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Research paper

Teaching in times of COVID-19: A mixed-method study into teachers' teaching practices, psychological needs, stress, and well-being

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HIGHLIGHTS

- Cluster analyses revealed three types of teachers during the lockdown.
- 'Relaxed' teachers reported little stress and less overwork.
- 'Worried and stressed' teachers reported most stress and low psychological need fulfillment.
- 'Happy work-a-holic' teachers reported most overwork but high psychological fulfillment.
- 30–40 year old teachers were overrepresented in the 'worried and stressed' cluster.

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ABSTRACT

The COVID-19 pandemic drastically changed the working life of teachers when schools all over the world went into lockdown. As teaching already is known to be a demanding profession, we aimed to study how teachers dealt with teaching during lockdown, and what kind of job demands and resources were relevant for different teachers. We conducted a cross-sectional mixed method study (questionnaire and interview) amongst 307 Dutch teachers (86% female). Cluster analyses revealed three types of teachers: 'relaxed', 'worried and stressed', and 'happy work-a-holic' teachers. Pro-active, supportive supervisors and connectedness with colleagues proved to be crucial job resources during the lockdown.

In the spring of 2020, schools all over the world closed their doors almost overnight as countries went into lockdown to face the COVID-19 crisis. These measures, unprecedented in recent history on such a global scale, meant a sudden change from face-to-face learning and teaching to what has now been termed 'emergency remote teaching' (ERT; Hodges et al., 2020). Normally, teaching and learning are embedded in real life social interactions, enacted in the material reality of the classroom. These meaningful social interactions, unfolding in the 'here-and-now' of the classroom, are the building blocks for learning and the development of long-term social relations in school (between teacher and students, but also between students as peers and between teachers and their colleagues) (Cadima et al., 2010; Mainhard et al., 2011). Forming social relations in school is a cornerstone of both students' and teachers' growth and well-being (Collie et al., 2015; Motti-Stefanidi et al., 2020). However, in the face of COVID-19 lockdowns, these real-life social interactions between teachers and students became impossible, which may well have had substantial consequences for teachers and students.

While there is a growing body of evidence indicating that the first lockdown and period of ERT led to significant learning losses (Maldonado & De Witte, 2020; Engzell et al., 2020) and decreased well-being for students (Patrick et al., 2020), teachers may have experienced adverse effects of the ERT period as well. First results indeed indicate that teachers experienced high levels of emotional exhaustion, stress, and job ambiguity (Chan et al., 2021). Longitudinal investigations showed that teachers' burnout symptoms increased over the course of the lockdown (Sokal et al., 2020), and that teachers' sense of professional well-being decreased as a consequence of the lockdown (Alves et al., 2020). On the other hand, teachers might also have experienced advantages of the school lockdown, such as saving time in commuting and a more flexible use of their time (Purwanto et al., 2020). After initial

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adjustment, teachers also reported an increased sense of efficacy and accomplishment with regard to their online teaching practices (Sokal et al., 2020). While these studies report a general trend towards increasing stress for teachers as a consequence of the lockdown, each study also reports considerable inter-individual differences in teachers' experiences of stress and well-being.

In the current study we use two combined theoretical models (the job demands-resources model, and self-determination theory) to help us understand why some teachers struggle with the consequences of the school lockdown, while others still experience satisfaction in their work. The first, the job demands-resources (JD-R) model, explains how job stress and well-being arise through two parallel yet interacting processes (Bakker & Demerouti, 2007; Demerouti et al., 2001). The energy-driven process explains how job demands, such as work pressure and emotionally or physically taxing work conditions can lead to stress, which can eventually accumulate to negative long -term outcomes such as decreased work performance and higher chance of burn-out. Although high job demands do not always lead to stress, this can be the case when job demands are consistently high (Bakker and Demerouti, 2007). The most important known job demands for teachers are a high workload (Gu et al., 2020), dealing with disruptive behavior of students (Zee et al., 2017), and poor physical working conditions (Bakker et al., 2007; Hakanen et al., 2006). The consequences of the COVID-19 measures might have led to increased job demands related to, for instance, an increased workload due to having to completely re-design class routines and learning content.

The motivational process in the JD-R model explains how job resources such as support from one's colleagues or supervisor, space for autonomy in the content of your work, and constructive feedback could lead to intrinsic motivation and well-being at work, ultimately resulting in positive outcomes such as long-term job satisfaction and high performance at work. Important job resources for teachers are a positive relationship with their students and colleagues, a cohesive team, support from their supervisor, and a supportive and inspiring school climate (Balkar, 2015; Jansen in de Wal et al., 2020; Tadić et al., 2015).

This motivational process in the JD-R model shows overlap with other well-known theories of motivation, especially self-determination theory (Bakker & Demerouti, 2007; Deci & Ryan, 2000). Jansen in de Wal et al. (2020) point out that although the JD-R model explains what type of job resources may contribute to professional engagement and motivation, the psychological processes that play a role in this link between environment and motivation are not made explicit. This specific link is made more specific by integrating self-determination theory in the conceptual framework. Within self-determination theory, the basic prerequisites for intrinsic motivation are a personal sense of autonomy (i.e., being able to make relevant choices, a sense of agency in working and learning), competence (i.e., being able to meet personally relevant goals) and relatedness (i.e., a sense of closeness to the people around you). The personal context plays an important role in the fulfillment of these basic psychological needs as autonomy support, structure, and involvement are essential environmental conditions for facilitating these needs (Stroet et al., 2013). Interestingly, the motivational process does not only link job resources to motivation but also assumes a 'buffering effect' of job resources on the link between job demands and stress. That is, high job demands do not necessarily lead to stress if there are also valuable job resources.

