

How the COVID-19 Pandemic Changed Swiss Primary School Teachers' Perceptions of Job Stress, Emotional Exhaustion, and Personal Resources – Insights from a Longitudinal Study

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Abstract

As in other countries around the world, teachers in Switzerland have been under great strain since the COVID-19 pandemic, which led to teaching in Switzerland being conducted entirely in distance learning mode for two months, followed by a phase with a hybrid form of teaching and half-class settings. In this context, teachers experienced numerous challenges and the need for constant adaptations. This study investigates changes in pre-primary and primary teachers' perceived stress and personal resources in the distance and hybrid learning phase compared to before the pandemic. Data from 91 teachers in the canton of Zurich were analysed longitudinally using four measurement points before and after the distance education phase.

The results of the analysis of variance with repeated measures show a decrease in job satisfaction and teacher self-efficacy in distance education compared to the previous time points. In contrast, teachers assessed their self-regulation more positively than before the pandemic, while their work overload and emotional exhaustion did not change during the distance education phase. However, our analysis revealed differential trajectories of work overload during distance education. Teachers with a high work overload and emotional exhaustion two years before the pandemic perceived a decrease in work overload while those with low work overload and emotional exhaustion showed an increase respectively. Using latent profile analysis, we identified two profiles, each with a different change in work overload during the distance education phase: teachers with higher resources before the pandemic again showed an increase, whereas the second low resource class showed a decrease in work overload. We conclude that the same job characteristics can be perceived as a demand or as a resource, depending on teachers' personal resources and personality.

Keywords

Job stress, teacher self-efficacy, self-regulation, emotional exhaustion, Job Demands-Resources model

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1 Introduction

As in other countries around the world (for a review, see García-Carmona et al., 2019), teachers in Switzerland had been found to be vulnerable to high levels of stress even before the COVID-19 pandemic (Sandmeier et al., 2017). Nevertheless, the majority of teachers report a high level of job satisfaction (Sandmeier et al., 2017). Stress can result in positive or negative stress reactions (e. g., cognitive activation, joy, monotony, strain), depending on whether the requirements for coping with it exceed an individual's adaptability (Lazarus & Launier, 1981; Rudow, 1994). High levels of stress over a long time, beyond the career entry phase, are considered to affect emotional exhaustion and professional development (Hobfoll, 1989). Whether and to what extent job demands are experienced as stressful and how teachers subsequently deal with them depends on their perception and evaluation of the demands (Rudow, 1994) as well as on their appraisal of coping resources or strategies (Lazarus & Launier, 1981). Such resources can be job resources or also personal resources (e. g., Demerouti & Nachreiner, 2018; Skaalvik & Skaalvik, 2016). Self-regulation and self-efficacy as modifiable personal resources are considered crucial for coping with stress (Klusmann et al., 2009; Mattern & Bauer, 2014; Skaalvik & Skaalvik, 2007). In addition, personality traits (McCrae & Costa, 2008) seem to have an important impact on teachers' well-being, affecting their experiences of stress (Mayr & Neuweg, 2006; Krause & Dorsewagen, 2007; Spinath, 2012).

As a reaction to the COVID-19 pandemic in Switzerland, teaching in kindergarten, primary and middle schools was conducted entirely through distance learning for a two-month period from mid-March to mid-May 2020. During the first opening phase, lessons in primary and middle schools in the canton of Zurich were held in a hybrid form or a half-class setting before classroom lessons were possible again with the whole class. In this context, teachers experienced numerous challenges and constant adaptations in the form of distance learning, half-class teaching, teaching students from absent fellow teachers' classes, and increasingly individualized (online) learning support. The aim of our study was to investigate changes in (pre-)primary teachers' perceived stress in the phase of distance learning compared to teaching before the pandemic. We analysed changes in the amount of stress, emotional exhaustion, and job satisfaction, as well as in personal resources and sources of stress.

1.1 *Job Demands-Resources Model*

The Job Demands-Resources (JD-R) model proposes that working conditions can be categorized into job demands and job resources (see Figure 1). The model further proposes two relatively independent processes that predict exhaustion, work-engagement and subsequent health and job-related outcomes (Bakker & Demerouti, 2017; Demerouti & Nachreiner, 2019). The first is a health impairment process which derives from a high level of job demands and emotional exhaustion, leading to ill health and occupational

strain. The second process, in contrast, is motivational and begins with good personal and professional resources that result in a high commitment to work and high professional engagement, leading to professional satisfaction and high professional quality (Bakker & Demerouti, 2017). Job resources refer to physical, psychological, social, and organizational aspects of work that help achieve work goals, reduce job demands or the consequences of job demands, and promote professional development (Demerouti et al., 2001). The model emphasizes the importance of workplace characteristics for the development of exhaustion and job satisfaction. More recent versions of the model (Bakker & Demerouti, 2017) also include personal resources in terms of personal beliefs regarding the ability to control one's activities in the work environment (e. g., optimism, self-efficacy) which are proposed to play a similar role as job resources. However, the role of these personal resources has not yet been sufficiently clarified within the JD-R model. We refer to the JD-R model as a framework for considering various aspects of teachers' experience of stress in the COVID-19 pandemic. In the following sections, the different components of the model relevant to our study are described in more detail.

1.2 Job Demands

According to Demerouti et al. (2001), job demands relate to physical, social, and organizational aspects of work that require sustained effort. Teachers are confronted with a variety of tasks and challenges that may be stressful (Neuber & Lipowsky, 2014; Skaalvik & Skaalvik, 2018). The classroom is a place where people with different preferences, abilities, heritage, and perspectives interact. This makes it a highly demanding and stressful work environment for teachers (Smylie, 1999). Risk factors generating chronic stress and provoking burnout syndrome among teachers include "work overload, complementary administrative work, overcrowded classrooms, role stressors, class discipline problems, conflicts with superiors, co-workers and parents, continual education reforms, deficits in training, promotion and professional development, low wages, disruptive attitudes and behaviour by students, deficient school and classroom facilities, poor timetabling and time pressures" (García-Carmona et al., 2019, p. 190). In our sample of teachers at the end of the career entry phase, results from the first survey revealed that they were most strongly affected by the different learning abilities of their students, as well as by a lack of students' motivation and concentration and discipline problems in the classroom (Berweger et al., 2019). Various studies suggest that discipline problems in the classroom and dealing with students who are perceived as difficult are particularly important predictors of teachers' stress (Baeriswyl et al., 2014; Berweger et al., 2019; Schaarschmidt, 2005) and the development of burnout (Krause & Dorsemagen, 2014).

