



# Job load, job stress, and job exhaustion among Chinese junior middle school teachers: Job satisfaction as a mediator and teacher's role as a moderator

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## Abstract

Job exhaustion is not uncommon among Chinese middle school teachers, but the key antecedents of job exhaustion and the underlying mechanisms in this historically underrepresented population remain poorly understood. This study examined the association between job demand and exhaustion, and tested the mediating role of job satisfaction and the moderating role of teachers' role (i.e., homeroom versus subject) in this association. The two-wave, China Education Panel Survey data from 701 Chinese junior middle school teachers ( $M_{\text{age}} = 30.05$  years old,  $SD_{\text{age}} = 7.86$ ; 78.75% females) were used. Primary hypotheses were tested using structural equation modelling. Results indicated that job load rather than job stress at Wave 1 was positively associated with job exhaustion at Wave 2 indirectly through its negative association with job satisfaction at Wave 2 only among subject teachers; in contrast, for homeroom teachers, job satisfaction at Wave 2 was the only factor that was identified to be negatively associated with job exhaustion at Wave 2. Notably, all significant associations emerged after controlling for a number of covariates, including job exhaustion at Wave 1. Such findings shed initial light on the complexity inherent within the phenomena of middle school teachers' occupational health in a Chinese cultural context. Reducing teachers' work load associated with long working hours and promoting teachers' job satisfaction may be effective ways to relieve and prevent job exhaustion, especially for Chinese subject teachers.

**Keywords** Job demand · Job exhaustion · Job satisfaction · Middle school teachers · Chinese

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## 1 Introduction

China has long been known for a highly competitive education system in which teachers usually devote enormous time and energy to their daily work, including teaching, student guidance, and class management (Ye & Zhao, 2019). In the meantime, they face considerable stress from various sources, such as high expectations from parents, school, and the society regarding students' academic success (Yin & Lee, 2012). Such circumstances are particularly applicable to Chinese middle school teachers because students' performance in the middle school stage is directly related to their prospect of being admitted to colleges (Hill & Wang, 2015). Besides, in contemporary Chinese societies, there seems to be a trend that schools are becoming increasingly market-oriented and regulated by economic principles (Cameron & Quinn, 2011). This contributes to some significant changes in the relationships among teachers, students, and parents, such that teachers as the providers of education services are expected to cater to students' and parents' preferences, attend to students' and parents' criticisms, and even sometimes unconditionally satisfy students' and parents' educational needs because they are the "customers", which likely increase teachers' job load and stress, decrease teachers' job satisfaction, and contribute to their job exhaustion (Guo & Kilderry, 2018). Overall, Chinese middle school teachers' job load and stress are substantial and their job exhaustion is not uncommon (Shackleton et al., 2019).

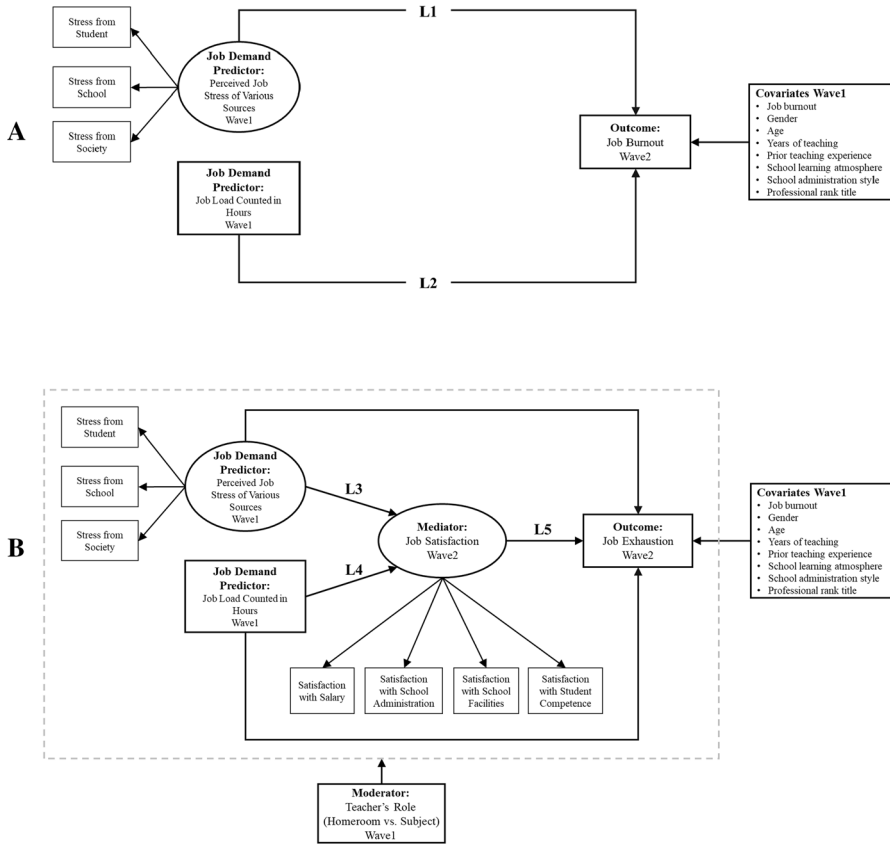
Yet, Chinese middle school teachers' occupational health and its predictors and underlying mechanisms remain understudied, despite the well-documented implications of teachers' occupational health for their well-being, students' academic achievement, and societal development (García-Arroyo et al., 2019). Moreover, job demand and its associations with job satisfaction and exhaustion may be different between Chinese homeroom and subject teachers (defined as whether the teacher is in full charge of the class) given their disparate role responsibilities. However, few studies have examined the potential differential job experiences between these two groups.

Overall, the present study sought to examine the association between job demand (i.e., job load counted in working hours and perceived job stress from various sources) and job exhaustion in a sample of Chinese teachers. More importantly, this study also tested the potential mediating role of job satisfaction and the possible moderating role of teachers' role (i.e., homeroom versus subject teachers) (see Fig. 1 for an illustration).

## 2 Conceptualization, theoretical framework, and empirical evidence

### 2.1 Job exhaustion: Conceptualization and prevalence

Job exhaustion is a chronic state of physical and psychological depletion that is mostly influenced by excessive job demands (Caldwell et al., 2019; Shirom,



**Fig. 1** The models for the direct effect (a) and the mediating effect (b). Note  $L_n$  ( $n=1, 2, 3, 4, 5$ ) represents the path coefficients

1989). Historically, research on job exhaustion emerges from Maslach’s (1982) influential model of burnout, in which job exhaustion is considered as a core component of job burnout (Hansen & Pit, 2016; Koeske et al., 1989; Kristensen et al., 2005; Maslach et al., 2001; Pines et al., 1988). Furthermore, it has been identified as one of the most robust contributing factors for job burnout among teachers (Kokkinos, 2006). Recent research also indicates that teachers often report high levels of job exhaustion (Burrow et al., 2020; Yin & Huang, 2021). Teachers’ experiences of job exhaustion have been associated with their physical problems (e.g., stress-related diseases; Wolfram et al., 2013) and psychological symptoms (e.g., depressive symptoms; Burrow et al., 2020). Teachers with higher levels of job exhaustion also tend to display lower job satisfaction and higher turnover intention (Delali et al., 2020; Lee et al., 2019; Mudau, 2016). Moreover, teachers’ job exhaustion is also associated with students’ compromised individual and educational outcomes, such as negative self-concept, diminished learning interest, poor academic achievement, and low school satisfaction (Arens & Morin, 2016;

Klusmann et al., 2022). Thus, it is critical to systematically examine the etiology of teachers' job exhaustion.