1. Goals and research questions

With schools locking down to face the coronavirus pandemic, teachers' daily jobs changed drastically. Instead of working whole days in a school that is always buzzing with activity and crowded with students, parents, and colleagues, teachers now mostly worked from home behind their laptop or prepared other forms of emergency remote teaching, sometimes alone, sometimes while simultaneously juggling taking care of a home-bound family. While some aspects of the teaching profession remained similar during the lockdown, we have reason to assume that the new ERT-situation brought new job demands. Working from home, either as a teacher or in another profession, can make it much harder to maintain a healthy work-life balance, especially when work has to be combined with taking care of and home-schooling children (Power, 2020). On the other hand, well-known demands of the teaching profession such as having to deal with disruptive student behavior and classroom management might be less present in the remote teaching situation. Resources that normally foster teachers' well-being at work, such as positive contact with students and colleagues might be jeopardized because of lessened possibilities for spontaneous contact.

Concluding, emerging evidence indicates that teachers might have experienced increased stress as a consequence of the COVID-19 measures and ERT. However, the differences between teachers in the way they experience stress and well-being in their work during the ERT period remain largely unexplained. The aim of this article is to better understand the source of these differences by taking a person-oriented approach, informed by leading theories in organizational and educational psychology. Person-oriented analyses are gaining momentum in the field of educational psychology (Molenaar & Campbell, 2009; Ratelle et al., 2007). A person-oriented approach is 'particularly valuable when the main theoretical and analytical unit is a pattern of factors, rather than individual variables' (Raufelder et al., 2013), such as the job demands and resources in this study. These patterns of factors can be analyzed on a group level, by distinguishing different patterns of factors that apply to different groups of individuals (by means of clustering techniques and latent class analyses). Another approach to person-oriented research, is to uncover causal mechanisms between these factors on the level of the individual, that is, by in-depth case studies (Raufelder et al., 2013). Both these approaches will be combined in this study, thereby providing an in-depth view on how teachers' experiences of stress and well-being are formed in the ERT period during the first 2020 lockdown. This aim is translated in the following research questions:

1. Which profiles can be distinguished in terms of teachers' levels of stress, well-being, basic psychological needs, and job demands and resources?
2. To what extent are these profiles linked to background factors such as the type of school teachers work at, their age, or their teaching experience?

The different profiles established in research question 1 offer a unique chance to gain a person-oriented and deeper understanding of the factors contributing to the experienced stress and well-being of individual teachers. This leads to the final research question:

3. Which mechanisms explain stress and well-being of individual teachers representing different teacher profiles?

2. Method

2.1. Design and procedure

We conducted a cross-sectional mixed-method study that comprised two phases: an online questionnaire was administered

to all participants (phase 1), followed by an in-depth interview with three teachers as case studies (phase 2). In April 2020, one month after the lockdown started in the Netherlands, we recruited teachers from different sectors (primary, secondary, vocational, and special education) via social media (LinkedIn, Twitter, and Facebook) as well as via our own professional networks and invited them to fill out an online questionnaire in Qualtrics (XM Platform). Participants signed an informed consent form prior to taking part in the study. The questionnaire, comprising closed-ended, open-ended, and rating-scale questions, took about 15-20 minutes to complete and was available until June 1st, 2020. At the end of the questionnaire, we asked respondents if they would be willing to participate in a follow-up interview. After completing the cluster analysis on the questionnaire data (see Analysis), we selected participants for the interview (1) whose scores on the questionnaire were most representative for each of the clusters, and (2) who consented to participating in a follow-up study. We approached nine teachers, of whom three agreed to be interviewed. These teachers received and signed separate informed consent forms prior to the interview study. The interviews took place between June and September 2020 via Google Meet and were recorded using this platform's record function. F4 was used for verbatim transcriptions of the interviews. The set-up of the study and procedures for data collection and storage were approved by the Ethical Committee of the Department of Pedagogical and Educational Sciences of the University of Groningen prior to the start of the data collection.

2.2. Participants

Our target population consisted of teachers from all sectors of education (both regular and special education; ranging from primary to secondary to vocational education), excluding higher education. Three hundred and seven participants filled out at least 80% of the online questionnaire. Female teachers were over-represented (86%). The age of teachers (measured by an ordinal scale with 5 ten-year intervals) was approximately normally distributed, with most teachers being between 30 and 39 years of age. Teachers had on average 14.7 years of teaching experience ($SD = 10.0$). Most participating teachers taught in secondary education (40%), followed by primary education (31%), special (primary or secondary) education (15%), and vocational education (14%). Three teachers (all female) participated in the second phase of our study (i.e., follow-up interviews). One of these teachers worked in secondary education, one in primary education (kindergarten), and one in special (primary) education.

2.3. Instruments

In Table 1, the variables included in this study are listed. We included variables that relate to the energy-driven process (stress, overwork ratio, worrying about one's health), and to the motivational process (job satisfaction, work-life balance, autonomy supportive work climate, contact with colleagues) of the JD-R model, and included the experienced basic psychological needs (autonomy, competence, and relatedness) from the self-determination theory. These variables were all measured with several 5-point Likert scale items per variable (1 = fully disagree to 5 = fully agree). The internal consistency of the variables included in our study can be considered good, as Cronbach's Alphas range from 0.75 to 0.90 (according to Hair (2006), values of > 0.70 can be considered acceptable and above 0.80 as good), and the composite reliability scores range from 0.87 to 0.96. The variable 'overwork ratio' equals the reported number of hours worked during ERT divided by the working hours according to one's contract.

For the follow-up interview, we developed a semi-structured interview scheme consisting of 14 main questions. Examples of possible follow-up questions were also specified in the interview scheme. During the interview, two main themes were addressed: (a) the teachers' strategies for teaching during the period of ERT (i.e., how did they teach in the first weeks after the start of the lockdown, what did a typical work day look like for them, did they make any changes in their teaching practices during the period of emergency remote teaching) and (b) teachers' energy-driven and motivational processes at play during the ERT period. We asked about concrete situations in which the teacher experienced high levels of stress, or a high level of satisfaction with their work, the ways in which they coped with stress, and the role their work environment played in their experienced stress, well-being, and fulfillment of their basic psychological needs.