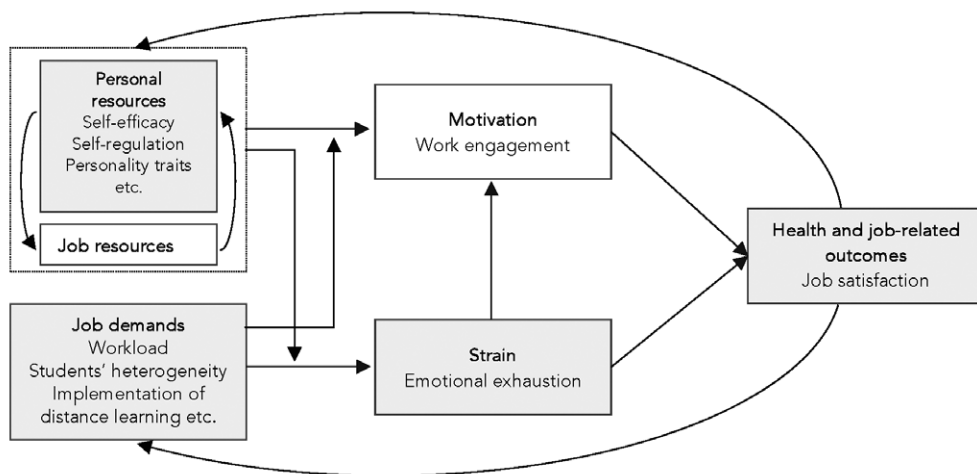


Figure 1: Job demands-resources model adapted from Bakker & Demerouti, 2017.

Note: Aspects addressed in the study are indicated by gray boxes

Due to the pandemic, teachers all over the world faced challenging working conditions, modified tasks and responsibilities, and the introduction of new working methods that increased job demands. For distance teaching, teachers had to learn in very short time how to prepare teaching materials for self-directed learning outside the classroom, how to use digital media in designing learning arrangements, and how to apply new hybrid teaching models without adequate resources or time to prepare themselves. In addition, teachers had to find effective ways to engage and motivate students during online education. A key challenge for teachers was to overcome the distance that had arisen between them and their students and to use digital tools for this purpose (Huber et al., 2020). According to a review of studies during the lockdown, about 10% to 38% of teachers felt insufficiently competent to provide adequate learning opportunities in distance education (Helm et al., 2021). About half of the teachers indicated that distance education caused them major challenges (Helm et al., 2021). In a survey in North Rhine-Westphalia (NRW, a federal state of Germany), 84% of the teachers surveyed reported a subjective impression of an increased workload due to the pandemic (Hansen et al., 2020). Teachers in Switzerland also reported a greater workload due to distance teaching (Garrote et al., 2021). Maintaining communication with students who had insufficient access to technical equipment (Gold et al., 2020; Dreer & Kracke, 2021) and problems with students' ability and motivation for self-regulated learning as key challenges in the pandemic were also identified as major stress factors (Dreer & Kracke, 2021; Garrote et al., 2021). In our study, we examined both, stress due to requirements specifically relevant for the distance education and stress caused by general professional characteristics.

1.3 Personal Resources

In the JD-R theory, personal resources refer to beliefs and attitudes people have regarding the sense of controllability of their environment, for example optimism or self-efficacy beliefs (Bakker & Demerouti, 2017). Personal resources play an important role in the development and management of negative strain, with personality traits also having both a direct and indirect effect on the experience of strain (Affolter, 2019). Neuroticism is considered an important predictor of stress experience and job satisfaction (Affolter, 2019; Keller-Schneider, 2009; Klusmann et al., 2012) and contributes to the explanation of differences in emotional exhaustion (Klusmann et al., 2012). In contrast, high extraversion tends to be associated with a more favourable perception of demands (Keller-Schneider, 2009) and a lower risk of burnout (Cramer & Binder, 2015).

Self-efficacy, according to Zimmerman and Cleary (2006), can be defined as a belief about what a person can do and achieve in a given situation, and how well he or she will succeed in these accomplishments. In the teaching profession, self-efficacy refers to “individual teachers’ beliefs in their own ability to plan, organize, and carry out activities that are required to attain given educational goals” (Skaalvik & Skaalvik, 2007, p. 612). Self-efficacy is fed by an individual’s own earlier experiences of success and failure in accomplishing their tasks (Bandura, 2006). It also determines how environmental opportunities and impediments are perceived, and therefore influences people’s goals, values, and behavior (Bandura, 2006). Thus, strong self-efficacy beliefs may diminish the experience of teacher stress (Klusmann et al., 2009; Skaalvik & Skaalvik, 2007). In accordance with this, studies have found that teacher self-efficacy influenced teachers’ perceptions of stressors in school (Collie et al., 2012; Klassen & Chiu, 2010, 2011). Conversely, emotional exhaustion as a result of prolonged high stress also negatively predicts teacher self-efficacy (Kim & Buric, 2020). The positive influence of teacher self-efficacy on teachers’ job satisfaction is well-established (Caprara et al., 2006; Klassen et al., 2009).

A longitudinal study among German teachers in May 2020 showed an increase in teacher self-efficacy compared to before the pandemic (Weißenfels et al., 2021). Other studies, concentrating on self-efficacy factors related to the distance learning situation, found lower values for teacher self-efficacy (Cataudella et al., 2021), engagement efficacy, and instructional efficacy during COVID-19 compared with normative samples before the COVID-19 pandemic (Pressley & Ha, 2021). The findings of a study of Chinese teachers indicate that teacher self-efficacy significantly improved for the application of technology, but not for online instruction during the COVID-19-pandemic (Ma et al., 2021). Finally, general self-efficacy was found to mediate teachers’ difficulties with the new job demands of organizing distance learning and the associated perceptions of stress (Rabaglietti et al., 2021).