Notably, a meta-analytical review of teachers' job exhaustion across 36 societies indicated that Chinese teachers' levels of emotional exhaustion in work ranked the second highest across all countries (García-Arroyo et al., 2019). Against the background of fierce competition in college entrance examinations, middle school teachers have been commonly rated as one of the most stressful job positions in China (Fan & Cheng, 2017). Chinese middle school teachers often have to overwork for six or even seven days per week to guarantee and improve students' academic achievement (Zhang & Zhu, 2007); and the class size is often quite huge (e.g., on average 60 or even more students per class; Yong & Yue, 2007). In addition, emotional investment and burdens in Chinese middle teachers' daily work also can be substantial (e.g., expected to always demonstrate passion in teaching; Yin & Lee, 2012).

## 2.2 Job demands : Conceptualization and prevalence

According to a job demands-resources model (Demerouti et al., 2001), job demands refer to the psychological, physical, social, or organizational aspects of the job that require sustained psychological and/or physical efforts and are, therefore, likely to be associated with various forms of psychological and/or physical costs. Specifically, job demands can be reflected in the more subjective stress that individuals experience in undertaking job responsibilities and also in the more objective load such as time that individuals devote to completing work tasks (Schaufeli & Bakker, 2004; Schaufeli et al., 2009).

Chinese middle school teachers face great job demands in daily work lives, which involve intensive teaching tasks, student guidance and class management responsibilities, and pressure associated with high expectations for student academic success from school evaluations, parents, and the society (Jiang et al., 2016; Ju et al., 2015; Yin & Lee, 2012). A nationwide survey indicated that Chinese middle school teachers reported the highest levels of job stress (with a detection rate of 75.60%) as compared with teachers from other types of schools (School of Public Administration and Policy, Renmin University of China, 2005).

## 2.3 Job demands and teachers' job exhaustion: Theoretical foundation and empirical evidence

*Theoretical foundation* The hypothesis that teachers' job demands is associated positively with their job exhaustion was deduced from the Symbolic Interactionism theory (SI; LaRossa & Reitzes, 2009; White & Klein, 2008). The SI theory posits that the greater the diversification of roles, the greater the role strain. Teachers with more complex combination of roles, such as coordinators of subject teaching, fully responsible persons for students' learning, health, and life, as well as class organizers and leaders, tend to experience more heightened job demands and thus more likely to suffer from role strain (Shi, 2021). Moreover, consistent with a stress response system theory (Maslach et al., 2001; Schaufeli & Taris, 2014; Sonnentag &

Fritz, 2015), prolonged experiences of job stress may incur a disequilibrium of the cognitive-emotional-environmental system and increase the vulnerabilities to physiological/psychological problems, and then result in job exhaustion.

*Empirical evidence: Teachers' job stress and exhaustion* Teachers' job stress as a contributor to job exhaustion has been widely examined (Ho, 2017; Pogorec et al., 2019; Skaalvik & Skaalvik, 2016). However, existing research on job stress and exhaustion was predominantly based on Western samples. As compared to teachers in Western societies, Chinese teachers typically handle a much larger class because of the huge population base and often shoulder greater teaching and management burdens due to the fierce education competition nationwide, especially those working in the middle school system (Yong & Yue, 2007). Thus, Chinese middle school teachers tend to experience elevated levels of job stress, which likely, in turn, results in poor job performance over time and job exhaustion ultimately (Ho, 2017). To our knowledge, very few studies have examined the link between job stress and job exhaustion specifically among Chinese middle school teachers (Wang et al., 2015; Zhang & Zhu, 2007). The available slim body of studies yielded results consistently indicating that Chinese middle school teachers with higher job stress tended to experience higher exhaustion at work. Notably, these examinations were cross-sectional in design and conducted in Chinese regional samples. Thus, longitudinal research based on national representative samples of Chinese middle school teachers is pressing.

*Empirical evidence: Teachers' job load and exhaustion* Teachers' job load can be primarily indexed by the time they typically spend in performing various daily tasks (Higton et al., 2017; Philipp & Kunter, 2013). When high levels of job overload extend over a long period of time, teachers are likely to suffer from chronic stress and display physical and mental health issues, such as emotional fatigue, which in turn may foreshadow job exhaustion in the long run (Sonnentag & Fritz, 2015; Steinhardt et al., 2011). A number of studies have indicated that teachers' job load was a vital antecedent of job exhaustion. There exists a moderate correlation ( $r = .40-.44$ ) between teaching-related workload and emotional exhaustion (Avanzi et al., 2018; Kokkinos, 2007). However, job load in previous studies was predominantly conceptualized as teachers' perceived overall job load rather than measured with specific indicators such as working hours (Kember & Leung, 2006). Teachers working for long hours (45.8 h per week) tended to feel exhausted (Sonnentag, 2005; Timms et al., 2012). Therefore, we specifically investigated the association between teachers' job load in classroom teaching and exhaustion in this study.

## 2.4 The mediating role of job satisfaction: Theoretical foundation and empirical evidence

*Theoretical foundation* Deduced from the theoretical construct of role satisfaction in the SI theory, teachers' job satisfaction refers to teachers' overall subjective evaluation of the degree to which they feel happy and content with the current teacher position when various factors with respect to this job are considered, including salary, school administration, school facilities, and student competence (Canrinus

et al., 2012; Msuya, 2016). Our examination of the potential mediating role of job satisfaction linking job demands and job exhaustion also is informed by the SI theory (Skaalvik & Skaalvik, 2011; White & Klein, 2008). Specifically, the quality of ego's role enactment in a position positively affects ego's satisfaction with the position and thus the amount of stress and workload associated with a vocational position likely shape how people feel about that position (Skaalvik & Skaalvik, 2017). Teachers' substantial job stress and load would be more likely to devalue their working experience and foster negative emotions and low satisfaction with their work.

Moreover, the SI theory also posits that people develop the self-concept and assign values to themselves through social interactions (LaRossa & Reitzes, 2009). In this case, teachers with lower job satisfaction are likely to have negative evaluations of themselves, which in turn could dampen their job motivation and performance. In sum, low job satisfaction as a result of high job demands may, in turn, contribute to elevated emotional fatigue in work, which may ultimately culminate in a state of job exhaustion (Judge et al., 2017; Skaalvik & Skaalvik, 2011).

*Empirical evidence* To our knowledge, very few studies have particularly tested the mediating role of job satisfaction in the association between job demands and job exhaustion (Aldrup et al., 2017; Zhang et al., 2014). Aldrup et al. (2017) found in a sample of 152 German teachers that teachers reported higher emotional exhaustion when exposed to higher levels of job stress and job satisfaction mediated this association. Similarly, job satisfaction was identified as a mediator accounting for how job stress was related to job burnout (e.g., emotional exhaustion) in a sample of Chinese middle school teachers from a North Central province in China (Zhang et al., 2014). Note that these studies were limited in focusing on one indicator of job demands (i.e., job stress) and using unrepresentative regional samples and cross-sectional designs.

## 2.5 The moderating role of teacher's role: theoretical foundation and empirical evidence

In Chinese middle schools, students are typically in a same classroom throughout a regular study day, and as scheduled beforehand different subject teachers take turns to come to the classroom and teach their classes. Each classroom is also assigned with a homeroom teacher (i.e., *ban zhu ren*) who is in the full charge of the class. This homeroom teacher is responsible for not only teaching a certain subject, but also for classroom administration, daily student guidance and discipline, and communication with parents. In contrast, subject teachers (i.e., *ke ren jiao shi*) primarily undertake the class-teaching tasks (Popper-Giveon & Shayshon, 2017; Ye & Zhao, 2019).