2.4. Analyses

In order to answer the first research question (i.e., To what extent can we distinguish meaningful profiles of teachers in terms of their levels of stress, well-being, job demands and resources?), we conducted a cluster analysis on all variables in Tanagra (Rakotomalala, 2005). We followed the steps formulated by Hair et al. (2006). A clustering of the data is in line with the first aim of our study which is to describe different profiles of teachers, based on the concepts central in our theoretical framework. The first step formulated by Hair et al. (2006) is to explore the data before clustering. The sample size is more than sufficient, based on the guidelines of Dalmaijer et al. (2020) who advise at least 20 to 30

Table 1
Description of scales used in the online questionnaire.

Variable	No. of items	Based on instrument	Crohnbach's alpha	Composite reliability (Average variance Extracted)
Stress	9	General Work Stress Questionnaire (De Bruin & Taylor, 2005)	.90	.92 (.57)
Job satisfaction	5	Teaching and Learning International Survey (Talis) 2013 (Van der Boom & Stuivenberg, 2013)	.78	.89 (.57)
Work-life balance	6	n.a. Self-constructed scale including items on time-management, boundary setting and maintaining interest	.85	.89 (.57)
Worrying about health	4	Penn-State Worry Questionnaire (Berle et al., 2011)	.82	.89 (.66)
Overwork ratio	1	n.a.	n.a.	
Autonomy supportive work climate	7	Work Climate Questionnaire (Baard et al., 2000)	.95	.96 (.76)
Contact with colleagues	2	n.a.	.75	.89 (.80)
Autonomy	3	Basic Psychological Needs Satisfaction and Frustration Scales (Chen et al., 2015)	.78	.87 (.70)
Competence	4	BPNSFS	.85	.90 (.92)
Relatedness	4	BPNSFS	.87	.91 (.97)

participants per expected cluster. Because the variables are measured on different scales, it is advised to standardize the scores. We therefore computed *z*-scores for all variables and used these as input for the clustering. As the data are metric, Eucledian distance is the most appropriate measure of object similarity. The second step is to check the assumptions for cluster analysis: a representative sample and multicolinearity. The assumption of the representative sample might have been violated, as there is some selection/attrition bias to be expected in an online questionnaire about this topic (we will come back to this point in the Discussion). The assumption of multicolinearity is not likely not to be violated: bi-partial correlations between variables ranged between −.46 and .48 and are, therefore, not sufficiently strong to suspect multicolinearity. The third and final step that Hair et al. (2006) describe is the selection of the clustering method. Hierarchical methods of clustering are preferred over non-hierarchical methods when the sample size is under 400, and when the number of clusters is not yet known, so examination of multiple options is necessary. This is the case in our data, and therefore hierarchical clustering (HAC) would be the most appropriate. To evaluate the extent to which the teachers in each cluster significantly differed from each other in terms of the included variables, we compared the scores of the participants in each cluster with a multivariate analysis of variance (MANOVA). To further explore our data, we also performed a *K*-means clustering to evaluate if this would result in similar data clusters.

To answer the second research question (i.e., To what extent are these profiles linked to background factors such as the type of school teachers work at, their age, or teaching experience?), Chi-square tests were used to evaluate the relation between profile membership and categorical individual characteristics; an analysis of variance (MANOVA) to test for differences between the different clusters with regard to years of teaching experience.

Last, for the third research question (i.e., Which mechanisms explain stress and well-being of individual teachers representing different teacher profiles?), we qualitatively explored to what extent teachers' experiences of the ERT-period differed for members of each of the three clusters. To this end, we analyzed the transcribed interviews using a Grounded Theory Approach (Flick, 2018). We first open coded the answers on the interviews, then grouped similar answers together, and as a last step, we analyzed how the codes related to core constructs in our theoretical models (i.e., stress, well-being, job demands, and resources, and basic psychological needs). The coding and analyses were performed in Excel by the first author and discussed with the co-authors.

3. Results

3.1. Descriptive analyses

Of the 307 participants, 286 completed all scale-items relevant for inclusion in the cluster analysis. Based on simulation studies with different clustering methods, Dalmaijer et al. (2020) recommend a minimal estimated sample size of 20−30 participants in each cluster in order to ensure sufficient power of the analysis. For a cluster solution with 3 or 4 clusters, this means that we have more than enough participants to detect meaningful differences between the clusters. Table 2 summarizes the data of these 286 participants. When looking at the distributions of the variables, it is noteworthy that most variables pertaining to job resources, basic psychological needs, and well-being (most notably job satisfaction) are at least to some degree left-skewed, with higher scores being reported more frequently than lower scores. The distribution for stress is right-skewed, while overwork ratio and work-life balance are approximately normally distributed.

Table 2
Descriptive statistics of variables included in the cluster analysis.

Variable	Range	Mean	Standard deviation
Stress	9–45	20.49	8.29
Job satisfaction	8–25	20.67	3.77
Work-life balance	6–30	20.48	5.53
Worrying about health	4–20	10.35	3.97
Overwork ratio	0–3.13	1.22	0.39
Autonomy supportive work climate	7–35	25.94	7.54
Contact with colleagues	3–10	8.46	1.60
Autonomy	3–15	11.21	2.69
Competence	7–20	15.89	3.23
Relatedness	4–20	16.87	3.02

Note. $N = 286$.

