun their practical teacher education, a so-called teacher traineeship (Referendariat) which begins after university and lasts for 12–18 months depending on federal state-specific regulations. During this phase, trainee teachers gradually start to teach at a school, regularly attend seminars, and are mentored by more experienced teachers. Trainee teachers teach a steadily increasing number of lessons and receive regular feedback on and evaluations of lessons they teach. As such, these trainee teachers normally receive extensive supervision and structure to gradually prepare them to assume full teaching responsibilities. Such supervision may have no longer been provided during school closures. On the one hand, this may imply that trainee teachers experience a more pronounced change in job demands and resources compared to their more experienced colleagues. Hence, they may be overwhelmed by the sudden disappearance of such guidance: Trainee teachers are rather new to teaching, presumably barely have established teaching routines, and now have to cope with teaching and learning to teach under very unusual circumstances. On the other hand, given the impossibility to sustain their supervision, trainee teachers may have been relieved from many of their tasks during the lockdown. Additionally, they may experience less change in job demands given their potentially stronger digital skills (Kerres, 2020).

Overall, we deemed it meaningful to consider the personal characteristics of care responsibilities (present vs. absent) and career stage (trainee teachers vs. full-service teachers) in our analyses concerning the changes in perceived job demands and resources as well as job-related well-being indicators. Given the lack of any prior empirical data, and the fact that those factors could conceptually meaningfully be considered as either aggravating or alleviating, these analyses were added as exploratory.

Method

Participants and Procedure

The present study was part of a larger longitudinal research project investigating teachers' emotional development. The study started with a baseline questionnaire assessing variables pertaining to emotional competencies, personality, and job motivation, followed by quarterly surveys on work characteristics and well-being retrospectively for the past 4 weeks, and quarterly 10-day measurement bursts with daily diaries about affective work events and emotion regulation use (measurement burst design, see, e.g., Sliwinski, 2008). The baseline questionnaire was administered in January 2020 prior to the quarterly surveys. The quarterly surveys, which contained the variables of interest for the present report, were collected twice, once prior (January/February 2020) and once during school lockdown caused by the COVID-19 pandemic (May 2020). The present study focuses on the results of those two quarterly surveys.

Participants were recruited by approaching all listed schools for primary, secondary, special needs, and vocational education from four German area states (Schleswig-Holstein, Lower Saxony, Baden-Wurttemberg, North-Rhine Westphalia) and one city-state (Bremen). These states were selected to represent less and more populous states, different regions within Germany, as well as the proportion of rural and urban regions.

In January/February 2020 (Time 1; in-class teaching prior to the COVID-19 pandemic), 380 teachers participated in the baseline questionnaire, of which 316 completed the first quarterly survey. In May 2020 (Time 2; remote teaching during country-wide school closures due to the COVID-19 pandemic), 208 teachers completed the second quarterly survey (response rate of 57%). One person did not provide sufficient data on the second quarterly survey (>80% missingness) and was therefore excluded from analyses. We analyzed Time 1 differences in demographics and investigated variables (i.e., job demands and resources, well-being) between the group that completed Time 2 measures and the group that dropped out; yet, we could not find any systematic differences between the two groups except that trainee teachers were significantly more likely to drop out for Time 2 than experienced teachers. For the following analyses, participants who only completed one quarterly measurement were excluded. A post hoc power analysis (using the pwrSEM-App developed by Wang & Rhemtulla, 2021, for power analysis in structural equation models) was conducted with an α of .05 for detecting latent changes and correlations of latent changes for the repeated measure T1–T2. We investigated power for the model with the smallest latent change to get a realistic estimate of power and to rule out overestimation. The analysis revealed that our sample size of 207 teachers is adequate to detect changes in work characteristics and well-being from T1 to T2 as we obtained a power of 1. For detecting correlations in latent changes, the post hoc power analysis yielded a power of .59.

The final sample consisted of 207 German teachers (85% female, 14% male, 1% diverse) from different school tracks (primary school 32.9%, lower and medium-track secondary school 13.1%, high-track secondary school 24.6%, special-needs school 13%, and other secondary school 16.4%), ranging in age from 24 to 66 years (M_{age} = 34.05, SD = 9.30). Our sample is largely comparable in terms of demographic characteristics and regional spread to the German teacher population (Statistisches Bundesamt, 2020a, 2020b). At T1 and T2, roughly two-thirds of teachers had completed their formal teacher education and worked either full time (66.7%) or part time (2.4%); the remaining one-third of the teachers were trainee teachers (30.9%). The duration of employment ranged from 1 to 36 years, with an average of 6.29 years of work experience as a teacher (SD = 6.90). Besides their teaching job responsibilities, 30.5% of the teachers indicated to have additional caretaking obligations (only assessed at T2) either due to childcare (74.1%), eldercare (20.7%), or both (5.2%). Study procedures were approved by the Ethical Committee at the first author's institution.

Measures

All items were derived from validated German translations of established scales. Measures were completed in the order shown below at both time points. The specific items[2] used and internal consistencies of the scales at T1 and T2 can be found in Appendix A.

Job Demands and Resources

Participants indicated the magnitude of seven work characteristics via multiple-item measures retrospectively for the past 4 weeks. In terms of job demands, we measured *emotional work demands* with the Copenhagen Psychosocial Questionnaire (Nübling et al., 2005) using three items of the emotional work demands subscale, *workload* with three items from the Quantitative Workload Inventory (Spector & Jex, 1998), and *interpersonal conflict* using three items from the Interpersonal Conflict at Work Scale (Spector & Jex, 1998). In terms of job resources, we assessed *autonomy* with three items, *social support* with two items, and *feedback from others* with three items, and *task variety* with two items from the Work Demands Questionnaire (Stegmann et al., 2010). All items were rated on a 7-point Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). During our psychometric analysis, we had to remove one item for social support, two items for task variety, and one item for conflict due to poor psychometric properties (see Appendix A).

Job-Related Well-Being

Fatigue was assessed with three items from the Three-Dimensional Work Fatigue Inventory (Frone & Tidwell, 2015), capturing physical, cognitive, and emotional fatigue. To reduce participant burden, we selected the item with the highest factor loading per subscale from the original 18-item scale. Items were rated on a 7-point Likert scale ranging from 1 (*not at all*) to 7

[2] The final set of items used for analyses was obtained iteratively to make sure that all items held up to the requirements of measurement invariance across time points. For more details, see Appendix Table A1.