*Theoretical foundation* The associations among job stress, job load, job satisfaction, and job exhaustion may vary between homeroom and subject teachers. We hypothesize that when experiencing heightened job demands, subject teachers would be more likely to report lower job satisfaction and higher exhaustion as a result than homeroom teachers. According to the SI theory (LaRossa & Reitzes, 2009), teachers' job satisfaction should primarily derive from their fulfillment of teacher role

expectations. Typically, homeroom teachers tend to have expectations for themselves to undertake both subject-teaching and comprehensive class management responsibilities, whereas subject teachers tend to view themselves as being primarily responsible for teaching a specific subject (Popper-Giveon & Shayshon, 2017; Smith & Bugni, 2006). Thus, in the face of high job load and job stress, homeroom teachers may be more tolerant of their job load and associated stress than subject teachers. Relatedly, it is also possible that daily homeroom routines may make homeroom teachers internalize those expectations and become desensitized and even accustomed to the high work stress and load (Conley & Woosley, 2000; Day & Gu, 2014; Howard & Johnson, 2004).

*Empirical evidence* Research comparing the job experiences between homeroom and subject teachers still remains scarce. Fisherman (2015) examined the differences in job burnout between homeroom and subject teachers and found that homeroom teachers in the second seniority group felt more depersonalized than subject teachers. A recent study found that Jewish homeroom teachers reported higher levels of general stress than did subject teachers (Zadok Boneh et al., 2021). There also exists recent evidence indicating that workload was positively related to emotional exhaustion specifically among homeroom teachers (Baeriswyl et al., 2021). No research, to our knowledge, has particularly explored the association among job demands, job satisfaction, and job exhaustion in homeroom teachers versus subject teachers, especially in the Chinese cultural context.

## 2.6 The present study

The COVID-19 pandemic has become a prolonged plague across the globe (Collie, 2021). Under this context, mental health of front-line workers, such as teachers, needs our urgent and timely attention. During the pandemic time, teachers may feel highly exhausted due to heavy workload resulted from teaching courses remotely and heightened work-family conflicts (e.g., taking care of kids while teaching courses online during home quarantine) (Amri et al., 2020; Collie, 2021). In addition, affective issues (e.g., panic and anxiety) related to the COVID-19 also may further exacerbate teachers' feelings of job exhaustion (Dabrowski, 2021; Pressley, 2021).

Using the two-wave, China Education Panel Survey (CEPS) data from 701 Chinese junior middle school teachers, this study examined the potential mediating role of job satisfaction in the associations between job demands (i.e., perceived job stress and job load counted in working hours) and job exhaustion as well as how these associations may vary as a function of teacher role (i.e., homeroom versus subject teachers). Based on prior research, we hypothesized that (a) teachers' job stress and job load would be positively related to job exhaustion; (b) teachers' job satisfaction would serve as a linking mechanism that explains how job load and job stress related to job exhaustion; and (c) the associations among job stress, load, satisfaction, and exhaustion would be stronger among subject teachers than among homeroom teachers.

## 3 Method

### 3.1 Participants

Participants were derived from the China Education Panel Survey (CEPS; see <https://ceps.ruc.edu.cn/>), a nationwide, school-based study by the National Survey Research Center (Ma & Wu, 2019; Tong, 2017). The CEPS used a multi-stage stratified probability proportional to size (PPS) sampling strategy. In total, 701 teachers were recruited from four hundred and thirty-eight 7th grade classes in 112 schools from 28 national level units at the first wave (W1) during the 2013–2014 academic year. One year later (the 2014–2015 academic year; W2), 581 teachers were followed up (17.12% attrition rate). The mean age of teachers at W1 was 38.048 years old ( $SD=7.86$ ). Among them, 522 (74.47%) were females, 279 (39.80%) were home-room teachers and 620 (88.45%) had at least a four-year college degree. On average, they had been working as teachers for 15.06 years ( $SD=9.04$ ); and 12.08% of them had junior-level professional rank titles, 73.05% with middle-level professional rank titles, and 14.87% with senior-level professional rank titles. To examine potential attrition effects, we conducted a multivariate analysis of variance (MANOVA) on covariates and key study variables at W1 between teachers who participated in this study at both waves and those only at W1. No significant differences emerged (i.e., partial  $\eta^2 < 0.14$ ; Bandalos, 2002). The basic demographic characteristics of the current sample were comparable to those for the other samples of Chinese primary and secondary school teachers (Table 1).

### 3.2 Measures

#### 3.2.1 Job stress at W1

Teachers' job stress was assessed using a 7-item scale (Li, 2019; Steinhardt et al., 2011), which was adapted from the scales used in the study by Kyriacou and Sutcliffe (1978) and a survey conducted in Hong Kong (Jin et al., 2008). An example item is "To what extent do you feel stressful due to students' poor academic achievement?" The three sources of stress were used as indicators for a latent construct. Teachers indicated their perceived job stress in 3 domains on a 5-point scale ranging from 1 (*not at all*) to 5 (*very high*): stress from students (i.e., two items, students' poor academic records and uneven academic records), school (i.e., two items, schools' evaluations of teachers' performance and administrations), and society (i.e., three items, expectations and requirements of students' parents, students' success and admission rate to prestigious senior middle schools, and public opinions about teachers). Confirmatory factor analysis (CFA) showed that the measurement model fit the data well:  $\chi^2=62.91$ ,  $df=11$ ,  $p < .001$ , CFI=0.98, SRMR=0.02, RMSEA=0.06 with 90% CI [0.05, 0.07]. Correlations between dimensions ranged from 0.66 to 0.77,  $ps < .001$ . Cronbach's  $\alpha$  was 0.88 for the overall scale, and 0.75, 0.86, and 0.82 for three subscales, respectively.



**Table 1** Comparisons of demographic information between the current sample and other Chinese samples

Females					
	A	B	C	D	E
Gender	522 (74.47%)	3890 (68.58%)	399 (52.09%)	381 (72.16%)	214 (58.31%)
Mean ± SD					
Age	36.05 ± 7.86	–	30 ± 8	–	31.06 ± 9.60
Homeroom teacher					
A	B	C	D	E	
Teacher's role	279 (39.80%)	2644 (46.62%)	–	241 (45.64%)	–
	0–5 years	5–10 years	10–20 years	20+ years	Missing
Years of teaching <sup>b</sup>	A 113 (16.12%)	118 (16.83%)	283 (40.37%)	177 (25.25%)	10 (1.43%)
	B 1114 (19.64%)	1296 (22.85%)	2141 (37.75%)	973 (17.15%)	–
Professional rank title					
	Junior	Middle	Senior	Missing	
A	82 (11.70%)	496 (70.76%)	119 (16.98%)	4 (0.57%)	
B	1458 (25.71%)	2788 (49.15%)	1091 (19.24%)	–	

A represents the current study with 701 teachers in 112 middle schools from 28 provinces in China; B represents a study with 5672 teachers from 20 national level units in China, which divides China into five regions for sampling (Beijing, eastern, central, western and northeastern China) according to China's social development plan, economic development level and Beijing's special status as the capital of China (Wu et al., 2019); C represents a study with 766 teachers sampling from two provinces (Shandong and Hubei Province) in China (Xu et al., 2005); D represents a study with 528 teachers sampling from Heilongjiang Province in China (Liu & Wang, 2004); E represents a study with 401 teachers sampling from Shandong Province in China (Xu et al., 2004)

### 3.2.2 Job load at W1

Teachers' self-reports of the total hours that they had spent in classroom teaching during the last week were used to index their job load (Avanzi et al., 2018), which was adapted from the survey launched in 2002 by the Department for Education and Skills (DfES; Butt & Lance, 2005) and some other workload reports on teachers in international research (Naylor, 2001). The single-item job load measure was positively correlated with fatigue ( $r = .38, p < .01$ ; Fan & Smith, 2017).