3.2. Profiles of teachers

We transformed the scores on all variables to z-scores and used these as input for the hierarchical cluster analysis. A partition into three clusters was suggested as the best fitting solution for the data (between SS-ratio = 0.28). The characteristics of these clusters are summarized in Fig. 1. We labeled the first cluster of teachers ($n = 84$) the *"worried and stressed"* profile. The responses of teachers in this cluster indicate relatively high levels of stress and worry about their health or the health of people close to them. Compared to the other clusters, the mean scores on work-life balance, basic psychological needs (autonomy, competence, and relatedness), job satisfaction, and autonomy support in the workplace are relatively low. The second cluster of teachers ($n = 87$) was labeled the *"relaxed"* profile. The responses of teachers allocated to this profile reported a somewhat better work-life balance than the teachers in the other two clusters. Moreover, most characteristic for this cluster are the relatively low levels of reported worrying and overwork, and lower levels of stress. Last, the responses of 115 teachers are clustered in a third profile, which we labeled the *"happy work-a-holics"* profile. Although teachers in this profile reported on average the highest level of overwork as (albeit marginally higher compared to teachers allocated to the worried and stressed profile), they experienced relatively low levels of stress. Interestingly, teachers in this cluster can be characterized by relatively high levels of fulfillment of all basic psychological needs, high job satisfaction, and an autonomy-supportive work climate. The results of the MANOVA indicated significant differences between the clusters on all dependent variables (see Table 3).

In order to further explore our data and to validate the clustering found with HAC, we also performed *K*-Means clustering. In order to be able to compare the results to the HAC clustering, we set the number of clusters to 3. This analysis yielded a first cluster which closely resembled the 'worried and stressed' cluster found in the HAC. The other two clusters were less comparable to the ones found in the original HAC clustering. Looking at the most comparable clusters, 43% of the participants were placed in a comparable cluster with the *K*-Means cluster. This means that the exact method of clustering indeed mattered for our results.

3.3. Relation between teacher profiles and background characteristics

Next, we examined whether background characteristics of teachers relate to profile membership. First, we looked at the relation between school type and cluster membership (see Table 4). Although we see that primary-school teachers are somewhat overrepresented in the third cluster, the overall relation between type of education and cluster membership is not significant, $\chi^2(6) = 11.11$, $p = .085$. In terms of age, we see a significant relation

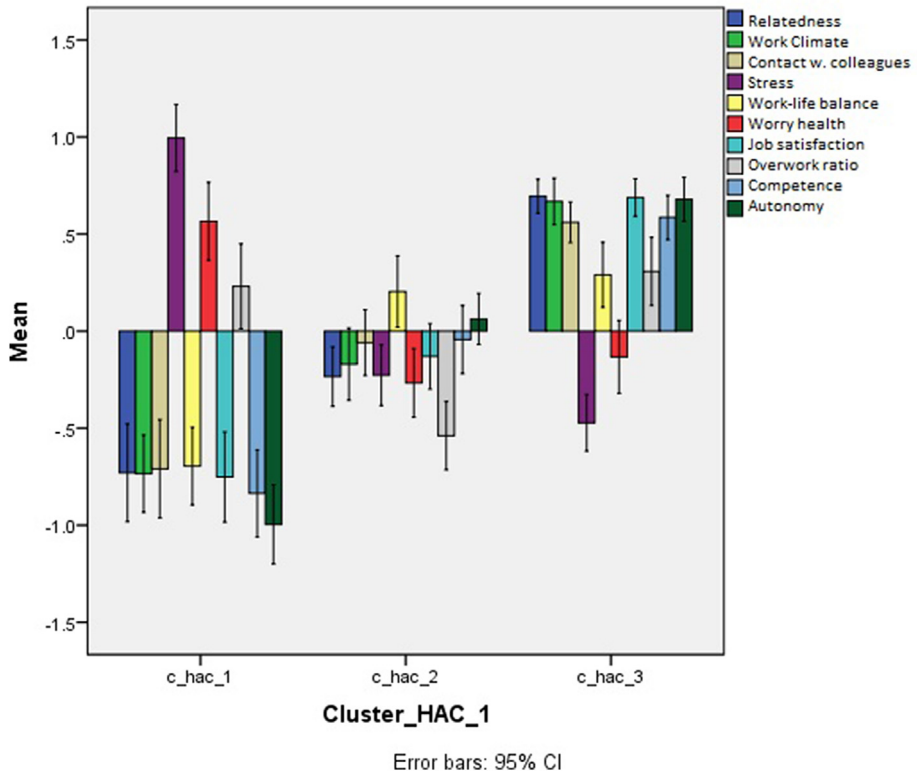

Fig. 1. Means and error bars (95% CI) for dependent variables per cluster (z-scores).

Table 3
Results of the Analyses of Variance for Mean Scores of all variables per Cluster.

	Cluster 1 "Worried and stressed"	Cluster 2 "Relaxed"	Cluster 3 "Happy work-a-holics"	F (2,283)	p
Stress	28.49	18.32	16.28	93.94	<.001
Job satisfaction	17.76	20.11	23.21	81.17	<.001
Work-life balance	16.76	21.76	22.23	33.28	<.001
Worry about health	12.48	9.16	9.70	19.84	<.001
Overwork ratio	1.30	1.00	1.33	23.35	<.001
Autonomy supportive work climate	20.37	24.64	30.99	76.66	<.001
Contact with colleagues	7.32	8.37	9.37	54.51	<.001
Autonomy	8.54	11.38	13.03	130.26	<.001
Competence	13.29	15.83	15.89	72.74	<.001
Relatedness	14.69	16.18	16.87	81.70	<.001

Table 4
Number of participants (percentages between brackets) of different types of education in the different clusters.

	Cluster 1 "Worried and stressed"	Cluster 2 "Relaxed"	Cluster 3 "Happy work-a-holics"
Primary education	20 (22.7)	21 (23.9)	47 (53.4)
Special education	14 (33.3)	12 (28.6)	16 (31.9)
Secondary education	40 (34.5)	39 (33.6)	37 (31.9)
Vocational education	10 (25.0)	15 (37.5)	15 (37.5)
Total	84 (29.4)	87 (30.4)	115 (40.2)

between the age (categories) of teachers and cluster membership, $\chi^2(8) = 20.00$, $p = .010$. Specifically, teachers between 40 and 49 years of age were relatively more often (in 54.2% of cases) allocated to the third cluster (*happy work-a-holics*), whereas teachers in the youngest (20–29 years) and oldest (60–65 years) age groups were relatively more often allocated to the second cluster (*relaxed*), with respectively 46.2 and 45.5 percent of cases allocated to these profiles. The relationship between years of teaching experience and cluster membership was not significant, $F(2, 283) = 1.55$, $p = .213$), suggesting that starting, intermediate, and (more) experienced teachers were about equally distributed among the profiles.