Self-regulation is assumed to be another important personal resource for teachers in dealing with stress (Mattern & Bauer, 2014). It is defined as the ability to control one's own thoughts, emotions, and behaviour in the pursuit of short- or long-term goals (Zimmerman, 2000). It is also aimed at maximizing the individual's long-term interest, which leads people to control their impulses and pay attention to their well-being (Sitzmann & Ely, 2011). Self-regulation indicates the ability to engage oneself while simultaneously monitoring one's own behaviour and, in stressful situations, find ways to cope adaptively (Kunter et al., 2013). The ability to self-regulate is a competence rather than a stable behavioural disposition, but it is influenced by personality traits. Depending on an individual's personality, more or less self-regulation is required to balance personal needs and work demands (Spinath, 2012). From a social-cognitive perspective, self-efficacy plays a prominent role in self-regulatory processes because it controls the perception and assessment of demands (Bandura, 1986, 2001). Confidence in one's own efficacy is of fundamental importance for successful self-regulation. Thus, while the two personal resources of self-efficacy and self-regulation interact with each other, their interplay has so far received little attention (Affolter, 2019). On the other hand, teachers' self-regulation has been found to predict lower levels of emotional exhaustion (Schaarschmidt & Fischer, 2013; Mattern & Bauer, 2014). To our knowledge, there has been no study examining changes in teacher self-regulation during the COVID-19 pandemic. We use our longitudinal sample to analyse the development of teacher self-efficacy, as well as self-assessed self-regulatory competence, during the challenging period of the pandemic on which our study focused.

1.4 Strain and Emotional Exhaustion

According to Rudow (1994; 1999), strain, based on Lazarus's transactional model of stress and coping (1966), is a reaction to high demands or stress that cannot be adequately coped with over a long time. Prolonged negative strain, in turn, increases the risk of negative strain consequences for mental and physical health. Emotional exhaustion as the key dimension of burnout is often seen as such a health consequence (e. g., Demerouti et al., 2001; Schaufeli & Enzmann, 1998). Emotional exhaustion refers to a negative, job-related (subclinical) psychological quality of experience that occurs when job demands exceed available resources over time (Hobfoll, 1989). Emotional exhaustion is manifested by low energy and chronic fatigue (Maslach et al., 1996; Skaalvik & Skaalvik, 2015). Research shows that teachers' emotional exhaustion is strongly related to their working conditions (job demands) and, can be predicted by workload, for example (Pogere et al., 2019; Skaalvik & Skaalvik, 2015).

In a study conducted among German primary school teachers, 60% experienced teaching to be significantly more strenuous during the COVID-19 pandemic compared to before, primarily due to the enforcement of corona protection measures for students (Hansen et al., 2020). In the same study, a majority of teachers (78%) reported having subjectively experienced an increase in emotional exhaustion especially those, who were already severely exhausted at the onset of the pandemic (Hansen et al., 2020). In contrast, a longitudinal

study found that teachers' emotional exhaustion, different than the other dimensions of burnout, did not increase during the period of distance learning (Weißenfels et al., 2021).

1.5 Job Satisfaction

Teachers' job satisfaction refers to their "affective reactions to their work or to their teaching role" (Skaalvik & Skaalvik, 2011a, p. 1030). Despite the high stresses and demands, most teachers are very satisfied with their profession (Schult et al., 2014). Job satisfaction can be primarily attributed to aspects of work content (Sandmeier et al., 2017). Furthermore, not only job resources, including positive social relations with colleagues and supervisory support, but also the experience of congruence of the prevailing goals and values of the school with the personal values of the teachers, have a positive impact on job satisfaction (Skaalvik & Skaalvik, 2011a, 2011b). In addition, and in line with the JD-R theory (Bakker & Demerouti, 2017), job satisfaction can also be explained by the absence of stress factors, or with a good ability to cope with stress and correspondingly low levels of emotional exhaustion. Good personal resources, such as self-efficacy and self-regulation, also contribute to high job satisfaction (e. g., Klassen & Chiu, 2010).

To date, relatively little is known about teachers' job satisfaction during COVID-19. However, according to Hansen and colleagues (2020), teachers in NRW had high job satisfaction during the COVID-19 pandemic. The vast majority (87%) experienced no subjective change in their job satisfaction due to the pandemic, with only 12% perceiving a decline. In our study, we not only describe subjectively experienced changes in teachers' job satisfaction, but also examine changes compared to previous measurement time points.

1.6 The Present Study

The present study aims to determine the job demands teachers experienced as particularly stressful in distance learning during the lockdown. It further contributes to a better understanding of whether the experience of work overload, emotional exhaustion, and job satisfaction as well as teacher self-efficacy and self-regulation have been altered by the impact of the first lockdown of the COVID-19 pandemic. The current state of research does not allow us to draw hypotheses about changes in teachers' self-efficacy and self-regulation during the lockdown. Based on previous findings on teachers' workload during the lockdown (Garrote et al., 2021; Hansen et al., 2020), we expect a) work overload to be higher at measurement time point t_4 than at the earlier time points (t_1 , t_2 , t_3). We do b) not expect changes in emotional exhaustion at t_4 compared to t_1 , t_2 , and t_3 . On the one hand, this hypothesis is theoretically justified, since the development of emotional exhaustion is considered to be a long-term process (Rudow, 1994; 1999). On the other hand, it is also in line with a recent result on the trajectory of emotional exhaustion during the first lockdown of the COVID-19 pandemic (Weißenfels et al., 2021). Although teachers' workload during the lockdown was particularly high, only about half of the teachers perceived distance learning as a major challenge and thus potentially as work overload (Helm et al., 2021).

This leads us to hypothesise that c) there are interindividual differences and corresponding differential effects in work overload in response to the COVID-19 pandemic at t_4 . To examine such differential effects, we test if the development of work overload between t_4 and the earlier the measurement time points (t_2 and t_3) differs depending on teachers' work overload, emotional exhaustion, self-regulation skills or teacher self-efficacy at t_1 before the pandemic. Moreover, we explore if there were specific profiles in personal preconditions based on which teachers reacted differently to the demands of the lockdown.