### 3.2.3 Job satisfaction at W2

Teachers were asked to rate their satisfaction with salary, school administration, school facilities, and student competence, respectively (1 item for each aspect) on a 5-point scale ranging from 1 (*strongly unsatisfied*) to 5 (*strongly satisfied*). The items were drawn from the revised 2000–2001 Teacher Questionnaire of Schools and Staffing Survey by the Department of Education of the United States suitable for Chinese teachers (Chen, 2010) and the Survey Questionnaire on Secondary School Teacher Job Satisfaction (Chen, 2007). The four item scores were used as four manifest indicators for a latent construct of job satisfaction (Li, 2019; Skaalvik & Skaalvik, 2017). The CFA showed that the measurement model fit the data well:  $\chi^2 = 2.68, df = 2, p = 0.26, CFI = 0.997, SRMR = 0.02, RMSEA = 0.02$  with 90% CI [0.00, 0.09]. Cronbach's  $\alpha$  for this scale in the present sample was 0.74.

### 3.2.4 Teacher's role at W1

Teachers reported whether they were underrating the role of homeroom teachers or subject teachers (0 = *subject teachers*, 1 = *homeroom teachers*).

### 3.2.5 Job exhaustion at both W1 and W2

Teachers' job exhaustion was measured using a single item developed specifically for the CEPS: "How often do you feel exhausted or burned out when working as a teacher?" (Li, 2019; Tong, 2017). Participants rated on a 4-point scale ranging from 1 (*never*) to 4 (*often*). The rationale for using a single-item measure of teacher job exhaustion is to obtain a measure of teachers' overall subjective evaluation of job exhaustion (Kyriacou, 2001). As noted already, job exhaustion has been identified as one of the most robust contributing factors for teacher burnout (Kokkinos, 2006;  $r = .64$  with burnout; Rohland et al., 2004). Moreover, among various widely-documented dimensions of job burnout (e.g., exhaustion, depersonalization, and personal accomplishment), job exhaustion appears to be more generalizable across cultural contexts than the others (Morgantini et al., 2020; Schaufeli, 2017).

Malasch Burnout Inventory (MBI), for instance, was a widely used assessment tool for job burnout and exhaustion. There were 7 items in the subscale for emotional exhaustion dimension in the MBI, where the item "I feel burned out from my work" loaded most robustly (observed factor loading = 0.84) on the emotional exhaustion dimension (Kokkinos, 2006). As such, this study used the single item "How often

do you feel burned out when working as a teacher?" to assess job exhaustion, which has been widely used in previous studies (Hansen & Pit, 2016; Lee et al., 2020; Rohland et al., 2004; West et al., 2009).

Research has also showed that single-item measure may still provide a sensitive and efficient way to measure its target construct over time (Eddy et al., 2019). Based on longitudinal and cross-sectional data collected from 2003 to 2009 in United States, West et al. (2012) found that the single-item measure of emotional exhaustion exhibited strong associations with a series of related construct (e.g., suicidality, dishonest behavior, and altruistic attitude). Furthermore, some studies have indicated that a single-item measure of self-reported exhaustion can be effectively used for job exhaustion screening and have been found to be comparable to the more established measure with 22 items (Cavanaugh et al., 2020; Cull et al., 2019; Hansen & Girgis, 2010; Rohland et al., 2004; West et al., 2009). With no license fee requirements, low response burdens, and more face validity, the single-item measure of exhaustion appears to be an acceptable alternative to the multiple-item scales (e.g., MBI) if the primary aim were to investigate antecedents of job exhaustion, particularly in large-scale national surveys (Knox et al., 2018).

### 3.2.6 Covariates

Several covariates were included due to their correlations with study variables (Gong et al., 2018): job exhaustion at baseline (i.e., Wave 1), gender (0 = *Male*, 1 = *Female*), years of teaching, teaching experiences ("Have you ever worked as a teacher in any other schools before you came to work in the present school?" 0 = *No*, 1 = *Yes*), school learning atmosphere ("What is the overall learning atmosphere of your school?" 1 = *Very bad*, 2 = *Bad*, 3 = *Moderate*, 4 = *Good*, 5 = *Very good*), school administration style ("What is the administration style of your school?" 1 = *Very loose*, 2 = *Loose*, 3 = *Moderate*, 4 = *Strict*, 5 = *Very Strict*), and professional rank title (0 = *junior-level professional rank titles*, 1 = *senior-level professional rank titles*, and 3 = *senior-level professional rank titles*; Tong, 2017). The professional rank title was recoded into two dummy variables, with junior-level as reference.

### 3.3 Analytic strategies

Hypotheses were tested with structural equation modeling via Mplus 7.4 (Muthén & Muthén, 1998–2017). The full information maximum likelihood (FIML) estimation method was used to handle missing data (Acock, 2005). Several model fit indices were used to evaluate the model fit adequacy (Kline, 2015): The non-significant Chi-Square statistic ( $\chi^2$ ), the comparative fit index (CFI) > 0.90, the root-mean-square error of approximation (RMSEA) < 0.08, and the standardized root-mean-square residual (SRMR) < 0.08. Yet, when the sample size is large, a significant  $\chi^2$  should be expected for most models (Byrne, 2013). Indirect effects were examined using Bootstrapping with 2,000 resamples (Preacher & Hayes, 2008). As Li (2016) suggested, implementing diagonally weighted least squares (WLSMV) instead of robust maximum likelihood is suitable for an ordinal scaled dependent

variable (job exhaustion). At the meantime, the correlation between the ordinal scale (job exhaustion at W1 and W2) and other variables should be computed using a Spearman-Rho-Correlation.

We used multi-group structural equation modeling (SEM) to test the moderating effect of teacher's role (Kline, 2015). First, measurement equivalence for latent factors were tested prior to examining the equivalence of structural models. Specifically, (a) we examined configural invariance, investigating the basic level of invariance between groups (i.e., testing whether the number of factors and the pattern of loadings are the same across groups); (b) after establishing configural invariance, we continued to examine metric invariance which is established where the equivalence of the factor loadings across groups; (c) if achieving metric invariance, we continued to examine scalar invariance, which tests the equivalence of item intercepts across groups; (d) if achieving scalar invariance, we continued to examine residual variance invariance, examining whether the error variances of the items are comparable across groups; (e) if achieving residual variance invariance, we continued to examine residual covariance invariance, testing whether the error covariances of the items are equal across groups; (f) if achieving residual covariance invariance, we continued to examine factor variance invariance, which examines whether the variances of latent factors are equal across groups; (g) if achieving factor variance invariance, we continued to examine factor mean invariance, which examines whether the means of latent factors are equal across groups.

Second, with measurement equivalence achieved, we proceeded to testing structural model equivalence. Specifically, nested models were compared such that the structural paths were freely estimated for each group in the first model and constrained to be equal across groups in the second model. In line with prior research, we used several criteria for evaluation of model differences.  $\Delta S-B\chi^2$  (with  $p < 0.05$ ),  $\Delta CFI$  ( $> 0.01$ ), and  $\Delta RMSEA$  ( $> 0.015$ ) indicate significant differences between models (Brown, 2015; Cheung & Rensvold, 2002; Millsap, 2012; Rossi & Mannarini, 2019). Based on these criteria, we would have evidence that the structural paths were significantly different across the two groups such that the more complicated model (i.e., more parameters estimated) fit significantly better than the simpler one. Then separate models for homeroom teachers versus subject teachers would be estimated to specify the potential differences in structural paths and/or indirect effects.