3.4. Three case studies: teaching practices, stress and well-being during the lockdown

In order to gain insight in the mechanisms underlying teachers' stress and well-being whilst teaching during the pandemic, we held in-depth interviews with one teacher from every cluster. The end result can be summarized in three teacher-specific 'idiographic theories' with which we aim to illustrate the interaction between job demands, resources, well-being, stress, and ERT-practices during the first national lockdown.

3.4.1. Case 1 (drawn from the 'Worried and stressed' cluster)

Context. This teacher is relatively new to the field, as she just started teaching at a secondary school for vocational education. She lives with her partner and their two young children. She teaches at a regional school with students living either in villages or in the nearest city. In terms of SES (educational level of the parents), the student population is quite mixed. The teacher indicates that she feels very much at home at this school, and despite only working there for five years, states: *"I hope to never leave this school."*

Strategies for Emergency Remote Teaching. Based on her experiences with teaching during the lockdown, it becomes apparent that this teacher adapted her strategies for online teaching throughout the period of the lockdown as she experienced which strategies did and did not work. Initially, she started out with solely a-synchronous teaching: she pre-recorded audio instructions integrated in a PowerPoint presentation and uploaded these videos along with assignments on an online drive. By using the same presentation lesson format, she hoped to provide a recognizable lesson structure for her students. Her students were expected to upload their finished assignments in the same platform, but it quickly turned out that there were large differences between students in the extent to which they actually did this. Notably, in the very first weeks of the lockdown, all teachers worked independently and used different ways of communicating with students (via mail, different online platforms etc.). After a few weeks, she noticed that this way of working was confusing for the students (who have contact with many different teachers), and that live teacher-student contact would be much more desirable for the students. This led to a different, school-wide strategy. All teachers were instructed by the board to use the same online platform for distributing and receiving assignments, and to have one live online meeting with each class each week. These live sessions were mandatory for students.

Job/Personal Demands and Stress. Especially in the first weeks, the teacher experienced that she was very stressed and totally overwhelmed with the new reality of teaching from home and having combining her teaching tasks with taking care of the children:

> "So then you suddenly have your child at home with a cold, and there's work constantly talking to you. You constantly get mails from all kinds of companies with the new corona measures. Every half hour [there is] a push message. And everyone just wants something from you. And then you also have a child that you have to pay attention to. Especially that constant overstimulation that I experienced in the first two weeks, that was what affected me the most. […] There's a sense of powerlessness that you have."

There are several factors that seem to contribute to this teacher's experiences of stress. First, the boundaries between home and work are rapidly shifting in the lockdown. Her work and personal life, especially her children, ask for attention simultaneously. She describes situations where she has to divide her attention simultaneously: *"So I would be here at the kitchen table with a baby crawling around so with half an eye on my child and half an eye on my computer."* Second, there were increasing job demands that related to adjusting work to the new situation. For example, this teacher experienced an increase in time spent on communicating, since all discussions with colleagues now took place via email. Also preparing online lessons took much more time than usual, which resulted in overwork. Third, another increased job demand was trying to keep contact with all students, some of whom were hard to reach. She felt as though she was losing grip on some of her students, which caused worry.

Job Resources, Basic Psychological Needs and Well-Being. A recurrent theme is that some of the things which normally are important positive resources for the teacher, namely (informal) contact with the students and with her colleagues, fell away during the lockdown. She missed the conversations and jokes from the students, and the fun she had with colleagues during meetings. Apart from the informal contact, the teacher emphasized that in her subject, interaction and discussion between students in the classroom is an important feature that is almost impossible to match in an online setting: *"And certainly my subject, is a really interactive subject. Where you have conversations with one another. That is why I like it so much. And that just isn't there anymore. The interaction is gone. It just consists of questions now. 'Miss, I have a question.' That's it."* Altogether, this lack of contact —which normally is an important job resource—stripped away a large part of the joy she got from her work. *"Yes you know, this digital teaching, it is because there is no other way, because you have to. But I don't like it one bit."*

Considering the support she got from her supervisor and the board of the school, it becomes clear that it took a while before there was a clear strategy communicated on how to work and teach during the lockdown. Only after the first weeks, the board put a structure in order for the teachers to work from. Regarding the contact with her direct supervisor, the teacher indicated that she appreciated the possibility for short online meetings, in which she could talk about how she was doing, as well as regarding specific work-related questions. These meetings confirmed her pre-lockdown feeling of being appreciated and cared for within the organization. She specifically asked for confirmation about decisions she made in adjusting her lessons and how she was teaching online, as she indicated feeling somewhat insecure about some aspects of her teaching online. *"Yes, also sometimes I get very scared that I do something wrong with these tests and that the inspectorate will get angry with me or something, you know. So with these kinds of things I like to get* support *from my supervisor if I do something in a certain way."*

Looking specifically at the basic psychological needs, a first emerging theme is the teacher's overall limited sense of agency and autonomy during the period of emergency remote teaching. She literally describes a sense of powerlessness, both when relating to the increased caretaking demands at home as well as related to her work, for instance when she describes the limited possibilities for engaging students in her lessons. Although she initially got a lot of freedom from her supervisors to design her distance education as she seemed fit, the initial lack of clarity and vision from the management might also have contributed to her feeling overwhelmed which in the end was counterproductive for her sense of autonomy. Because interaction with her students is an intrinsic part of her subject, this also directly affects her sense of competence as a teacher. We do have to note the differences between students here, which greatly increased during the ERT period. With some of the students, the teacher achieved better results than she initially had hoped for, while with other students she completely lost contact in spite of several attempts to get them engaged. The relatedness with students and teachers declined, as explained earlier, due to a lack of

live, on-site contact.