(*extremely*). During our psychometric analysis, the physical fatigue item was removed from the scale due to poor psychometric properties (see Appendix A).

Psychosomatic complaints were assessed using five items from the Freiburg Bodily Complaints Inventory (FBL; Fahrenberg, 1994), assessing the frequency with which pain is experienced in different parts of the body (headache/migraine, back pain, cervical pain, gastric problems, physical tension) on a 7-point Likert scale with indicators from 1 (*never*) to 7 (*always*).

Job satisfaction was assessed using three items pertaining to the satisfaction with the job, the employer, and work tasks (Rafferty & Griffin, 2006). Items were adapted to be used within the educational work context and rated on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*extremely*). During our psychometric analysis, the satisfaction with work item was removed from the scale due to poor psychometric properties (see Appendix A).

Caretaking was assessed with a single self-generated multiple choice question. It asked whether teachers had to take care of either children, care-dependent people, or both. In our analyses, we dichotomized caretaking (0 = no caretaking, 1 = caretaking).

Latent Change Score Models

To examine Hypothesis 1 (that teachers' work characteristics changed during lockdown), we estimated univariate latent change score (LCS) models (see Kievit et al., 2018) for all work characteristics using MPlus 8 (Muthén & Muthén, 1998–2020). For descriptive purposes, we also estimated change scores for the three job-related well-being indicators. We created latent change scores with loadings fixed to 1 as well as means and variances fixed to 0. Residuals were allowed to vary across occasions. Change effects were computed by regressing change scores on T1 scores (see Figure 1). At a second stage, we added caretaking responsibilities including child and/or eldercare (coded 0 for no caretaking responsibilities and 1 for caretaking responsibilities), and career stage (coded 0 for trainee teachers and 1 for full-service teachers) as predictors to the models; latent change scores were regressed on each predictor in separate models.

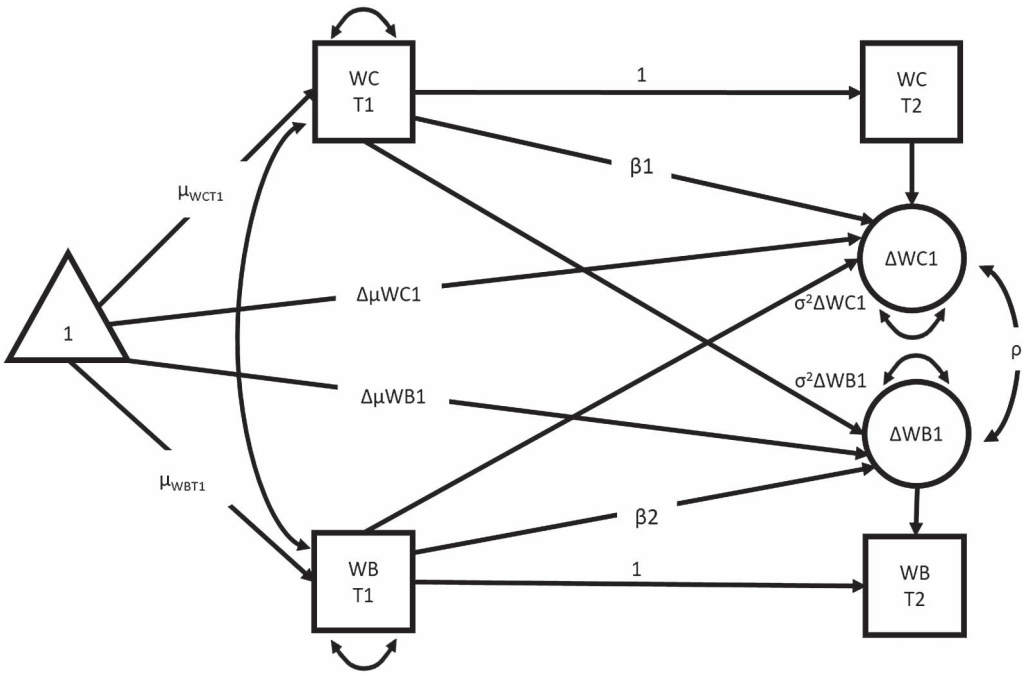
To examine Hypotheses 2 and 3 which stated that changes in work characteristics would be correlated with changes in well-being, we estimated bivariate LCS models for each work-characteristic/well-being link. Due to deviations from normality of some variables, we estimated all models using the maximum likelihood parameter estimate with robust standard errors (MLR).

Finally, to explore any potential effects of the caregiving status and career stage on latent change in work demands and resources and well-being indicators, we added the personal characteristics as predictors of the latent T2–T1 change. Separate models were run for care responsibilities and career stage, respectively. All models were saturated and hence showed perfect fit.

Results

A table including intercorrelations among all manifest study variables is provided in Appendix B. All work characteristics except for autonomy, and the three job-related well-being indicators,

Figure 1
Latent Change Score Model



Note. Job-related well-being (WB) and work characteristics (WC) were measured at two time points T1 and T2. Change (ΔWB1 and ΔWC1) between the two time points is modeled as latent variable. Average change between T1 and T2 is captured by the mean of the latent change score factors ΔμWB1 and ΔμWC1. Estimates of correlated change are marked as ρ.

showed moderate to high positive correlations between the first and second measurement points (Table B1).

Changes in Work Characteristics and Job-Related Well-Being

We expected significant changes in teachers' work characteristics and explored the directionality of changes in the present study. In fact, all seven work characteristics decreased significantly from T1 to T2, as indicated by significant and negative average changes $\Delta\mu$ (see Table 1). Thus, during COVID-19 school closures, teachers experienced lower job demands but also lower job resources as compared to the time prior to school closures. Further, only fatigue decreased significantly, whereas psychosomatic complaints and job satisfaction did not. At the same time, there was considerable variability in all latent change scores, indicating heterogeneity in change across teachers (see Figure 2).

Relating Changes in Work Characteristics to Changes in Job-Related Well-Being

In line with the JD-R model, we had expected systematic links between change in job demands and resources and change in job-related well-being (Hypotheses 2 and 3). Indeed, we found changes in all three job demands from T1 to T2 to be positively related to changes in fatigue (emotional demands: $\beta = .64$, $p < .01$; interpersonal conflict: $\beta = .30$, $p < .01$; workload: $\beta = .55$, $p < .01$) and psychosomatic complaints (emotional demands: $\beta = .37$, $p < .01$; interpersonal conflict: $\beta = .29$, $p < .01$; workload: $\beta = .43$, $p < .01$). Hence, as job demands decreased, so did strain. However, and contrary to Hypothesis 2, changes in job demands were unrelated to changes in job satisfaction (see Table 2).