## 4 Results

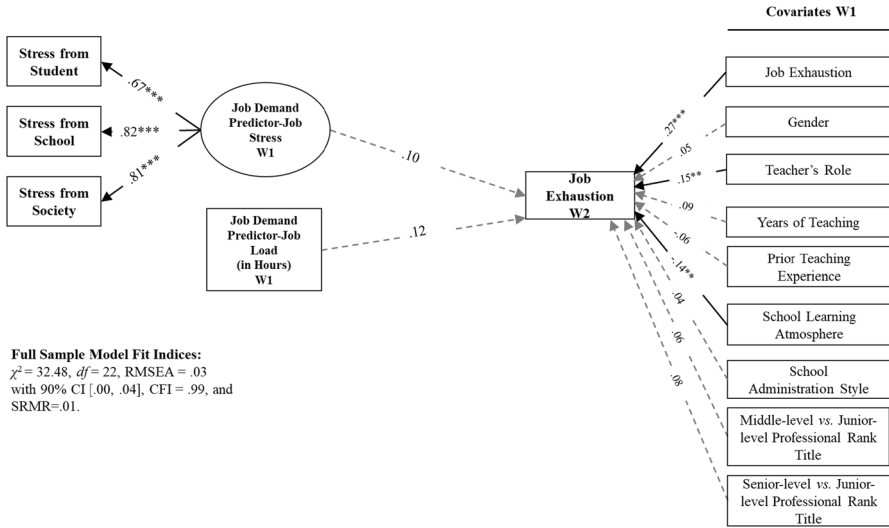
Descriptive statistics and bivariate correlations for study variables and covariates are presented in Table 2. The full sample direct effect model (Fig. 2) fit the data well:  $\chi^2 = 32.48$ ,  $df = 22$ ,  $RMSEA = 0.03$  with 90% CI [0.00, 0.04],  $CFI = 0.99$ , and  $SRMR = 0.01$ . Job stress or job load was not directly associated with job exhaustion. The full sample mediating model (Fig. 3) also fit the data well:  $\chi^2 = 128.75$ ,  $df = 68$ ,  $RMSEA = 0.04$  with 90% CI [0.03, 0.05],  $CFI = 0.96$ , and  $SRMR = 0.03$ . Job load at W1 was associated negatively with job satisfaction at W2 ( $\beta = -.20$ ,  $p = 0.006$ ), which, in turn, was associated negatively with job exhaustion at W2 ( $\beta = -.40$ ,  $p < .001$ ), after controlling for covariates.

**Table 2** Zero-order bivariate inter-correlations and descriptive statistics of key study variables and covariates

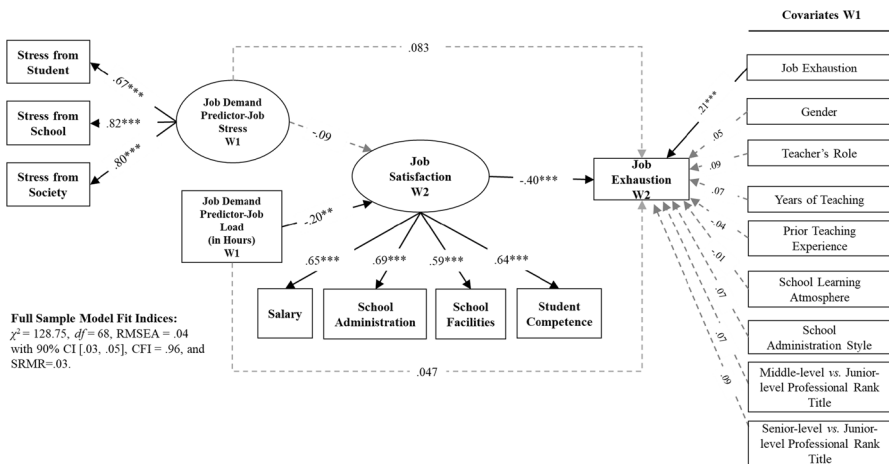
	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
<i>Study variables</i>											
1. Job load in hours W1	13.82	7.01	–								
2. Stress from student W1	3.92	0.71	-.05	–							
3. Stress from school W1	3.60	0.89	-.03	.55***	–						
4. Stress from society W1	3.76	0.82	-.05	.55***	.64***	–					
5. Satisfaction with salary W2	2.67	1.02	-.10*	-.06	-.16***	-.11**	–				
6. Satisfaction with school administration W2	3.33	0.92	-.089*	.07	.01	.07	.47***	–			
7. Satisfaction with school facilities W2	3.55	0.90	-.13**	-.05	-.08	-.06	.37***	.45***	–		
8. Satisfaction with Student competence W2	2.98	0.87	-.06	-.05	-.02	-.03	.32***	.45***	.42***	–	
9. Job exhaustion at W2	2.35	0.84	.07	.10*	.14**	.16**	-.34***	-.26**	-.18**	-.27**	–
<i>Covariates (W1)</i>											
10. Job Exhaustion	2.31	0.78	.14**	.16**	.25**	.24**	-.24***	-.15**	-.12**	-.10*	.30**
11. Gender	0.75 <sup>a</sup>	–	.02	.002	.03	-.05	.01	-.002	.05	.07	.01
12. Teacher's role (homeroom vs. subject) <sup>a</sup>	0.40 <sup>a</sup>	–	.01	-.11**	-.09*	-.06	-.17***	-.09*	-.06	-.08	.12**
13. Years of teaching	15.06	9.034	-.12**	.08*	.14***	.17***	.01	-.01	.03	-.04	.10*
14. Prior teaching experience	1.57	0.50	.02	.02	.02	.06	.02	.04	.03	.05	-.01
15. School learning atmosphere	3.723	0.812	-.06	-.05	-.09*	.01	.20***	.26***	.24***	.34***	-.14**
16. School administration style	3.88	0.64	-.003	.10*	.03	.07	.13**	.22***	.13**	.20***	-.03
17. Middle versus junior professional rank title	0.71 <sup>a</sup>	–	-.15***	.04	.04	.05	-.09*	.04	.03	-.004	-.003
18. Senior versus junior professional rank title	0.17 <sup>a</sup>	–	-.112**	-.02	.03	.05	.09*	-.01	-.01	.01	.06

*n* ranged from 577 to 701. \*\*\**p* < .001. \*\**p* < .01. \**p* < .05. Middle versus Junior = Middle-level versus Junior-level Professional Rank Title, Senior versus Junior = Senior-level versus Junior-level Professional Rank Title

<sup>a</sup>As the variables of gender, teacher's role, Middle versus Junior, and Senior versus Junior were binary, the means for these variables represent the percentage of females, homeroom teachers, teachers who have middle-level professional rank title, and teachers with senior-level professional rank title, respectively, and SDs were not applicable for these variables. W1 represents Wave 1 in 2013–2014, and W2 represents Wave 2 in 2014–2015. The correlations between job exhaustion (both W1 and W2), and other variables were calculated by Spearman rank correlation, while the correlations among other variables were calculated by Pearson correlation



**Fig. 2** The associations between job stress/load and job exhaustion (701 teachers in total). *Note* \*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ . W1 represents Wave 1 in 2013–2014, and W2 represents Wave 2 in 2014–2015



**Fig. 3** The mediating role of satisfaction in the associations between job stress/load and job exhaustion (701 teachers in total). *Note* \*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ . W1 represents Wave 1 in 2013–2014, and W2 represents Wave 2 in 2014–2015

Bootstrapping analyses indicated that teachers’ job load at W1 was associated indirectly and positively with their job exhaustion at W2 via its negative association with job satisfaction at W2 (the indirect effect:  $B = 0.01$ ,  $SE = 0.004$ , 95% CI [0.005, 0.02],  $\beta = .08$ ). According to Kenny (2012), this indirect effect was “between small to medium” in magnitude. No significant associations emerged for job stress.