3.4.2. Case 2 (Drawn from the 'relaxed' cluster)

Context. The second teacher is a beginning primary school teacher who started teaching one year ago. During the ERT period she held a part-time job in a small school in a rural area where she teaches in kindergarten (note that in the Dutch educational system, kindergarten is officially part of primary school). When asked to describe her school, this teacher notices both the closeness of the team of colleagues, and high involvement from the parents. A recurring personal value is professional development through and next to teaching. Although she is happy to work at this school, she does not aim for a full-time job because she aspires to fulfill other roles in her career next to teaching.

Strategies for Emergency Remote Teaching. Together with her colleagues of the kindergarten section, a combination of online, asynchronous teaching and providing the students (through the parents) with 'offline' teaching materials is established. This strategy was established quickly and maintained throughout the lockdown. One day per week, the colleagues of the kindergarten section came together in the school to compile packages with offline teaching materials for each student which can be picked up by the parents, and to prepare online content in the form of videos. The online content was shared in an app which the school already used to communicate with parents, but the possibilities in this app were further explored during the period of the lockdown. Teachers uploaded the lesson content which could be viewed by the students and parents at home, and in return they could send messages to the teacher, share pictures or videos of finished work etcetera, to which the teacher could then respond. The intention was to provide the students with some tasks each day, but also limit the demands on parents: *"[…] just to take over the parents' work as much as possible that they have to supervise [their children]. Because we made the videos as well. So basically, we made it as easy as possible for the parents that the children could do something independently. But yes they're still four-year-olds so …".*

Job/Personal Demands and Stress. Regarding the energy-driven processes at play (job demands and personal demands which potentially lead to stress), a recurrent theme is that this teacher did not feel particularly stressed during the lockdown: *"But in general during that whole Corona period, I was just more relaxed really. Because all social things also fell away, there were no sports or whatever."* The teacher worked a few hours less compared to her regular work schedule and indicated that at times she felt guilty about that. Both the reduction in work hours and a less busy social life indicate low demands from her job as well as from her personal life. Concerning the demands of interacting with her students, this teacher experienced both advantages and disadvantages of this period. At the end of the lockdown the school reopened first with small classes, which enabled the teacher to provide much more individual attention to students. However, during the lockdown the teacher experienced large differences between the intensity with which the parents kept contact. Because of the a-synchronous teaching and the age of the students, the teachers were fully dependent on the parents to maintain contact, and this led to some parents and students having very little contact with the teacher. The teacher felt therefore as though she was losing grip on some of the students.

Job Resources, Basic Psychological Needs and Well-Being. Relating to job resources, one prevalent theme in the data is that the teacher felt that even in these unusual circumstances, matters were taken care of smoothly and quickly in her school, both by the school board and director and within her team with her direct colleagues. *"[The members of the board] were really anticipating that the schools would close and so quite a lot was being taken care of. […] We had everything arranged quite quickly."* Furthermore, the teacher felt supported by the board. On the one hand, a general framework of how to work (all teachers in the school used the same app for online lessons and communicating with parents) was communicated by the board. On the other hand, the teachers had freedom within this frame to design their own lesson content and strategy for teaching. That is to say, the board both provided structure for the teachers while at the same time being autonomy supportive. This relates to the teacher feeling autonomous as well as feeling competent. Another dominant theme for this teacher was her sense of connectedness with her colleagues. Notably, she used 'we' as opposed to 'I' frequently when it came to describe her experiences. From her descriptions of a typical work day during the lockdown, it becomes clear that the teachers in the kindergarten section worked very closely together: *"And we were with four colleagues. […]. And of course, then we had a certain theme. So we would all look for assignments [to go with that theme] and one of us would find materials for one assignment and one for the other assignment. And we thought, we should also have an instruction video to go with this. So one of us would make that video for the assignment, or would read a story. Someone else did that."*

This teacher indicated that the period of emergency remote teaching and the close collaborations that went with it, actually helped her to find her place in the team of colleagues. From these close collaborations, and her indicating that everything went smoothly, emerged a sense of pride*: "Now, if we have a meeting we also look back proud of what we achieved all together."* What helped as well with this sense of accomplishment was that the team received positive feedback on their work from both the parents of the students, and from the school board.

The main picture that emerges from this case is that of a teacher who experienced relatively little stress in her job and a great sense of well-being and accomplishment. On the one hand, the limited job demands (in some ways limited by the lockdown itself) evoke little stress; on the other hand, several strong indicators of job resources (an organized, supportive work climate in all layers of the organization) contributed both to 'protecting' this teacher from the effects of job demands on stress, while also directly impacting upon the teacher's fulfillment of the basic psychological needs for autonomy, competence, and relatedness (mostly with colleagues, to a lesser extent with parents and students) and thereby leading to a positive sense of well-being.

3.4.3. Case 3 (from the 'happy work-a-holic' cluster)

Context. The third teacher is an educational professional with more than 30 years of work experience who has had different roles throughout her career. She started out as a teacher in regular education, was an educational counselor, and, after starting at her current school, combines this role with being the school's IT coordinator. Although she currently does not teach, for the sake of consistency we will still refer to her as 'Teacher 3'. After working at different schools for regular (primary) education for most of her career, her current job is in a school for special (primary) education. The school has a regional function, meaning students either live close to the school or are referred to this school from other villages. The teacher describes the student population as mixed in terms of SES, and indicates that since the implementation of the law on Inclusive Education in 2014, the severity and complexity of special educational needs of the students increased. An important theme which was leading throughout her career, was that constantly looking for new challenges is what makes her work life meaningful.

Strategies for Emergency Remote Teaching. Although the teacher did not actually teach students herself in this period, because of her role as an IT coordinator she became a central figure in shaping distance education at this school during the lockdown.