2 Methods

This study is part of a larger research project on early-career teachers' self-management, including self-regulation and goal pursuit, in the context of a professional development programme. The project was designed as an experimental field study and aims to compare intervention settings designed to promote self-management skills and goal pursuit, and to examine the extent to which they affect teachers' experience of stress, self-efficacy, and self-regulation. The implementation of the training took place in January 2018, embedded in a three-week in-service training course for teachers at the Zurich University of Teacher Education at the end of the induction phase of teachers in the canton of Zurich. Teachers completed a comprehensive online questionnaire at several time points: before the training in December 2017 (t_1) and after the training in June 2018 (t_2), December 2018 (t_3) and June 2020 (t_4). The last measurement time point (t_4), after the first lockdown of the COVID-19 pandemic, was specifically designed and conducted to examine the impact of the pandemic on teachers' perception of job stress, emotional exhaustion and job satisfaction, as well as on their personal resources.

2.1 Sample

Our longitudinal sample with additional t_4 -data on the lockdown phase ("lockdown-sample") consisted of 91 teachers in the canton of Zurich, of whom 67 were primary/middle school teachers and 24 kindergarten/pre-school teachers. We only included those teachers in the analysis who had participated in all four, including the t_4 surveys (33.3% of the total sample). At the time of the initial survey, the teachers were between 23 and 53 years old with a mean age of 28 years. They had completed their teacher training between 2013 and 2016. About 40% ($n = 38$) of the participants had been part of the intervention group in the self-management training course. At the time of the last survey (t_4), they had had between five and seven years of professional experience.

2.2 Instruments

Teacher self-efficacy was measured using five items from Schwarzer and Schmitz's (1999) scale. For example, "I am confident that I can make good contact with problematic students if I make an effort to do so". Responses were given on a 4-point Likert-scale from

“disagree” (1) to “agree” (4). Cronbach’s alpha for the scale was between $\alpha = .614$ (t1) and $\alpha = .738$ (t2).

Self-regulation was assessed using the instrument developed by Mattern and Bauer (2014). Their scale focuses on cognitive aspects of self-regulation. It includes 11 items from three subscales: *action plan* (e. g. “Before I start an extensive task, I determine how I will proceed”), *performance control* (e. g. “In a difficult activity, I can specifically look at the positive sides”), and *attention control* (e. g. “I can keep my mind from constantly wandering from the task at hand”). Participants were asked to rate the items about their work behaviour on a 4-point Likert-scale from “disagree” (1) to “agree” (4). Cronbach’s alpha was between $\alpha = .754$ (t1) and $\alpha = .860$ (t4).

Job satisfaction was assessed using three items of the German translation of the LAKS-DOC (Sann, 2003). The items were “I really enjoy my job” and two items which were slightly adjusted for survey t4: “I found my profession really interesting during distance learning”, and “If I could choose again, I would become a teacher again – also against the background of my experiences during the lockdown”. Responses were given on a 5-point scale from “does not apply” (1) to “applies” (5). Cronbach’s alpha for job satisfaction was between $\alpha = .628$ (t3) and $\alpha = .789$ (t1).

Work overload was measured with the work overload subscale of the job stress inventory of Enzmann and Kleiber (1989). The measure contained five items for stress regarding responsibility, time pressure, overload, and bad conscience towards the students. One item was slightly adjusted for the fourth measurement point: “Being responsible for the children’s successful learning put a lot of stress on me.” Responses were given on a 5-point scale from “does not apply” (1) to “applies” (5). Cronbach’s alpha was between $\alpha = .627$ (t4) and $\alpha = .764$ (t2).

Emotional exhaustion was assessed using three items of the Maslach Burnout Inventory (in the German version of Baumert et al., 2008). The participants rated statements indicating that their work made them feel emotionally drained or exhausted. The items were “I often felt exhausted at school (t4 “at work”); “I noticed more often in school (t4 “at work”) how listless I was”; “Sometimes I felt really depressed at the end of a school day (t4 “workday”)”. Responses were given on a 4-point scale from “does not apply” (1) to “applies” (4). Cronbach’s alpha was between $\alpha = .631$ (t4) and $\alpha = .740$ (t2).

Stress factors were measured using 11 items from the questionnaire developed by van Dick (2006). The items describe the experience of stress due to working conditions inside and outside the classroom. Different areas of job demands were rated by teachers according to how stressful they experienced them as being. The teachers subjectively assessed the extent of their stress for learning and teaching-related characteristics, for example: “lack of motivation or ability to concentrate on the part of the students”, as well as for working

conditions outside the classroom, for example “problems with parents”. Responses were given on a 6-point scale from “not at all stressful” (1) to “very stressful” (6).

The personality factors *neuroticism and extraversion* were assessed only in the baseline questionnaire at t1 with four items from the short version of the Big Five Inventory (Rammstedt & John, 2005). The questions for neuroticism capture aspects of a person’s emotional instability, such as anxiety: “I worry a lot”. Cronbach’s alpha for the neuroticism scale was $\alpha = .772$. The items measuring extraversion refer to how sociable or, conversely, how reserved people are in social interactions: “I am outgoing, I am sociable”; or “I am more of a taciturn, silent type”. Responses on all items measuring personality were given on a 5-point scale from “very inaccurate” (1) to “very accurate” (5). Cronbach’s alpha for this subscale was $\alpha = .838$.

These instruments were supplemented by *four open questions*: Two questions capture the main individual challenges of distance learning in terms of learning and development, and in terms of teamwork and parent collaboration. A third, open-ended question concerned the period after the lockdown, and a fourth question covered challenges and areas where teachers perceived a lack of support.