Regarding the coupling of job resources with well-being, results were more mixed (see Table 2). In line with expectations, changes in two job resources were positively related to changes in job satisfaction, that is job satisfaction decreased with decreasing social support ($\beta = .29$, $p < .01$) and decreasing feedback ($\beta = .28$, $p < .01$). Yet, no such coupling of changes was found for autonomy and task variety. Unexpectedly, change in task variety was positively related to changes in fatigue ($\beta = .22$, $p < .01$) and psychosomatic complaints ($\beta = .14$, $p < .05$), suggesting that reduced task variety was related to reduced strain. Yet, changes in autonomy, social support, and feedback were unrelated to fatigue and psychosomatic complaints (see Table 2).

Changes as a Function of Caretaking Responsibilities

We found a significant positive effect of caretaking responsibilities on change of all three job demands (emotional demands: $\beta = .19$, $p < .01$; interpersonal conflict: $\beta = .15$, $p < .01$; workload: $\beta = .22$, $p < .01$; see Table 3 and Figure 3). Thus, teachers with caretaking responsibilities faced more pronounced changes compared to their colleagues without caretaking demands. Subsequent group comparisons revealed that teachers without caretaking responsibilities experienced significant decreases in emotional demands ($b = -1.24$, $p < .01$) and workload ($b = -.98$, $p < .01$), whereas teachers with caretaking responsibilities did not (emotional demands: $b = -.37$, $p = .06$; workload: $b = -.09$, $p = .65$). Further, caretakers experienced significantly smaller decreases in interpersonal conflict ($b = -.29$, $p < .01$) than noncaretakers ($b = -.54$, $p < .01$). Regarding change in job resources, caretaking responsibilities had no effect on change.

Further, we found no effect of caretaking on change of the two negative well-being indicators, fatigue and psychosomatic complaints, but a significant negative effect of caretaking on change in job satisfaction ($\beta = -.16$, $p < .05$). Subsequent group comparisons revealed that only caretakers experienced significantly reduced job satisfaction ($b = -.37$, $p < .01$), whereas job satisfaction did not change for teachers without caretaking responsibilities ($b = .03$, $p = .74$).

Overall, these models suggest that while job demands and resources generally decreased for all teachers, the decreases in job demands were less pronounced for teachers with caretaking responsibilities. Moreover, only teachers with caretaking responsibilities experienced a significant drop in job satisfaction in response to the school closures.

Changes as a Function of Career Stage

We found a significant positive effect of career stage on the change in all three work demands (emotional demands: $\beta = .21$, $p < .01$; interpersonal conflict: $\beta = .14$, $p < .01$; workload: $\beta = .15$,

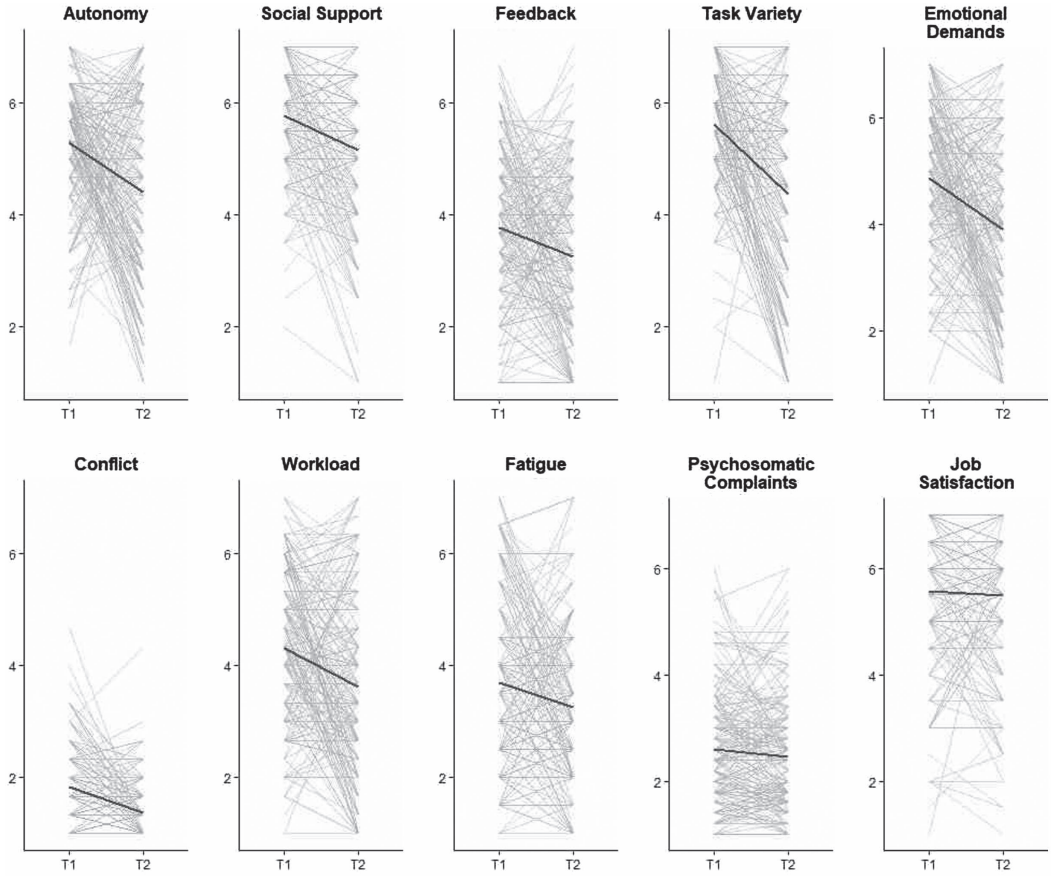
Table 1
Average Change From T1 to T2 for Work Characteristics and Job-Related Well-Being

Variable	Change			T1		T2	
	$\Delta\mu$	*SE*	95% CI	*M*	*SD*	*M*	*SD*
1. Autonomy	−.87**	0.14	[−1.14, −.59]	5.279	1.07	4.407	1.60
2. Social support	−.64**	0.09	[−.82, −.46]	5.771	0.99	5.145	1.26
3. Feedback	−.51**	0.12	[−.75, −.28]	3.773	1.31	3.261	1.47
4. Task variety	−1.25**	0.13	[−1.51, −.99]	5.611	1.06	4.357	1.75
5. Emotional demands	−.97**	0.13	[−1.23, −.72]	4.863	1.35	3.894	1.63
6. Interpersonal conflict	−.47**	0.05	[−.57, −.37]	1.836	0.68	1.370	0.48
7. Workload	−.70**	0.12	[−.94, −.47]	4.314	1.34	3.614	1.62
8. Fatigue	−.46**	0.12	[−.69, −.23]	3.705	1.51	3.246	1.41
9. Psychosomatic complaints	−.14	0.07	[−.28, −.00]	2.605	1.07	2.469	1.08
10. Job satisfaction	−.09	0.08	[−.25, −.07]	5.575	1.24	5.481	1.27

Note. Variables are measured at two time points (T1 and T2). Change between the two time points is modeled as latent variable. $\Delta\mu$ captures the mean of the latent change factor.
* $p < .05$. ** $p < .01$.