She realized soon that everyone came to her with questions: both teachers and the school management. These questions ranged from practical matters (e.g., working with new online tools and arranging laptops or other devices for students who did not have access to these at home) to establishing a strategy for ERT suitable for this school, and selecting online platforms and tools that the teachers could use. The teachers would also come up with their own initiatives which she, if deemed successful, would communicate to the rest of the team. In the formal strategy, which she formulated together with the school board and in collaboration with the teachers, two principles were leading. First, considering the vulnerable student population, maintaining contact with all students was given absolute priority. The most vulnerable students could still physically attend school. Students working from home (and their parents) were regularly called by the teachers and were asked how they were coping with the situation. Students working from home were provided with a laptop if they did not have access to one at home. If needed, teachers went to the students' homes to visit them personally (considering social distancing measures). Second, in terms of content, all teachers would aim for repetition of previously taught content and consolidation of previously learned skills rather than offering new content. Again, this choice was made with the specific student population in mind and in order to prevent differences between students to increase. In order to keep this interesting for the students, they were offered a variation in offline and online assignments.

Job/Personal demands and Stress. Her role of IT-coordinator brought along several new job demands during the period of ERT. A recurring theme during the interview was that this new role came with greater responsibilities, especially with regard to designing and communicating the school-wide ERT-strategy. She was well aware of the effects that the lockdown would have on the students (similarly to the other two teachers, she also experienced differences between the students in the extent to which she could reach them). Furthermore, although the strategy 'repetition and consolidation of skills instead of offering new content' was chosen deliberately and was supported by the whole team, she could worry about the long-term effects of this choice such as the delay students experienced: *"What cost me a lot of energy? Well, hoping you are doing the right thing. To [aim at] skill consolidation and to not go further with the content. Because, you can't catch up with this delay. You are working with actual children […] It is a choice that you made and […] that is something I worried about. I still do a bit. So it means that this group of students, until the end of their school period really, will always keep a certain delay. Because you can never catch up these weeks. […] And I hope, please, that the inspectorate will not judge us for this. I don't expect they do, but still."*

While working from home instead of school, Teacher 3 also felt that the boundaries between her private life and work were fading during the period of ERT. Not distracted by caretaking responsibilities at home, she found herself working long days behind the computer. She worked more hours than usual and often continued to work in the evenings. *"You never have a moment [where you say]: in a while, at 5 o'clock, I'm going to close off my office and go home on my bike. Get a breath of fresh air."* Especially in the first weeks, she was flooded by requests from colleagues, as well as by acquisition from commercial companies specializing in e-learning. However, she found a way of coping with this by organizing her mailbox inbox first thing in the morning which made matters more manageable. In spite of the overwork, she also saw the advantages of working from home. In this way, she could avoid close contact and thereby also reduce the chances of being affected by the virus.

Job Resources, Basic Psychological Needs, and Well-Being. Despite high job demands, Teacher 3 could also describe sources of energy during her work. A recurring theme was working together as a team, both with teachers and with the school management. Her role as a key figure in shaping distance education at this school led to frequent contact between her and her colleagues, not only by mail but also by telephone or in video meetings. Concerning the management, she felt supported to take initiative in shaping the school's distance education strategy. Regarding her sense of competence and autonomy, an important theme was that taking initiative, dealing with complex new challenges and finding solutions for both everyday and complex problems proved to be a great source of energy during the period of ERT. This effort did not go unnoticed by her colleagues: *"So my colleague and I put this whole proposal on paper of why we chose for skill consolidation and to not go further [with new content]. And we got many compliments on how we put that into writing and how we had consulted everyone."* The close contact she had with colleagues fostered her sense of relatedness with the team, which consisted not only of working closely together but also of having fun together.

Taken together, the experiences of Teacher 3 during the lockdown indicate a situation that was high in job demands due to increased responsibilities within the school. However, what seems to help this teacher was the intrinsic joy she would get out of solving problems, which made the job demands challenges that she could cope with instead and experienced a sense of agency, rather than external circumstances that she could do little about. Also, she described important job resources and a feeling of both being supported by, and working closely together with, colleagues from different levels of the organization.

4. Discussion

The aim of this study was to shed light on how teachers dealt with emergency remote teaching during the first COVID-19-lockdown, a unique period in recent educational history, informed by theories in organizational and educational psychology. By taking a person-oriented approach we were able to distinguish groups of teachers who had different experiences during the first lockdown. We also got a more detailed insight in the mechanisms on the individual level which might explain why certain teachers experienced more stress and lower levels of wellbeing than others.

4.1. Dutch teachers' stress and wellbeing, job demands and resources

In general, our data shows that the average stress levels of Dutch teachers during the first lockdown are not exceptionally high. This was somewhat unexpected, considering the fact that teaching already is known to be a highly demanding profession (Day et al., 2011) and the first reports on the effects of the COVID-19 lockdowns on teacher's well-being and stress pointed to elevated stress levels (Alves et al., 2020; Sokan et al., 2020). What might have played a role here is that this study took place relatively early in the COVID-19 crisis. Work pressure and fatigue build up over time and it is possible that teachers experienced more stress as the crisis progressed.

Although the average stress levels of teachers in our sample were not substantially elevated, there are substantial differences in their experiences. One subgroup of teachers *("worried and stressed")* was characterized by high levels of stress, high job demands but low job resources, and little fulfillment of the basic psychological needs. A second group of teachers *("relaxed")* consisted of teachers who experienced relatively low levels of stress, were satisfied with their jobs, and had medium levels of job resources combined with somewhat lower job demands. And third, the largest group of teachers *("happy work-a-holics")* reported both

high job demands and high job resources, experienced relatively little stress and high job satisfaction. Although we did not test the relationships between the separate variables, these results are in line with the job demands-resources model (Bakker & Demerouti, 2007): the combination of high job demands on the one hand and low job resources on the other are expected to lead to stress. Experiencing a lower level of stress can be due to having low job demands (as we see in the second group), but can also be a consequence of the combination of high work demands and high job resources, as is apparent in the third group.