2.3 Data Analysis

The quantitative data were analysed using the statistical software package SPSS (version 27; IBM) and Mplus8 (version 1.6). Since only 33% of the teachers participated in the t4 survey on stress in the first lockdown of the COVID-19 pandemic, the first step was to check whether the longitudinal lockdown-sample differed systemically from the reference sample without t4 data. For this purpose, the mean values of all relevant scales of the measurement time point t1 of the lockdown-sample were compared with those of the reference sample using t-tests. To describe which job demands were experienced as stressful by the teachers in the lockdown, the items relating to the stress factors in distance education were evaluated descriptively in the next step. Changes in stress factors from t3 to t4 were analysed using repeated measures ANOVAs for stress factors of which t3 data were available. To supplement these quantitative analyses of stress due to working conditions, the responses to the open-ended questions were analysed using content analysis. The answers were coded using deductively created categories. To test whether teacher self-efficacy, self-regulation, job satisfaction, work overload, and emotional exhaustion differed between the four measurement time points across all individuals, analysis of variance with repeated measures was performed for all variables. In these analyses, we controlled for the influence of participation in the self-management training.

To examine whether the work overload has developed differently between the measurement time points (t3 and t4) depending on the previous (t1) level of teachers work overload, emotional exhaustion, self-regulation skills or teacher self-efficacy the t1 values were z-standardized and converted into dichotomized variables (with the median as the cut-off

value). The dichotomous variables were added as between subject factors to repeated measures ANOVAs with participation in self-management training (yes/no) as a covariate. In the next step we conducted a latent class analysis (LPA) in Mplus (Muthén & Muthén, 1998–2018) to identify different types of personal preconditions for coping with stress. The aim of LPA (Vermunt & Magidson, 2002) is to generate a categorical variable to explain the associations between continuous observed indicators. We classified teachers based on in-person variable at t1 known to affect teachers' coping with stress: neuroticism, extraversion, teacher self-efficacy and self-regulation. All grouping variables for the LPA were normalized in advance by a z-score transformation. Two outliers with extreme values in the variables concerned were removed from the analysis. For model selection the sample-adjusted Bayesian Information Criterion (BIC) indicating goodness of fit, with smaller values indicating better fit (Nylund et al., 2007) and Entropy (Celeux & Soremenho, 1996), indicating the certainty in the estimation, with values above 0.7 considered sufficient (Nylund et al., 2007; Geiser, 2009) were taken into account. As the BIC tends to lead to an overextraction of classes however, additional classes should be considered only if they represent more than variations of types already present in solutions with fewer classes, additional criteria were considered as well (Specht et al., 2014). We decided for the final LPA model based on a mix of statistical indicators and theoretical considerations (Nylund et al., 2007).

3 Results

The longitudinal lockdown-sample (t4) did not differ from the rest of the samples in terms of any of the following variables used in the study: neuroticism, extraversion, self-regulation, teacher self-efficacy, work overload, emotional exhaustion, and job satisfaction at t1. There were no significant differences in the lockdown-sample compared to the rest of the sample according to t-tests².

These results of the descriptive analysis indicated that during the lockdown the teachers perceived the heterogeneity of the students concerning their different learning preconditions, as well as the students' migration backgrounds as particularly stressful (see Table 1).

2 The lockdown-sample did not differ from the reference sample in any of the variables: neuroticism of lockdown-sample ($M = 2.33$ $SD = .74$), reference sample ($M = 2.39$, $SD = .78$), $t(265) = .57$, $p = .57$; extraversion of the lockdown-sample ($M = 3.99$ $SD = .84$), reference sample ($M = 4.11$, $SD = .78$), $t(265) = 1.08$, $p = .27$; teacher self-efficacy of the lockdown-sample ($M = 3.29$ $SD = .37$), reference sample ($M = 3.31$, $SD = .37$), $t(265) = 1.13$, $p = .27$; their self-regulation of the lockdown-sample ($M = 3.08$ $SD = .41$), reference sample ($M = 3.10$, $SD = .40$), $t(265) = 1.06$, $p = .29$; job satisfaction of the lockdown-sample ($M = 4.48$ $SD = .59$), reference sample ($M = 4.49$, $SD = .61$), $t(265) = .77$, $p = .77$; work overload of the lockdown-sample ($M = 2.29$ $SD = .65$), reference sample ($M = 2.28$, $SD = .65$), $t(265) = -.36$, $p = .72$; exhaustion of the lockdown-sample ($M = 2.08$ $SD = .70$), reference sample ($M = 1.81$ $SD = .58$), $t(265) = .77$, $p = .50$.

Table 1: Means, Standard Deviations, and Repeated Measures ANOVA Statistics
 Note. * $p < .05$ ** $p < .01$ *** $p < .001$

Stress Factors for Teachers in (Distance) Education	Lockdown (t4)		Pre-lockdown (t3)		ANOVA F(df1, df2)	f	n
	M	SD	M	SD			
I feel stressed by...							
Different learning preconditions of students	4.27	1.52	4.12	1.40	0.64 (1, 84)	0.09	85
Difficulties with migration background of students	3.51	1.66	2.31	1.38	32.81 (1, 85)***	0.62	86
Preparation and follow-up of [distance] learning	3.54	1.27	2.81	1.24	25.10 (1, 85)***	0.54	86
Implementation of distance learning	3.41	1.38					88
Difficulties with accessibility of individual students	3.38	1.57					87
Difficulties with IT equipment of individual students	2.76	1.73					87
Difficulties with parents	2.63	1.45	3.12	1.64	4.14 (1, 83)*	0.22	84
Difficulties with the software/digital media	2.54	1.47					87
Difficulties with school IT	2.22	1.50					88
Difficulties with the IT infrastructure in the home office	1.89	1.33					88

The analysis of variance with repeated measures revealed, that compared to t3 teachers felt more stressed by difficulties due to the migration backgrounds of students and by the preparation and follow-up of distance learning compared with the preparation and follow-up of lessons at school. In contrast, the stress caused by problems with parents decreased in the distance mode (t4) compared to t3. The descriptive distribution of the frequencies showed that most teachers (74%) found the students' diverse learning prerequisites to be (very) stressful. About half of the teachers in the survey considered the preparation (49%) and follow-up (53%), as well as the implementation (52%) of distance education, problems in connection with students' migration backgrounds (57%), or the accessibility of students (51%) as stressful. In contrast, the majority of teachers experienced problems with parents (72%), problems with the IT equipment of the students (64%), the school (77%) and the home office (86%), as well as with software or digital media (74%) as not stressful.