Figure 2

Individual and Average Changes From T1 to T2 in Work Characteristics and Job-Related Well-Being



Note. All scales were measured on a 7-point Likert scale. The bold line denotes the average change from T1 to T2 across teachers; each gray line represents one teacher.

$p < .05$). Subsequent group comparisons revealed that the decreases in work demands were smaller for full-service teachers compared to trainee teachers (see Table 3 and Figure 4). Further, career stage had a positive effect on change in the job resource feedback ($\beta = .19$, $p < .01$). Subsequent group comparisons revealed that the decrease in feedback was smaller for full-service teachers ($b = -.30$, $p < .05$) compared to trainee teachers ($b = -.99$, $p < .01$). Career stage was unrelated to changes in the other job resources and in any of the job-related well-being indicators.

Discussion

There are always two sides to a coin—even in a worldwide pandemic caused by the COVID-19 virus. Work characteristics

Table 2

Correlated Change for Work Characteristics and Job-Related Well-Being

	Fatigue			Psychosomatic complaints			Job satisfaction		
Variable	β	*SE*	95% CI	β	*SE*	95% CI	β	*SE*	95% CI
1. Autonomy	−.12	0.07	[−.26, .02]	−.06	0.07	[−.20, .08]	.04	0.07	[−.10, .18]
2. Social support	−.07	0.07	[−.21, .06]	−.05	0.07	[−.19, .09]	.29**	0.06	[.17, .41]
3. Feedback	.07	0.07	[−.07, .21]	.05	0.07	[−.09, .19]	.28**	0.06	[.16, .40]
4. Task variety	.22**	0.07	[.08, .36]	.14*	0.07	[.00, .28]	.00	0.07	[−.14, .14]
5. Emotional demands	.64**	0.04	[.56, .72]	.37**	0.06	[.25, .49]	.04	0.07	[−.10, .18]
6. Interpersonal conflict	.30**	0.06	[.18, .42]	.29**	0.06	[.17, .41]	−.12	0.07	[−.26, .02]
7. Workload	.55**	0.05	[.45, .65]	.43**	0.06	[.31, .55]	.01	0.07	[−.13, .15]

Note. Variables are measured at two time points (T1 and T2). β reflects the estimate of correlated change, the degree to which changes in the two variables co-occur.

* $p < .05$. ** $p < .01$.

Table 3

Estimates for the Proportional Relations of Change in Work Characteristics and Job-Related Well-Being, With Caretaking and Career Stage

Variable	Caretaking[a]			Career stage[b]		
	β	*SE*	95% CI	β	*SE*	95% CI
1. Autonomy	−.10	0.06	[−.22, .02]	.00	0.06	[−.12, .12]
2. Social support	−.08	0.07	[−.22, .06]	.07	0.07	[−.07, .21]
3. Feedback	−.09	0.06	[−.21, .03]	.19**	0.06	[.07, .31]
4. Task variety	.11	0.07	[−.03, .25]	.10	0.06	[−.02, .22]
5. Emotional demands	.19**	0.06	[.07, .31]	.21**	0.06	[.09, .33]
6. Interpersonal conflict	.15**	0.04	[.07, .23]	.14**	0.04	[.06, .22]
7. Workload	.22**	0.06	[.10, .34]	.15*	0.06	[.03, .27]
8. Fatigue	.07	0.06	[−.05, .19]	.04	0.05	[−.06, .14]
9. Psychosomatic complaints	.12	0.06	[.00, .24]	.08	0.06	[−.04, .20]
10. Job satisfaction	−.16*	0.07	[−.30, −.02]	−.01	0.06	[−.11, .13]

Note. Variables are measured at two time points (T1 and T2). Change between the two time points is modeled as latent variable. The estimate of proportional change, the extent to which change is dependent on T1 values, is captured by β.

[a] Caretaking was coded as 0 = no caretaking and 1 = caretaking. [b] Career stage was coded as 0 = trainee teachers and 1 = full-service teachers.

* $p < .05$. ** $p < .01$.

changed dramatically for many employees and especially teachers faced a new challenge. They were confronted with a sudden shift to remote teaching while bearing lagging digitalization in education (Kerres, 2020), difficult-to-reach students, concerned parents, and frequent changes in requirements from principals and the government. Nevertheless, many teachers strived to continue delivering high-quality education. This sounds like an overwhelming burden—however, our results show a more nuanced picture.

Drawing on the JD-R model, we investigated how the German nationwide shutdown due to the COVID-19 pandemic, including

Figure 3

Change in Work Characteristics and Job-Related Well-Being for Teachers With and Without Caretaking Responsibilities