As displayed in Table 3, for latent constructs of job stress at W1 and job satisfaction at W2, configural invariance, metric invariance, scalar invariance, residual variance invariance, residual covariance invariance, factor variance invariance, and factor mean invariance were achieved. Thus, we moved forward to examining the differences in structural coefficients (i.e., structural path invariance) between the homeroom teachers and subject teachers. Results indicated a non-significant difference for the direct effect model and a significant difference for the mediating model across groups indicated by a significant difference in the CFI value (Table 3).

When comparing the path coefficients of the mediating model across the two groups using WALD Tests, we found that (a) the path coefficient of “job satisfaction on job stress (L3, Fig. 1)” was not different between the homeroom teacher group ( $\beta = .08, p = .44$ ) and the subject teacher group ( $\beta = -.10, p = 0.18$ ; Wald test  $B = -0.02, p = .88$ ); (b) the path coefficient of “job satisfaction on job load (L4)” was not different between the homeroom teacher group ( $\beta = -.16, p = .12$ ) and the subject teacher group ( $\beta = -.17, p = .002$ ; Wald test  $B = -0.01, p = .77$ ); (c) the path coefficient of “job exhaustion on job satisfaction (L5)” was not different between the homeroom teacher group ( $\beta = -.40, p = .002$ ) and the subject teacher group ( $\beta = -.45, p < .001$ ; Wald test  $B = -0.05, p = .67$ ).

Then, we proceeded to examining the differences in indirect effects in the mediating model in the homeroom teacher group (Fig. 4) and the subject teacher group (Fig. 5), respectively. We found that the indirect effects among job stress, job satisfaction, and job exhaustion was not different between the homeroom teacher group ( $B = 0.03, SE = 0.05, 95\% CI [-0.05, 0.14], \beta = .03$ ) and the subject teacher group ( $B = 0.04, SE = 0.03, 95\% CI [-0.02, 0.11], \beta = .04$ ; Wald test  $B = -0.01, p = .80$ ). Bootstrapping analyses demonstrated that job satisfaction at W2 served as a mechanism accounting for the positive association between job load at W1 and job exhaustion at W2 among subject teachers ( $B = 0.02, SE = 0.01, 95\% CI [0.01, 0.03], \beta = .08$ ) but not among homeroom teachers ( $B = 0.01, SE = 0.01, 95\% CI [-0.002, 0.03], \beta = .06$ ) although they were not statistically significantly different (Wald test  $B = 0.004, p = .65$ ). These indirect effects were “between small to medium” in magnitudes.

## 5 Discussion

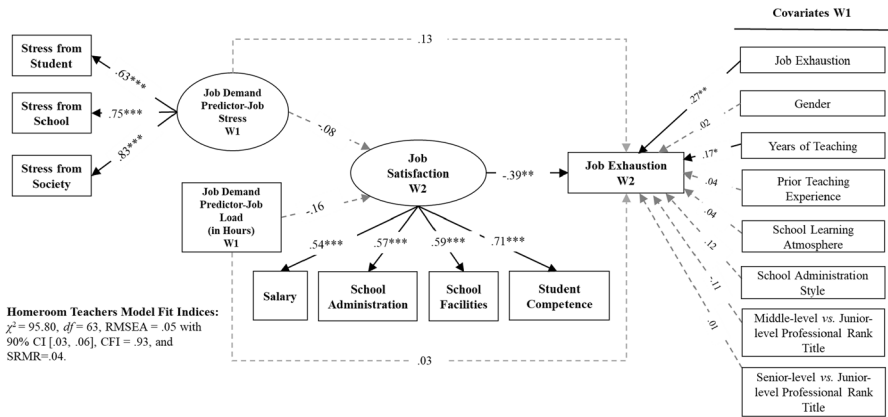
Our findings provide a more nuanced understanding of the etiology of middle school teachers' job exhaustion in the Chinese cultural context. In particular, by delineating the etiological mediating and moderating mechanisms, this study also yields practical insights that reducing work load associated with long working hours and improving teachers' job satisfaction may be potential avenues to effectively alleviate job exhaustion, especially for subject teachers, in the Chinese junior middle school context.

**Table 3** Model fit indices, measurement invariance tests, and multi-group SEM analyses (N = 701)

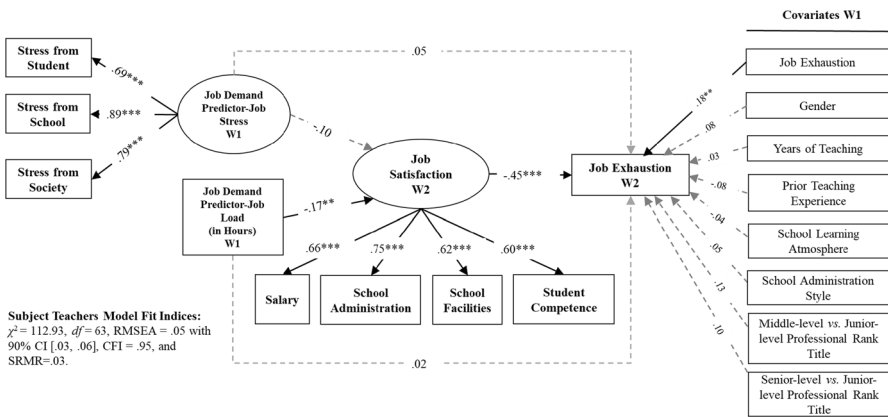
	S-B $\chi^2$ (df)	$\Delta$ S-B $\chi^2$ (df)	RMSEA 90% CI	CFI	SRMR	$\Delta$ RMSEA	$\Delta$ CFI
<i>Full sample mediating model (701 teachers)</i>							
	128.745 (68)		0.036 [0.026, 0.045]	0.955	0.028		
<i>Measurement invariance tests for latent constructs as a function of teacher's role (372 subject vs. 329 homeroom teachers)</i>							
Configural invariance	47.833 (22)		0.062 [0.038, 0.086]	0.977	0.044		
Metric invariance <sup>a</sup>	101.967 (29)	54.134 (7)**	0.090 [0.072, 0.110]	0.935	0.091	0.028	0.042
Partial metric invariance <sup>b</sup>	47.742 (27)	0.091 (5)	0.050 [0.025, 0.073]	0.982	0.049	0.012	0.005
Scalar invariance	51.376 (31)	3.634 (4)	0.046 [0.022, 0.068]	0.982	0.051	0.004	0.000
Residual variance invariance <sup>a</sup>	68.601 (37)	17.225 (6)**	0.053 [0.033, 0.072]	0.972	0.061	0.007	0.010
Partial residual variance invariance <sup>b</sup>	57.127 (36)	5.751 (5)	0.044 [0.020, 0.064]	0.981	0.055	0.002	0.001
Residual covariance invariance	64.439 (38)	7.312 (2)*	0.047 [0.026, 0.067]	0.977	0.056	0.003	0.004
Factor variance invariance	59.012 (38)	5.427 (0)	0.042 [0.019, 0.063]	0.981	0.054	0.005	0.004
Factor mean invariance	70.003 (40)	10.991 (2)**	0.049 [0.029, 0.068]	0.973	0.063	0.007	0.008
<i>Multi-group SEM analyses for the direct model as a function of teacher's role (372 subject vs. 329 homeroom teachers)</i>							
Unconstrained model	48.391 (42)		0.022 [0.000, 0.046]	0.994	0.018		
Constrained model	48.024 (44)	0.349 (2)	0.017 [0.000, 0.043]	0.996	0.018	0.005	0.002
<i>Multi-group SEM analyses for the mediating model as a function of teacher's role (372 subject vs. 329 homeroom teachers)</i>							
Unconstrained model	215.483 (129)		0.047 [0.035, 0.057]	0.940	0.036		
Constrained model	199.875 (134)	1.586 (5)	0.040 [0.028, 0.051]	0.955	0.036	0.007	0.015