The qualitative analysis of the open-ended questions revealed that the most frequently mentioned challenges in distance learning were the heterogeneity of the learners and their corresponding adaptation to different individual learning modes, as well as providing sufficient support to weaker students to avoid widening the achievement gap. The second

most frequently cited challenge of distance education was the lack of support for some children in the non-formal learning setting at home. Many teachers mentioned the lack of social contact and exchange among colleagues as a challenge. Likewise, some of the teachers found it a challenge to create appropriate and motivating learning assignments for independent learning at home that supported and promoted self-directed and self-organized work. Many teachers experienced good and not particularly challenging cooperation with parents. However, difficulties in reaching some parents/families or the fact that some parents were very dissatisfied with the situation were also mentioned. Finally, some teachers also found the team collaboration and coordination challenging, especially because there was no preparation time for joint planning and arrangements before the lockdown. The teachers mentioned the following challenges in the transition phase after the lockdown: great uncertainty and a high workload due to catching up on learning deficits, and adjustments to constantly changing requirements, for example, in half-class teaching.

3.1 Changes in Strain, Job Satisfaction, and Personal Resources

Analysis of the longitudinal data revealed changes at the time point after the first lockdown of the COVID-19 pandemic (t4) compared to earlier time points in teacher self-efficacy, self-regulation, and job satisfaction (see Table 2). For work overload and emotional exhaustion, the analysis revealed no effect of time, indicating that both variables did not change significantly across the four time points.³

Table 2: Means, Standard Deviations, and Repeated Measures ANOVA Statistics with Greenhouse-Geisser Correction

Variable	t1		t2		t3		t4		ANOVA		f	n
	M	SD	M	SD	M	SD	M	SD	F(df1, df2)			
Teacher self-efficacy	3.29 ^a	.37	3.28	.42	3.26	.42	3.12	.43	3.45	(2.49, 186.77) [*]	.22	76
Self-regulation	3.05 ^a	.43	3.06 ^a	.40	3.12	.39	3.21	.42	8.53	(2.60, 205.71) ^{***}	.29	81
Job satisfaction	4.51 ^a	.46	4.42 ^a	.52	4.42 ^a	.55	3.82	.74	16.95	(1.97, 147.49) ^{***}	.71	77
Work overload	2.29	.65	2.20	.69	2.28	.67	2.37	.70	1.40	(2.81, 208.27)	.14	76
Emotional exhaustion	2.08	.70	2.04	.71	2.10	.70	2.06	.79	1.27	(2.23, 167.22)	.13	74

Note: ANOVA = analysis of variance; f = effect size f according to Cohen (1988); SMT self-management training was included as covariate to the analysis to control for. a = differs from t4 according to Bonferroni-corrected pairwise comparisons. In between the other measurement time points, variables did not differ. ^{*}p < .05 ^{**}p < .01 ^{***}p < .001

3 Regression analyses identified no significant predictors of work overload, emotional exhaustion, and job satisfaction at t4.

Analysis of variance with repeated measures and dichotomous variables of self-regulation, teacher self-efficacy, work overload and emotional exhaustion (t1) as between subject factors and self-management training as covariate were used to test individual differences in the development of work overload between before (t3) and after the first lockdown of the COVID-19 pandemic (t4). The results showed no effect of time but a significant moderation effect of previous level of work overload (t1) on the development of work overload from t3 to t4 ($F(1) = 5.06, p = .027, \eta^2 = .058, n = 86$). The effect size f , in accordance with Cohen (1988), was .25 and corresponds to a medium effect. For teachers with a low work overload at t1 work overload increased between t3 and t4. For teachers with a high work overload at t1, work overload decreased between t3 and t4. Similarly the analysis for a moderation effect of previous emotional exhaustion (t1) on the development of work overload between t3 and t4 revealed a trend ($F(1) = 3.97, p = .050, \eta^2 = .046, n = 86, f = .22$). Teachers with high emotional exhaustion at t1 showed a tendency for work overload to increase from t3 to t4, whereas for teachers with low emotional exhaustion at t1, work overload tended to decrease between t3 and 4. No moderation effects were found for self-regulation and teacher self-efficacy (t1).

As a next analytical step, we applied a LPA to group teachers into distinct classes according to personality factors and personal resources related to teachers' coping with stress. A latent profile class model consisting of two patterns was selected because the BIC adjusted score for two classes (939) was only slightly higher compared with the solutions with three (927) and four classes (916), which suggested weak evidence (Raftery, 1995). Moreover, the solution with two classes had a higher entropy (.798) compared to the solutions with three (.744) and four classes (.784). The average latent class probabilities for most likely latent class memberships were the highest for the solution with two classes (class 1 = .918, class 2 = .954). Another argument in favour of the solution with two classes was that the additional classes each represented only variations of the two-class solution, not qualitatively different types of personal preconditions. Finally, the two-class solution was chosen as the final model for reasons of ease of class interpretability.

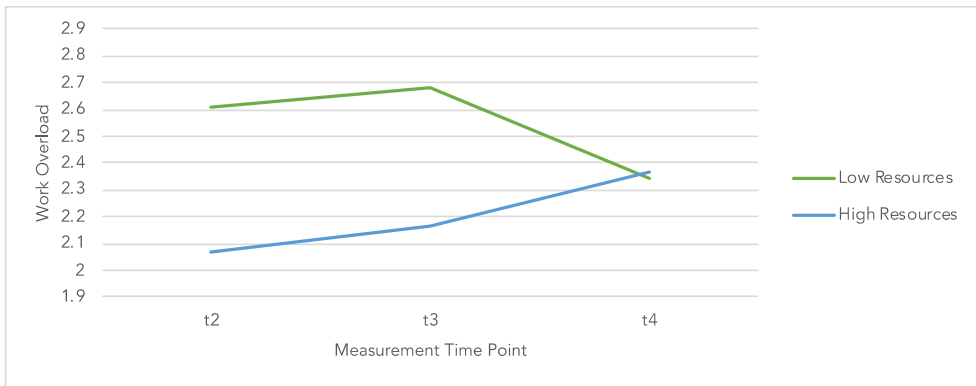


Figure 2: Work Overload of the 'High Resources' and 'Low Resources' Classes Before (t2, t3) and After the Lockdown (t4)

The first class ('high resources') characterized 69% of the participants ($n = 62$). This group showed high teacher self-efficacy ($M = 3.34$, $SD = .34$) and self-regulation ($M = 3.13$, $SD = .33$), low neuroticism ($M = 2.10$, $SD = .62$), and high extraversion ($M = 4.46$, $SD = .46$). Thus, it comprised those teachers who reported good personal resources before the pandemic. The second class ('low resources') included 30% of the participants ($n = 27$). Teachers in this group showed low teacher self-efficacy ($M = 3.06$, $SD = .32$) and self-regulation ($M = 2.96$, $SD = .33$), combined with relatively high scores on neuroticism ($M = 2.76$, $SD = .69$), and low scores on extraversion ($M = 2.98$, $SD = .50$).