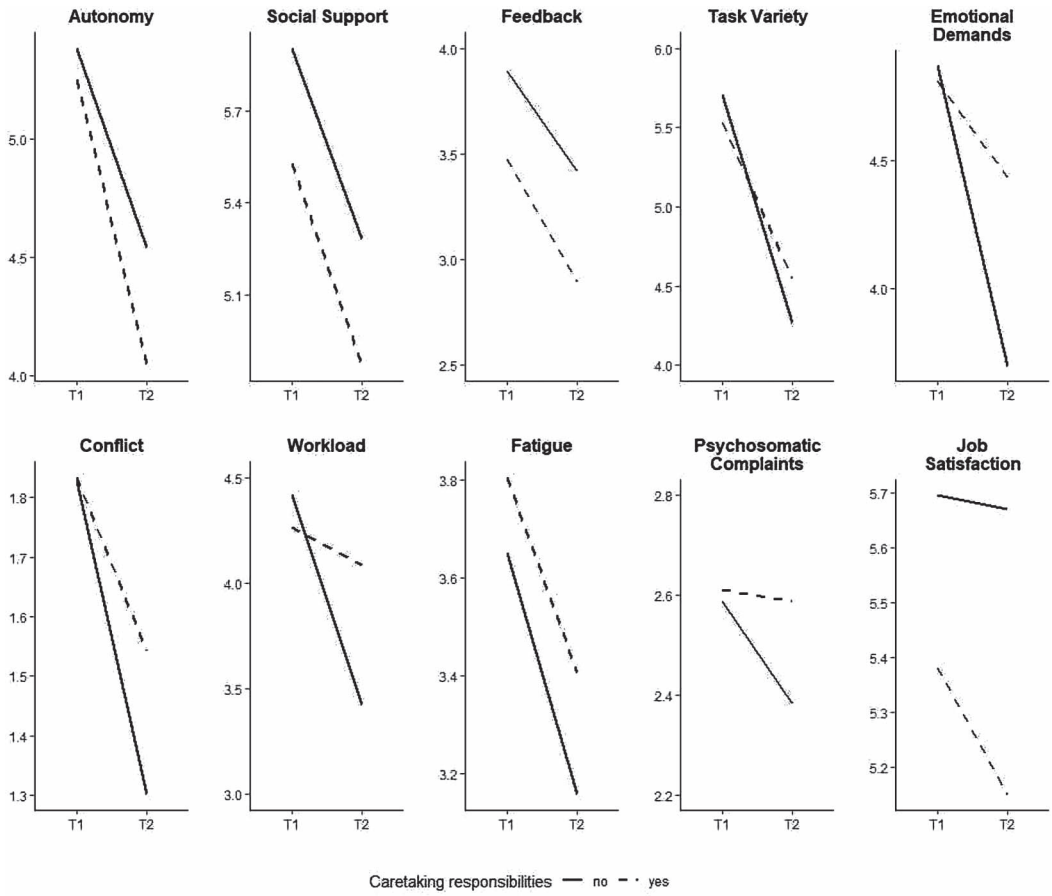
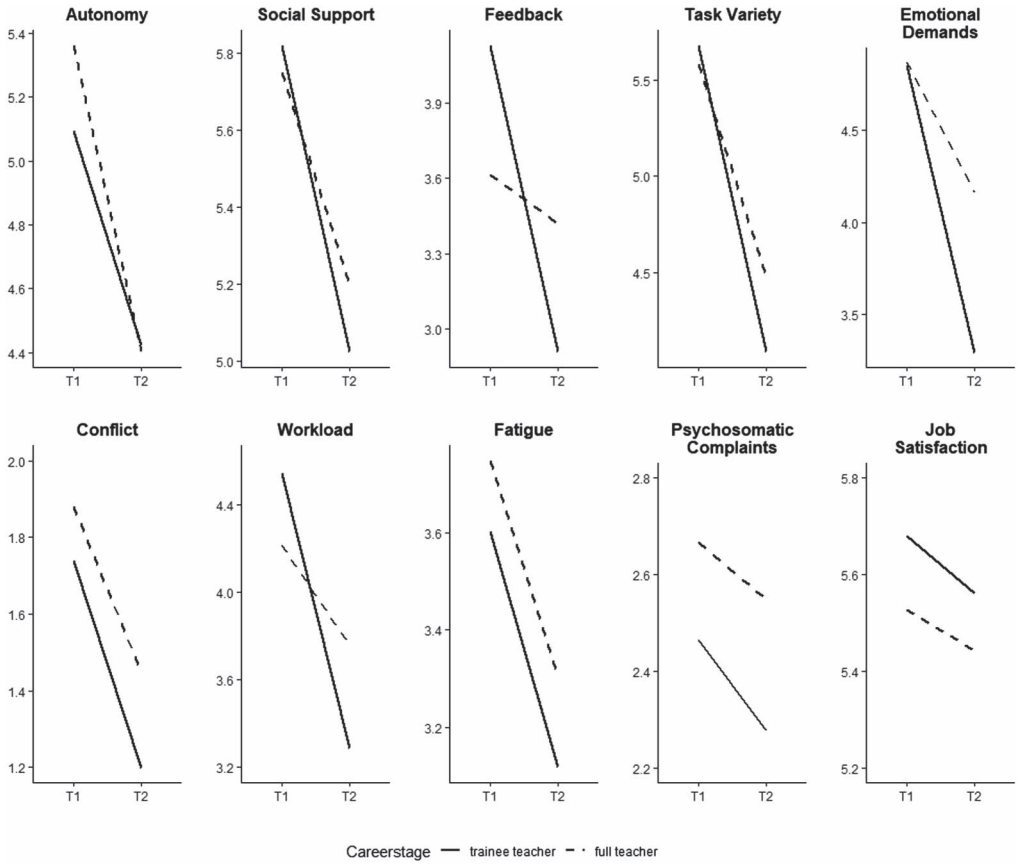


Figure 4

Change in Work Characteristics for Teachers at Different Career Stages



school closures, led to a redesign of teachers' work and, by extension, affected their job-related well-being. The first major finding of our study was that both job demands (emotional demands, interpersonal conflict, and workload) and job resources (autonomy, social support, feedback, and task variety) decreased from the time prior to the time during the COVID-19-related school closures. Further, we found concurrent changes in job-related well-being in terms of decreased fatigue. However, no overall changes were found for psychosomatic complaints and job satisfaction. Thus, although the closure of schools reduced teachers' access to job resources, it also seemed to reduce the demanding aspects of the teaching job. These findings highlight the double-edged nature of the teaching profession (Neves de Jesus & Lens, 2005): On the one hand, frequent and direct interaction with students constitutes a major motivator and source of job satisfaction for many teachers (Benita et al., 2019; Watt et al., 2012), whereas on the other hand, this interpersonal and social nature of the teaching job can also represent a major job demand relating to poor well-being outcomes (Johnson et al., 2005). As such, our results imply that the transition to remote teaching constituted both a relief and a strain for teachers—yet, it remains to be seen what will prevail in the longer term if school closures persist or return.