\*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ . Because Metric invariance "model didn't reach equivalence, as well as the modification indices suggest that freeing the loading of "Pressure by Satisfaction with Salary W2" between groups, and adding the correlation between "Satisfaction with School Facilities W2" and "Satisfaction with Student Competence W2" would help significantly, so we calculated Scalar invariance<sup>b</sup> model. Because Residual variance invariance<sup>a</sup> model didn't reach equivalence, as well as the modification indices suggest that freeing the error variance of "Satisfaction with School Facilities W2" between groups would help significantly, so we calculated Residual variance invariance<sup>b</sup> model





**Fig. 4** The mediating role of satisfaction in the associations between job stress/load and job exhaustion (329 homeroom teachers). Note \*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ . W1 represents Wave 1 in 2013–2014, and W2 represents Wave 2 in 2014–2015



**Fig. 5** The mediating role of satisfaction in the associations between job stress/load and job exhaustion (372 subject teachers). Note \*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ . W1 represents Wave 1 in 2013–2014, and W2 represents Wave 2 in 2014–2015

**5.1 The associations among job load, job satisfaction, and job exhaustion**

With both job stress and job load simultaneously tested in the present study, only job load emerged as a predictor to subsequent job exhaustion through job satisfaction above and beyond job stress. However, job load was not associated directly with job exhaustion in the current study, which is inconsistent with the finding in prior studies that job load was a vital antecedent of job exhaustion (Higton et al., 2017; Philipp & Kunter, 2013). It seems that teaching hours in the classroom as the index for job load in the current study may not be sufficient to represent the overall job load and thus failed to relate to job exhaustion (Avanzi et al., 2018; Kember & Leung, 2006;

Kokkinos, 2007). Future studies are warranted to explicate the potential differential contributions of various indicators of job load to teachers' job exhaustion to provide insights for more targeted interventions in reducing teachers' exhaustion.

The identified mediating role of job satisfaction in explaining job load and job exhaustion is in line with the findings from prior research (Aldrup et al., 2017; Zhang et al., 2014). According to the Symbolic Interactionism theory (SI; LaRossa & Reitzes, 2009; White & Klein, 2008), teachers' excessive job load likely devalues their experience at work, contributes to negative emotions, incurs persistent physiological over-activation and overtaxing, and ultimately results in job exhaustion in the long run. For example, teachers' increased teaching time (i.e., job load in this study) may reduce their allocation of time for rest and recovery (Higton et al., 2017). Accordingly, teachers may feel that their working hours do not match rewards (e.g., salary), and thus the unsatisfactory working conditions may make teachers lack a sense of power, which may in turn reduce their job satisfaction and lead to job exhaustion (Judge et al., 2017; Lindqvist & Nordanger, 2006).

Nevertheless, job stress did not relate to job exhaustion directly or indirectly in the current study, which was inconsistent with prior research (Ho, 2017; Steinhart et al., 2011; Yu et al., 2015). It may be that job load can be a more salient antecedent of job satisfaction and/or exhaustion than job stress (Higton et al., 2017; Judge et al., 2017), which highlight the consideration of both job stress and job load in understanding their unique association with teachers' job exhaustion over time. Moreover, it is critical to identify other possible linking mechanisms (e.g., self-efficacy) underlying the association between job stress and job exhaustion. For instance, when teachers struggle to cope with a considerable amount of job stress, they may attribute their working failure to their incapacity in teaching or other relevant responsibility, which thus may cause feelings of job exhaustion (Yu et al., 2015).

## 5.2 The moderating role of teachers' role

The differential pattern of mediating effects (i.e., only present for subject teachers but not for homeroom teachers) may be accounted by several mechanisms. First, in support of the proposition of the SI theory (LaRossa & Reitzes, 2009; White & Klein, 2008), teachers' satisfaction of their jobs come from their fulfillment of the related role responsibilities. As compared to subject teachers, homeroom teachers may get better prepared for and used to relatively high work load and even become desensitized over time (Day & Gu, 2014). Thus, homeroom teachers may be more resilient than subject teachers in the context of heavy job load and thus their occupational health could be less bothered by the consequences of long working hours (Luthar et al., 2000). As compared to subject teachers, homeroom teachers may have more opportunities in reaping a sense of achievement and satisfaction from their execution of daily homeroom duties due to the extensiveness and richness of their work duties (Day & Gu, 2014; Howard & Johnson, 2004; Tatar & Horenczyk, 2003). In support of this idea, Popper-Giveon and Shayshon (2017) conducted interviews with teachers in Israel. They found that subject teachers often perceived their daily work routines as tedious and boring because their work was almost exclusively limited

to preparing teaching materials and teaching classes. In contrast, due to the more extensive role duties, homeroom teachers could often develop much closer and more meaningful relationships with students and thus have more sources of job emotional rewards such as students' appreciation. Thus, they may be less likely to perceive low levels of job satisfaction when working long hours as subject teachers do.

Besides, the JD-R Model suggests that the factors affecting the physical and/or mental health and working status of the practitioners can be summarized into two categories: job demands and job resources (Bakker et al., 2003). Teachers experience high levels of workload and are already fatigued at the end of a workday, and they usually compensate fatigue with extra energy whose mobilization may result in acute fatigue (Gaillard, 2001). Incomplete recovery from high pressure can lead to chronic effects on health and well-being (e.g., job exhaustion). Subject teachers cannot recover timely from negative effects of job load through job resources such as psychological support from their work, so subject teachers' high levels of job load decreased job satisfaction, and in turn led to job exhaustion. However, homeroom teachers may benefit from their unique job resources like participating issues concerning students and the class to gain a sense of empowerment and achievement (Boone, 2015), and as a consequence, they can avoid the negative effects of job load.

In addition, school administrators tend to assign the homeroom teacher role to those who are more capable of managing class and students (Friedman, 2003), and on the other hand, Chinese middle school homeroom teachers can get extra credits such as higher salary, which may compensate their job load (Han et al., 2017; Muguongo et al., 2015). Taken altogether, future research can assess both teachers' role expectations and resilience and examine their contributions to how subject versus homeroom teachers differ in their experiences of job satisfaction and exhaustion in response to job demands.

### 5.3 Limitations

First, all constructs were assessed with self-report surveys, which might inflate the identified associations due to shared-method and informant variance. In addition, although the single-item measure of job exhaustion has been used in prior studies, some scholars claim that it may fail to achieve an optimal balance of sensitivity or specificity relative to multi-item scales such as MBI (Knox et al., 2018). Future research would benefit from utilizing multi-method and multi-informant designs and the current results await to be replicated using the more established measures of job exhaustion. Second, although teaching time constitutes a primary portion of middle school teachers' work time (Higton et al., 2017), teaching time is only one core aspect of teachers' job load (Kember, 2004). Future research should incorporate more indicators of job load to adequately represent this construct. Third, limited by the used dataset, the mediators and outcomes were measured both at Wave 2. Future research should conduct temporally ordered analyses using assessments of predictors, mediators, and outcomes across different waves (Maxwell et al., 2011). Last, the present examination used data derived from a nationwide survey. Limited by scope and also for economic considerations, most constructs in this survey were

assessed with brief, self-developed questionnaires/items, which is not uncommon in large-scale projects. Research using well-established scales is warranted.