First, we compared the groups in terms of demographic characteristics (age and school level). The results from chi-square tests showed that the two groups did not differ in terms of school level (kindergarten vs. primary and middle school) $\chi^2(1) = .29$, $p = .59$. The results from the t-test showed that the groups also did not differ in terms of age, $t(87) = .74$, $p = .63$. The comparison of development in work overload between the 'high resources' and 'low resources' groups, using ANOVA with repeated measures, class as between subject factor and self-management training as covariate showed that the classes differed in the development of work overload between measurement time points t3 and t4 ($F(1) = 7.45$, $p = .008$, $\eta p^2 = .084$, $n = 81$). The effect size $f .30$, indicated a medium effect according to Cohen (1992). While teachers in the 'high resources' class perceived an increase in work overload during the lockdown, work overload of those in the 'low resources' class decreased in the same period (see Figure 2).

4 Discussion

Our longitudinal sample provided a unique opportunity to investigate the trajectories of teachers' stress and personal resources during the challenging time of the first lockdown of the COVID-19 pandemic.

4.1 *Job Demands and Stress*

The first objective of our study was to describe which requirements of distance education teachers experienced as being stressful. By far the most stressful aspect for teachers during distance education was students' different learning abilities. This is not only reflected in the quantitative analysis, but also in the analysis of the open questions. This finding is consistent with the survey two years before the pandemic. However, the results of the current survey were more accentuated. Presumably, differing abilities to self-regulated learning, a factor which has been shown to be particularly stressful in distance learning (Dreer & Kracke, 2021; Garrote et al., 2021), may have exacerbated the strain of heterogeneity. In addition, the majority of teachers perceived problems related to students' migration backgrounds to be a cause of stress. However, it remains undetermined what exactly the issues were which teachers perceived as stressful. Possible explanations might include language problems, language-related difficulties in parental support for learning, culturally different expectations of school, or problems related to socioeconomic status (e. g., availability of equipment, IT-infrastructure), or educational resources of the parents which are linked with the migration backgrounds of the students (Federal Statistical Office, 2021), which may have led to a loss of support for the children in distance learning (Bremm, 2021). It is not possible to assess with the available data if the reported problems were actually caused by the migration backgrounds of the students or if problems were simply attributed to the migration backgrounds by the teachers (Chamakalayil et al., 2022). The challenge of reaching students, partly due to poor technical equipment, which has been highlighted in other studies (Dreer & Kracke, 2021; Gold et al., 2020; Huber et al., 2020), was only partially reflected in our survey. About half of the teachers felt stressed by the difficulties in reaching students. However, only about one third perceived IT problems as a source of stress. Problems in reaching students seemed to be more dominant at higher school levels than at kindergarten, primary, and middle school level. The latter were less dependent on functioning technology for their distance learning than teachers at higher school levels. Moreover, students in Switzerland are comparatively well-equipped with IT (Reimers & Schleicher, 2020). It has also been found that the learning difficulties of students from educationally disadvantaged families were less due to a lack of technical equipment than to difficulties in self-regulated learning and lack of parental support (Huber & Helm, 2020). Slightly more than half of the teachers experienced the preparation, follow-up, and implementation of distance learning as rather or very stressful and as more stressful than preparation and follow-up of lessons at school. This might be due to the great challenge

of the new didactic forms in distance learning for which, according to Helm et al. (2021), some teachers felt poorly prepared.

4.2 Changes in Job Strain, Job Satisfaction and Personal Resources

Teachers had significantly lower job satisfaction in the distance education phase during the COVID-19 pandemic, whereas their work overload and emotional exhaustion did not change compared to the measurement time points during the period of 2.5 years before the pandemic. Regarding personal resources, our analysis showed a significant increase in teachers' perceptions of their own self-regulation compared to previous measures (t1 and t2), and yet a significant decline compared to t1 in teacher self-efficacy in distance education. Thus, hypothesis a) according to which work overload increases on average across the entire sample, must therefore be rejected. This contradicts the finding of an overall self-assessed increase in workload and strain by Hansen et al. (2020). Hypothesis b) that emotional exhaustion did not change during the lockdown, can be confirmed. This is consistent with the result of the study of Weißenfels and colleagues (2021), who found that the burnout components depersonalization and lack of accomplishment significantly increased from the pre- to the post-lockdown survey, whereas emotional exhaustion did not change longitudinally. The result also aligns with the theoretical assumption that emotional exhaustion only occurs when work demands exceed available resources over an extended period (Hobfoll, 1989). Apparently, teachers were able to cope with the increase in workload, or the strain caused by the challenge of distance learning, for that short period during the first lockdown possibly by increasing their self-regulation (Sitzmann & Ely, 2011). The increase in self-regulation at t4 could be interpreted as an indication that teachers strengthen their efforts to self-regulate in response to more demanding conditions. In addition, it seems important to distinguish the strain of distance learning during the lockdown from that in the post-lockdown period. The teachers in Hansen and colleagues' study (2020) felt particularly exhausted by the enforcement of protective measures at school. In contrast, our survey, as well as that of Weißenfels and colleagues (2021), referred explicitly to the lockdown situation.