A second major finding was that teachers with caretaking responsibilities did not benefit from the decrease in emotional demands and workload that their colleagues without caretaking reported. Consequently, only teachers with caretaking responsibility reported reduced job satisfaction. For those caretaker teachers, private responsibilities may have spilled over into the work domain, resulting in more pronounced decreases in job satisfaction compared to teachers without these additional caretaking responsibilities. Thus, we could not find evidence of work–family enrichment but rather work–family conflict. Meta-analytic longitudinal studies showed that family-to-work conflict (i.e., family interfering with work) is linked to lower well-being over time (Nohe et al., 2015). Our results show that these results also hold in times of crisis. They thereby add to the scarce literature on work and family dynamics during crisis situations (Eby et al., 2016). The long-term consequences for teachers with caretaking responsibilities may entail withdrawal from work, reduced motivation, and increased psychosomatic complaints. As a practical implication, it therefore seems essential that schools provide teachers with caretaking responsibilities, especially, with access to job resources and offer additional support. Specifically, teachers with caretaking responsibilities could be provided with more freedom and flexibility in scheduling their work tasks.

Upon consideration of career stage, we could show that trainee teachers experienced a more pronounced decrease in all job demands, but also in the job resource feedback, compared to full-service teachers. Thus, trainee teachers may indeed have had reduced access to extensive supervision and guidance during the COVID-19 school closure, but had also been relieved from a range

of tasks and challenges that emerged due to the COVID-19 crisis at German schools. In contrast, the more experienced full-service teachers were required to continue delivering high-quality teaching and may have been more affected by the hassles associated with remote teaching, such as students who were unable to access remote lessons. However, these findings have to be interpreted with caution as we found that trainee teachers were more likely than senior teachers to drop out for the assessment at T2 during the COVID-19 implemented measures. Hence, we cannot rule out that those trainee teachers who were more burdened by the new demand of remote teaching, were underrepresented in the sample, and we thus may have underestimated the impact of the shift to remote teaching on trainee teachers. The trainee teachers retained in our sample may have had more experience, and better skills, in working with digital tools (see Inan & Lowther, 2010), which suddenly gained so much relevance when teaching was moved from the classroom to digital environments due to the COVID-19 crisis. Even though we have no data on digital skills of the teachers in our samples, König et al.'s (2020) findings showed that teachers with more advanced ICT skills were better able to handle the sudden remote teaching demands. We, therefore, suggest to offer assistance and regular workshops on handling digital tools for teachers at all career levels. Further, we suggest to schedule regular online meetings between trainee teachers and their supervisors as well as building networks and exchange platforms to ensure that supervision and guidance are met, even in times of remote teaching.

Another notable finding of the present study was that job demands and job resources differentially impacted well-being: Whereas changes in job demands—but not job resources—were related to negative well-being (fatigue and psychosomatic complaints), changes in job resources—but not job demands—were associated with changes in positive indicators of well-being (job satisfaction). This double dissociation into demands-strain and resources-satisfaction relations is consistent with theoretical (but inconsistently supported) propositions made within the JD-R model of two psychologically different pathways: a strain pathway (from job demands to strain) and an engagement pathway (from job resources to job satisfaction; see Bakker & Demerouti, 2007). Our results hence show that this theoretically proposed mechanism does apply even in times of crisis. In terms of practical implications, it seems advisable that the management in schools supports teachers in ensuring that work resources are met, to maintain teacher job satisfaction during times of remote teaching, such as in times of lockdown due to the COVID-19 pandemic. For example, regular exchange via digital media about remote teaching with colleagues enabling sharing of experiences and best practices could enhance the experience of social support and could provide valuable feedback for all teachers.

Yet, we also observed peculiarities: changes in autonomy were found to be neither related to changes in job satisfaction (as did, with the exception of task variety, the other job resources), nor to changes in fatigue and psychosomatic complaints. A second peculiarity concerned task variety: Its decrease over time did not relate to a similar decrease in job satisfaction, but instead related to a decrease in fatigue and psychosomatic complaints. These peculiarities may be explained by the special circumstances brought about for work life due to the COVID-19 crisis: The newly gained task variety and autonomy through remote teaching may for some have constituted truly more freedom in organizing their workday, and inspiring new ways to approach teaching. Yet for others, this may have been experienced as an overwhelming burden, specifically as they lacked guidance on how to actually handle the new digital tools, and to design and produce digital and asynchronous learning opportunities. This may explain why no clear relationship to the well-being indicators emerged.

Limitations and Future Directions

In this study, we focused on seven commonly assessed work characteristics, yet, it might have been worth considering other work characteristics that are more specifically related to the teaching profession, such as student misbehavior which has been shown as a predictor of teacher strain (e.g., Chang & Taxer, 2020). Moreover, as the present study was not originally designed to test the impact of COVID-19, we may not have captured all of the work characteristics most relevant to describing the COVID-induced shift in teachers' work environment. Future research may focus on investigating teacher-specific work characteristics relevant to different modes of teaching, such as the amount and quality of direct interaction with students and the ease with which students are able to access online content.

Second, while our longitudinal two-wave study design was well suited to establish change and correlated change, it still could not establish the causality of relationships. It is possible that a change in job-related well-being caused a subsequent change in work characteristics (for a review, see Sonnentag, 2015). Moreover, more than two waves are needed to assess nonlinear change (e.g., an initial drop in job resources but subsequent recovery to precrisis levels) and disentangle short-term and long-term effects of remote teaching. We speculate that the initial drop in job demands, observed at the outset of the crisis, may sooner or later turn into increased demands when remote teaching had to be continued for longer periods of the school year. Investigating this question with additional longitudinal studies may be an important endeavor for future research, also to rule out that our results were obtained due to naturally occurring variation in demands and resources related to the requirements associated with the respective time in the school year.

Third, the data for the present study were collected online from teachers within Germany. Thus, even though there was variety in the distributions of age, gender, location, and school type, findings may not generalize to teachers outside Germany. Specifically, our findings regarding career stage may be different for countries with different teacher education systems. Also, digitalization in education, both in hardware as well as skill and experience on the teachers' and students' side, may be different in other countries, as could be the specific lockdown measures enacted by the German federal and state governments. It would, therefore, be important to see how the investigated relations of changes in work characteristics and job-related well-being played out during the COVID-19 crisis in other countries.

Fourth, the post hoc calculated power of .59 for our sample of 207 teachers to detect correlations in latent changes was rather small. Thus, we may not have been able to detect small effects.

Conclusion

Our study provides unique insights into changes in German teachers' work characteristics and relations to changes in well-being prior to and during early stages of the pandemic-induced

school closures. Study findings revealed that both job demands and job resources decreased over time. Moreover, the decrease in job demands related to a decrease in strain, whereas the decrease in resources related to a decrease in job satisfaction. In particular, teachers with caretaking responsibilities seemed to have been hit more severely by the crisis: These teachers experienced reduced job resources just like their colleagues without caretaking responsibilities, yet weaker or no decreases in job demands and significantly decreased job satisfaction.