The different teacher profiles hold no relation to the type of education in which teachers work, nor to their level of teaching experience. We did observe, however, a relation between the profiles and teachers' age, with teachers between the ages of 30 and 39 years of age being overrepresented in the *"worried and stressed"* cluster. During the lockdown, with people bound to their homes, the boundaries between work and private life blurred completely. In terms of work stress, this could be especially problematic for parents of young children who had to combine their work with taking care of, and homeschooling their own children. Moreover, recent studies have shown that especially women (who were overrepresented in our sample) carry the increased childrearing demands as a consequence of the lockdown (Zamarro & Prados, 2020). In combination with an already demanding teaching job, this combination of increased responsibilities at home and at work might pose a serious risk for burnout of this specific (age) group of teachers.

From the case studies, we learned which mechanisms might play a role in explaining individual teachers' stress and well-being. Some of these mechanisms confirm our literature-based expectations. For example, one important job resource during the pandemic proved to be a school environment that provided structure (for instance, by prescribing the contours of a strategy for ERT, providing teachers with online tools to use, giving constructive feedback) while simultaneously allowing teachers to develop their own initiatives and thus create a sense of 'ownership'. This balance between providing structure and supporting employees' autonomy is a cornerstone of good management in general (Collie et al., 2018) and seemed to have played a similar role in schools during the pandemic.

At the same time, we see in our results that some job demands and resources are altered during the ERT period. Key factors in teachers' well-being are normally the meaningful social interactions they have with both their students and with their colleagues (Collie et al., 2015). An important mechanism for the teacher in the 'worried and stressed' cluster was indeed the lack of fulfillment she got from the online classes in which interactions between her and the students were badly missed. All teachers reported worries about students they had limited or no contact with. In the two cases where teachers reported high levels of well-being, there was a pronounced feeling of coping with the challenges of the ERT period together with colleagues, as a team, supported by the school management. This experience of (sometimes increased) teamwork led to an experience of fulfillment in teachers' work in these extraordinary circumstances. These results are also in line with the self-determination theory, where relatedness to colleagues is considered an important prerequisite for work engagement.

Another finding that can be interpreted in the light of self-determination theory is that teachers' experiences of autonomy differed between the three case descriptions. As the first COVID-19-lockdown asked for over-night new educational initiatives and innovations in the way teachers dealt with their work, an important question is how teachers' innovations and initiatives were supported by the school management. The teacher in the worried-and-stressed cluster initially had complete freedom in the way she arranged her teaching, but later it turned out that this lack of boundaries created uncertainty for teachers and students alike. The teachers in the other two clusters had boards who on the one hand set clear guidelines and made sure that innovation were adopted school-wide, and on the other hand supported and appreciated teachers' own initiatives. As found earlier in research on creativity and innovation in education, an environment that provides a combination of structure and autonomy support is a prerequisite for productive innovation and problem-solving (Sawyer, 2017).

4.2. Limitations and recommendations for future research

The current study provides an in-depth picture of teachers' well-being and stress in the relative beginning of the Covid-19 crisis. Its timeliness is a strength as well as a limitation. Because of rapid developments and more lockdowns during the past year, stress levels might be higher several months after the initial lockdown. On the other hand, strategies for remote teaching may also be more firmly implemented in subsequent lockdowns. In order to capture long-term mechanisms at play during the covid-19 crisis in education, it would be worthwhile to conduct a follow-up study.

Selection and attrition bias might also play a role in some of the results we found in the first phase of data collection. Given the fact that we used an online survey that took about 15 min to complete, the teachers who were most stressed might have been less likely to respond to or complete the questionnaire. Therefore, we speculate that the prevalence of the 'worried and stressed' teacher profile might be proportionally higher than indicated by the data. However, the findings in the second phase of our study point to three highly different qualitative experiences of the first lockdown which we believe are a valid and representative view of how teachers coped with the lockdown differently in different work circumstances. Furthermore, our approach of performing a second cluster analysis with a different clustering technique (*K*-Means instead of hierarchical clustering) seems to suggest that the exact groups found in our data depend to some extent on the exact clustering method used.

Although we found indications for causal mechanisms in line with the JD-R-model on the level of case studies, we did not test these same mechanisms on the group level. Forming 'ideographic theories' at an individual level is a meaningful way to start because group-level mechanisms might not be generalizable to individuals. In the future, these causal mechanisms have to be further validated by predictive (statistical) models on the group level.

Although profiles hold for different types of education, it would be interesting to also include higher education in a next study, because teaching adults through (emergency) online education might pose unique challenges.

4.3. Implications for practice

Our results have several relevant implications for education, not only during possible future lockdowns, but certainly beyond that as well. First, although the average stress level of teachers during the period of ERT was not particularly high, there seems to be a more vulnerable group of teachers experiencing high levels of stress and low resources in their job. School management needs to be attentive to these teachers who could be more susceptible for long term disadvantageous outcomes such as burn out. This vulnerability could be due to personal circumstances such as caretaking responsibilities or vulnerabilities in being able to cope with unexpected stressors. Although the 'worried and stressed' teachers were a minority in our study during the first lockdown, it could well be that chronic stress of a prolonged coronavirus pandemic makes

more teachers susceptible to fatigue and stress. It is important for all teachers, but especially for this group, that supervisors create an environment that supports teachers by offering a common structure and strategies for ERT, while at the same time supporting autonomy and individual initiatives. Also, this study highlights the importance of working as a team, even though working from home might create some challenges with regard to informal contact among colleagues. Supervisors can play a role both in maintaining contact with individual teachers themselves, and in creating opportunities within the school for teachers to interact.

Another point relevant for practice is the accountability for student results during the lockdown. The interviews highlighted that teachers could worry about the learning losses students were facing as a consequence of the lockdown. These worries unfortunately seem justified, especially for students from disadvantageous backgrounds (Engzell et al., 2020). In the interviews, however, teachers also voiced their concerns of being held accountable for these delays by the inspectorate of education. For both teachers and students, it would be strongly advised if the inspectorate takes a constructive stance that is aimed at supporting schools where delays seem most prominent instead of focusing on accountability during this exceptional period.

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