The decline in teacher self-efficacy due to the distance learning is consistent with the theoretical assumption that self-efficacy changes steadily based on experiences of success and failure (Bandura, 1986; Kim & Buric, 2020). In addition, it is also consistent with the findings of other studies on the effects of the COVID-19 pandemic on teacher self-efficacy (Cataudella et al., 2021; Pressley & Ha, 2021). It can be assumed that the lockdown presented many new challenges for teachers. As at least some teachers did not consider themselves capable of meeting these demands (Huber et al., 2020; Helm et al., 2021), it seems plausible that they experienced more professional failures than before the COVID-19 pandemic. More specifically, our qualitative analyses show that some of the teachers felt that they were not able to reach certain students during the lockdown. Many of the teachers failed to motivate some of their students to learn independently and were

not able to support their self-regulated learning adequately. They sometimes felt helpless when they found that the learning deficits of some students were increasing. This loss of control and the partial impossibility to succeed in dealing with heterogeneity, which is a core task of the profession, is a probable reason for the decreased self-efficacy. In addition, the great uncertainty of the situation, with constantly changing regulations in the transition phase after the lockdown, also represented a loss of control and a stressful situation for the teachers, as the analysis of the qualitative questions clearly showed. Accordingly, teacher self-efficacy should return to its original level once regular on-site teaching returns to normal. However, there are also studies on the impact of COVID-19 pandemic that found a positive change in teacher self-efficacy (Ma et al., 2021; Weißenfels et al., 2021). There may have been improvements in specific aspects of teacher self-efficacy, such as self-efficacy in technological applications for teaching (Ma et al., 2021). In this area, in contrast to the difficulties described above, many teachers had the opportunity for mastery experiences.

As a result of the COVID-19 pandemic, the working conditions of teachers have changed significantly. While distance education met the new requirements in terms of handling the technology, adapting didactics, and maintaining contact with students from a distance (Helm et al., 2021), important job resources, such as direct social contact, were missing during the phase of distance learning. If we take this into account, it is not surprising that teachers' job satisfaction worsened in the survey carried out during the lockdown compared to the earlier time points. This is in contrast with results from other studies, revealing that most teachers had not perceived a deterioration in their job satisfaction (Hansen et al., 2020).

4.3 Interindividual Differences in Changes of Job Strain and Job Satisfaction

We found support for hypothesis c) regarding interindividual differences in the development of work overload due to the demands of the lockdown, depending on teachers' characteristics, using two different analytical strategies. Firstly, using median splits of variables measuring personal resources, work overload, and emotional exhaustion at t1, we tested different trajectories of work overload from t3 to t4. This showed that teachers who had exhibited high work overload and emotional exhaustion at t1 showed a decrease in work overload from t3 to t4, whereas those with low work overload and emotional exhaustion at t1 showed an increase in work overload after the lockdown compared to t3. Thus, unlike Hansen and colleagues (2020), the lockdown did not show a reinforcing effect on the strain of already exhausted teachers in our study. This reinforcing effect does not yet seem to manifest in the lockdown in spring 2020. Rather, it possibly occurred only after the lockdown due to the great uncertainty and the constantly changing protective measures that had to be implemented, maintained, and enforced and that required a great deal of flexibility. It is conceivable that the distance mode was also used in part by highly

exhausted teachers to reduce their effort for work. However, we do not have data on working hours to test this hypothesis.

Second, we conducted LPA to identify different teacher classes with self-regulation, teacher self-efficacy, neuroticism, and extraversion ($t1$), which were found to be relevant predictors of teachers' coping with work stress. We identified two classes of teachers with different profiles of personal resources. The first, 'high resources' class showed high teacher self-efficacy and self-regulation, low neuroticism, and particularly high extraversion. Conversely, the second, 'low resources' class was characterized by low teacher self-efficacy and self-regulation, high neuroticism, and low extraversion. The two profiles showed a different development of strain between pre- to post-lockdown surveys: while work overload increased in the 'high resources' class, it decreased in the 'low resources' group during the lockdown. Possibly, more introverted, and neurotic teachers, with lower self-regulation competencies and a lower teacher self-efficacy, experience the variety of personal social contacts on a normal working day at school (class, students, colleagues, pedagogical staff, parents, day care centre, school management) more as a job demand. The removal of this demand during the lockdown of the COVID-19 pandemic might be the reason for the decrease in work overload for this 'low resources' teachers. In contrast, extroverted, little neurotic teachers with high self-efficacy and self-regulation might experience personal contact and interaction with their students and colleagues more as a job resource than a demand and therefore have experienced a temporary loss of resources in distance education. Under normal conditions this resource can buffer negative effects of job demands. The loss of this job resource accordingly has led to an increase of work-overload for the 'high resources' teachers. This very different individual experience of the lockdown situation may also explain why the work overload did not change on average. This finding expands the focus on an unresolved issue regarding the distinction between challenges and resources in the JD-R model. The perception of job characteristics as demands or as resources seems to depend on the one hand on the work context (Bakker & Demerouti, 2017), but also on attributes of the person. In turn the same working conditions can be beneficial (resource) or harmful (demand) in dealing with job requirements depending on individual preconditions. Accordingly, it could be beneficial for schools to offer teachers individual support opportunities depending on their personal needs.

4.4 Limitations, Conclusions, Further Questions

Our study does not contain a fully representative sample. It includes teachers at the end of their career entry phase, who voluntarily attended a professional development program for teachers in the canton of Zurich, Switzerland, in January 2018. In addition, our sample is limited to teachers of the kindergarten and primary/middle school levels.

The typological approaches we used to examine differential change profiles have several weaknesses. Both, grouping by median-split and LPA represent a simplification of reality.

Profile analyses moreover have some inherent limitations. There is no suitable indicator for absolute model fit and the determination of the optimal number of types based on quantitative criteria is limited, so the decision for a solution is not solely based on objective criteria (Specht et al., 2014).

Nevertheless, our study investigates different trajectories of work overload, emotional exhaustion, job satisfaction, self-efficacy, and self-regulation among teachers before and after the lockdown of the COVID-19 pandemic in Switzerland. However, explanations for individual changes in stress and stress reactions could only partly be addressed. We would therefore recommend further clarification of the processes that have led to the deterioration of self-efficacy and job satisfaction and, at the same time, to improved self-regulation.

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