Overall, the study findings highlight the demands teachers faced in the COVID-19 crisis in Germany and the importance of providing job resources to maintain well-being. According to our findings and in order to ensure happy and healthy employees, it is essential to focus on both processes: Increasing individual work resources and reducing work demands—even more so in times of a worldwide pandemic.

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Appendix A

Original and Adapted Scales, Item Wordings and Internal Consistencies Across Measurement Points

The aim of the present study was to explore changes in teachers' work characteristics and relate changes in work characteristics to changes in job-related well-being. Although we used preexisting and validated measures for work characteristics and well-being, we prioritized measurement invariance in analyzing change.

As a preliminary step to testing our research questions and hypotheses, we sought to establish measurement invariance of all variables across Time 1 (T1) and Time 2 (T2) to ensure that participants interpreted the measures used for each construct in a similar way at T1 and T2. We followed a step-wise approach, testing for configural measurement invariance first, followed by metric measurement invariance (equal factor loadings) and then additionally constraining item intercepts for equality over time (scalar invariance). As recommend by Bialosiewicz et al. (2013), we concluded that measurement invariance could be assumed as long as the increasingly restricted models remained sufficiently well-fitting according to the standard criteria compararative fit index (CFI)/Tucker–Lewis index (TLI) > .90 (Hu & Bentler, 1999) and root mean square error of approximation (RMSEA, <.08 (Browne & Cudeck, 1992) in addition to chi-square test statistics.

Each of our models for the respective job characteristics and well-being indicators produced satisfactory fit when assuming metric invariance. However, scalar invariance could only be achieved after dropping items for the constructs interpersonal conflict, social support, task variety, fatigue, and work satisfaction. We, therefore, proceeded to the analyses with those adjusted scales. The adapted scales produced acceptable internal consistencies at both time points. The retained items and internal consistencies for the original and adapted scales at T1 and T2 are depicted in Table A1.

Table A1

Scales, Item Wordings, Retained Items and Internal Consistencies for T1 and T2

			Original scale			Adapted scale	
			Coefficient Omega			Coefficient Omega	
Scale	Label	Item wording	T1	T2	Retained items	T1	T2
Autonomy			.83	.88		.83	.88
	Aut1	In the past weeks I have been able to choose between different approaches in my work In den letzten Wochen konnte ich bei meiner Arbeit oft zwischen verschiedenen Herangehensweisen wählen			x		
	Aut2	In the past weeks, my job allowed me to make decisions about what methods I use to complete my work Ich konnte in den letzten Wochen selbst entscheiden, mit welchen Mitteln ich zum Ziel komme			x		
	Aut3	In the past weeks, my job gave me considerable opportunity for independence and freedom in how I do the work Ich hatte in den letzten Wochen viele Freiheiten, in der Art und Weise, wie ich meine Arbeit verrichte			x		
Social support			.63	.76		.66[a]	.82[a]
	SoSp1	In the past weeks, my supervisor was concerned about the welfare of the people that work for him/her In den letzten Wochen interessierten sich meine Vorgesetzten für das Wohlergehen der Mitarbeitenden					

(*Appendices continue*)

Table A1 (*continued*)

Scale	Label	Item wording	Original scale Coefficient Omega T1	Original scale Coefficient Omega T2	Retained items	Adapted scale Coefficient Omega T1	Adapted scale Coefficient Omega T2
	SoSp2	In the past weeks, my colleagues took a personal interest in me Meine Kollegen/innen interessierten sich in den letzten Wochen für mich			x		
	SoSp3	In the past weeks, people I worked with were friendly In den letzten Wochen waren meine Kollegen/innen freundlich			x		
Feedback			.69	.73		.69	.73
	Fdb1	In the past weeks, I received a great deal of feedback from my superiors about my job performance Meine Vorgesetzten gaben mir in den letzten Wochen häufig Rückmeldung über meine Arbeitsleistung			x		
	Fdb2	In the past weeks, I received a great deal of feedback from my colleagues about my job performance In den letzten Wochen erhielt ich von Kollegen Rückmeldung über meine Arbeitsleistung			x		
	Fdb3	Other people in the school gave me feedback in the past weeks about the effectiveness of my job performance Andere Personen aus der Schule haben mir in den letzten Wochen Rückmeldung über die Effektivität meiner Arbeitsleistungen gegeben			x		
Task variety			.85	.91		.73[a]	.87[a]
	TaVa1	In the past weeks my job involved a great deal of task variety In meiner Tätigkeit machte ich in den letzten Wochen sehr viele verschiedene Dinge			x		
	TaVa2	In the past weeks I occasionally did something new in my job In den letzten Wochen habe ich bei meiner Arbeit immer mal wieder etwas Neues gemacht					
	TaVa3	In the past weeks, my job required the performance of a wide range of tasks Bei der Arbeit musste ich in den letzten Wochen eine Vielfalt von Aufgaben bearbeiten					
	TaVa4	In the past weeks, my job involved performing a variety of tasks In den letzten Wochen war meine Arbeit sehr abwechslungsreich			x		
			.88	.90		.88	.90

(*table continues*)

(*Appendices continue*)

Table A1 (*continued*)

Scale	Label	Item wording	Original scale: Coefficient Omega T1	Original scale: Coefficient Omega T2	Retained items	Adapted scale: Coefficient Omega T1	Adapted scale: Coefficient Omega T2
Emotional demands	EmoD1	In the past weeks, my job put me in emotionally demanding situations In den letzten Wochen brachte mich meine Arbeit in emotional belastende Situationen			x		
	EmoD2	I felt emotionally involved in my work during the past weeks Bei meiner Arbeit fühlte ich mich in den letzten Wochen emotional eingebunden			x		
	EmoD3	My work was emotionally demanding in the past weeks In den letzten Wochen war meine Arbeit emotional fordernd			x		
Workload			.87	.90		.87	.90
	Worl1	In the past weeks, my job required me to work very fast In den letzten Wochen erforderte es meine Arbeit sehr schnell zu arbeiten			x		
	Worl2	In the past weeks, my job required me to work very hard In den letzten Wochen erforderte es meine Arbeit sehr hart zu arbeiten			x		
	Worl3	In the past weeks, there was a great deal to be done at my job Bei meiner Arbeit hatte ich in den letzten Wochen sehr viel zu tun			x		
Interpersonal conflict			.76	.68		.68	.70
	Con1	In the past weeks, I got into arguments with others (colleagues, students, parents) at work In den letzten Wochen geriet ich bei der Arbeit in Auseinandersetzungen mit anderen (der Kollegschaft/Schülern/Eltern)			x		
	Con2	In the past weeks, people at work yelled at me Andere haben mich in den letzten Wochen bei der Arbeit angeschrien					
	Con3	In the past weeks, people at work were rude to me In den letzten Wochen sind andere bei der Arbeit unfreundlich zu mir gewesen			x		
	Con4	In the past weeks, people at work did nasty things to me Andere haben mir in den letzten Wochen bei der Arbeit gemeine Dinge angetan			x		
Work satisfaction			.87	.75		.92[a]	.88[a]
	WoSat	Overall, how satisfied are you with the kind of work you do? Wie zufrieden sind Sie insgesamt mit der Art von Arbeit, die Sie tun?					
	JoSat	Overall, how satisfied are you with your job? Alles in allem, wie zufrieden sind Sie gerade mit Ihrer Arbeitsstelle?			x		
	EmSat	Overall, how satisfied are you with the school where you work? Wie zufrieden sind Sie mit der Schule, an der Sie arbeiten?			x		

(*Appendices continue*)

Table A1 (*continued*)

Scale	Label	Item wording	Original scale Coefficient Omega T1	Original scale Coefficient Omega T2	Retained items	Adapted scale Coefficient Omega T1	Adapted scale Coefficient Omega T2
Fatigue		Over the past 4 weeks, to what extent ... Wie oft haben Sie sich während der vergangenen vier Wochen am Ende des Arbeitstages ...	.86	.86		.86[a]	.88[a]
	Fati1	... did you feel physically worn out? ... körperlich erschöpft gefühlt?					
	Fati2	... did you feel mentally exhausted? ... mental erschöpft gefühlt?			x		
	Fati3	... did you want to avoid anything that takes too much emotional energy today? ... emotional erschöpft gefühlt?			x		
Psychosomatic complaints		Please indicate to what extent you had the following symptoms in the past 4 weeks Bitte geben Sie an, inwieweit in den vergangenen vier Wochen folgende Symptome bei Ihnen aufgetreten sind	.78	.80		.78	.80
	PsySy1	I had neck pain Ich hatte Nackenschmerzen			x		
	PsySy2	I had headaches/migraines Ich hatte Kopfschmerzen/Migräne			x		
	PsySy3	I had a back pain Ich hatte Rückenschmerzen			x		
	PsySy4	I had an upset stomach Ich hatte Magenprobleme			x		
	PsySy5	Have you experienced any bodily tension? Spüren Sie, dass Ihr Körper verkrampft ist?			x		
Caretaking	Care	Please check all that apply: Bitte kreuzen Sie Zutreffendes an:					
		I have children to take care off Ich habe Kinder, die ich betreuen muss			x		
		I look after care-dependent persons Ich habe pflegebedürftige Angehörige, die ich betreuen muss			x		

Note. Coefficient Omega is reported for multi-item scales.
[a] Spearman's Brown coefficient is reported for two-item scales (see Eisinga et al., 2013).

(*Appendices continue*)

Appendix B

Intercorrelations

Table B1

Intercorrelations for Variables Under Investigation at T1 (a) and T2 (b)

Variables	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b	9a	9b	10a	10b	11
1a Autonomy	1																				
1b Autonomy	−.06	1																			
2a Social support	.26*	.51	1																		
2b Social support	.22*	.07	.42*	1																	
3a Feedback	.11	.00	.36*	.08	1																
3b Feedback	.08	.08	.15*	.47*	.27*	1															
4a Task variety	.29*	−.00	.25*	.16*	.28*	.14	1														
4b Task variety	.02	.38*	.00	.13	.049	.30*	.14*	1													
5a Emotional demands	−.19*	−.15*	−.06	.01	.06*	.02	.25*	.18*	1												
5b Emotional demands	.03	−.17*	.07	.10	.02	.26*	.18*	.01	.22*	1											
6a Interpersonal conflict	−.15*	.07	−.11	−.11	.00	.08	.05	.05	.34*	.04	1										
6b Interpersonal conflict	.01	−.04	−.09	−.17*	.03	.05	.14*	.18*	.03	.53*	.20*	1									
7a Workload	−.29*	−.01	−.00	−.02	.17*	.01	.46*	.10	.49*	.24*	.18*	.10	1								
7b Workload	.07	.06	−.01	−.07	.08	.18*	.06	.49*	.04	.53*	.02	.28*	.28*	1							
8a Fatigue	−.26*	−.10	−.21*	−.17*	−.14	−.12	.11	.01	.62*	.15*	.26*	.03	.52*	.11	1						
8b Fatigue	−.03	−.15*	−.04	−.08	−.01	.04	.19*	.23*	.21*	.64*	.01	.27*	.35*	.58*	.31*	1					
9a Psychosomatic complaints	−.22*	−.04	−.14*	−.11	−.09	.05	−.07	−.06	.37*	.10	.15*	−.04	.32*	.08	.46*	.20*	1				
9b Psychosomatic complaints	−.12	−.07	−.10	−.10	−.04	.07	.04*	.09	.26*	.37*	.14	.22*	.23*	.40*	.32*	.50*	.56*	1			
10a Job satisfaction	.25*	−.01	.39*	.27*	.29*	.09	.19*	.05	−.19*	.02	−.20*	−.05	−.06	.04	−.34*	−.05	−.27*	−.14	1		
10b Job satisfaction	.17*	.03	.26*	.39*	.13	.26*	.10	.03	−.10	.04	−.09	−.12	−.06	.02	−.20*	−.08	−.06	−.03	.56*	1	
Covariates																					
11 Career stage[a]	.12	−.01	−.03	.07	−.18*	.16*	−.04	.10	.00	.25*	.10	.24*	−.11	.14	.05	.06	.09	.12	−.06	−.04	1
12 Caretaking[b]	−.06	−.14	−.18*	−.15*	−.15*	−.16*	−.08	.07	−.02	.21*	.00	.23*	−.05	.18*	.05	.08	.01	.09	−.12	−.19*	.40*

Note. a = Time 1; b = Time 2.

[a] Career stage was coded as 0 = trainee teachers and 1 = full-service teachers. [b] Caretaking was coded as 0 = no caretaking and 1 = caretaking; work characteristics were all measured on a 7-point Likert scale.

* $p < .05$.

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