## 5.4 Implications

In the context of COVID-19 outbreak and its ongoing impact, teachers have been staying on the education frontlines, both online and offline. Under this condition, teachers' job demands, satisfaction, exhaustion and their interrelations appear to become more relevant issues than ever before (Pressley, 2021). This study provides insights for practice to diminish mental health consequences of high job demands. First, teachers' job satisfaction, especially for subject teachers, can be an intervention target to reduce the negative impact of teachers' heavy job load. To promote teachers' job satisfaction, schools may raise teachers' salary, employ more humanistic administration system, improve hardware facilities to provide convenient teaching environment, and build friendly learning atmosphere (Skaalvik & Skaalvik, 2017; Song et al., 2020). Second, Halbesleben et al. (2006) pointed out that failing to consider various teacher groups' unique stressors and underlying processes for job exhaustion might be the most critical limitation of existing job exhaustion interventions. Our study suggests that occupational health interventions should be separately tailored for homeroom teachers and subject teachers by considering their respective unique needs and characteristics.

## 6 Conclusions

Results of this study demonstrate that Chinese junior middle school subject teachers' job load that was counted in working hours (instead of perceived job stress) was related to their increased job exhaustion over time indirectly through its negative association with their perceived job satisfaction. In contrast, only job satisfaction emerged as a predictor to job exhaustion over time among Chinese junior middle school homeroom teachers. Such findings highlight the importance of disentangling complexity in the etiology of junior middle school teachers' job exhaustion in the Chinese cultural context by examining the implicated moderating and mediating mechanisms. Practically, our findings suggest that reducing teachers' work load associated with long working hours and promoting teachers' job satisfaction may be effective ways to relieve/prevent job exhaustion, especially for Chinese subject teachers working in the junior middle schools.

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**Author contribution** NZ and NZ has contributed to conception of the present work and drafted the whole manuscript. HC and NZ have contributed to analyses and interpretation of data. LJ, BL, and XL contributed to the revision, validation, and writing. All authors have been involved in revising the manuscript critically for important intellectual content.

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**Availability of data and materials** The data that support the findings of this study are available from the corresponding author upon reasonable request. The full data for the larger project from which the current dataset was derived are available at <https://ceps.ruc.edu.cn/>. Please note that restrictions may apply to the availability of the full data.

**Code availability** The statistical code is available from the corresponding author upon reasonable request.

## Declarations

**Conflict of interest** No financial interest or benefit that has arisen from the direct applications of our research. The authors declare that they have no conflicts of interest.

## References

- Acock, A. C. (2005). Working with missing values. *Journal of Marriage and Family*, 67(4), 1012–1028. <https://doi.org/10.1111/j.1741-3737.2005.00191.x>
- Aldrup, K., Klusmann, U., & Lüdtke, O. (2017). Does basic need satisfaction mediate the link between stress exposure and well-being? A diary study among beginning teachers. *Learning and Instruction*, 50, 21–30. <https://doi.org/10.1016/j.learninstruc.2016.11.005>
- Amri, A., Abidli, Z., Elhamzaoui, M., Bouzaboul, M., Rabea, Z., & Ahami, A. O. T. (2020). Assessment of burnout among primary teachers in confinement during the COVID-19 period in Morocco: Case of the Kenitra. *The Pan African Medical Journal*, 35(Suppl 2), 92. <https://doi.org/10.11604/pamj.supp.2020.35.2.24345>
- Arens, A. K., & Morin, A. J. S. (2016). Relations between teachers' emotional exhaustion and students' educational outcomes. *Journal of Educational Psychology*, 108(6), 800–813. <https://doi.org/10.1037/edu0000105>
- Avanzi, L., Fraccaroli, F., Castelli, L., Marcionetti, J., Crescentini, A., Balducci, C., & van Dick, R. (2018). How to mobilize social support against workload and burnout: The role of organizational identification. *Teaching and Teacher Education*, 69, 154–167. <https://doi.org/10.1016/j.tate.2017.10.001>
- Baeriswyl, S., Bratoljic, C., & Krause, A. (2021). How homeroom teachers cope with high demands: Effect of prolonging working hours on emotional exhaustion. *Journal of School Psychology*, 85, 125–139. <https://doi.org/10.1016/j.jsp.2021.02.002>
- Bakker, A. B., Demerouti, E., Taris, T. W., Schaufeli, W. B., & Schreurs, P. J. (2003). A multigroup analysis of the job demands-resources model in four home care organizations. *International Journal of Stress Management*, 10(1), 16–38. <https://doi.org/10.1037/1072-5245.10.1.16>
- Bandalos, D. (2002). The effects of item parceling on goodness-of-fit and parameter estimate bias in structural equation modeling. *Structural Equation Modeling*, 9(1), 78–102. <https://doi.org/10.1207/S15328007SEM0901>
- Boone, S. C. (2015). Teacher leaders as school reformers. In N. Bond (Ed.), *The power of teacher leaders: Their roles, influence, and impact* (pp. 105–119). Routledge.
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). Guilford.
- Burrow, R., Williams, R., & Thomas, D. (2020). Stressed, depressed and exhausted: Six years as a teacher in UK state education. *Work, Employment and Society*, 34(5), 949–958. <https://doi.org/10.1177/0950017020903040>
- Butt, G., & Lance, A. (2005). Secondary teacher workload and job satisfaction: Do successful strategies for change exist? *Educational Management Administration & Leadership*, 33(4), 401–422. <https://doi.org/10.1177/1741143205056304>
- Byrne, B. M. (2013). *Structural Equation Modeling with Mplus: Basic Concepts, Applications, and Programming*. Routledge.

- Caldwell, J. A., Caldwell, J. L., Thompson, L. A., & Lieberman, H. R. (2019). Fatigue and its management in the workplace. *Neuroscience & Biobehavioral Reviews*, *96*, 272–289. <https://doi.org/10.1016/j.neubiorev.2018.10.024>
- Cameron, K. S., & Quinn, R. E. (2011). *Diagnosing and changing organizational culture: Based on the competing values framework* (3rd ed.). Jossey-Bass.
- Canrinus, E. T., Helms-Lorenz, M., Beijaard, D., Buitink, J., & Hofman, A. (2012). Self-efficacy, job satisfaction, motivation and commitment: Exploring the relationships between indicators of teachers' professional identity. *European Journal of Psychology of Education*, *27*(1), 115–132. <https://doi.org/10.1007/s10212-011-0069-2>
- Cavanaugh, K. J., Lee, H. Y., Daum, D., Chang, S., Izzo, J. G., Kowalski, A., & Holladay, C. L. (2020). An examination of burnout predictors: Understanding the influence of job attitudes and environment. *Healthcare*, *8*(4), 502. <https://doi.org/10.3390/healthcare8040502>
- Chen, J. (2010). Chinese middle school teacher job satisfaction and its relationships with teacher moving. *Asia Pacific Education Review*, *11*(3), 263–272. <https://doi.org/10.1007/s12564-010-9085-1>
- Chen, W. (2007). The structure of secondary school teacher job satisfaction and its relationship with attrition and work enthusiasm. *Chinese Education & Society*, *40*(5), 17–31. <https://doi.org/10.2753/CED1061-1932400503>
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, *9*(2), 233–255. [https://doi.org/10.1207/S15328007SEM0902\\_5](https://doi.org/10.1207/S15328007SEM0902_5)
- Collie, R. J. (2021). COVID-19 and Teachers' somatic burden, stress, and emotional exhaustion: Examining the role of principal leadership and workplace buoyancy. *AERA Open*, *7*(1), 1–15. <https://doi.org/10.1177/2332858420986187>
- Conley, S., & Woosley, S. A. (2000). Teacher role stress, higher order needs and work outcomes. *Journal of Educational Administration*, *38*(2), 179–201. <https://doi.org/10.1108/09578230010320163>
- Cull, W. L., Frintner, M. P., Starmer, A. J., & Leslie, L. K. (2019). Longitudinal analyses of pediatrician burnout. *Academic Pediatrics*, *19*(3), 256–262. <https://doi.org/10.1016/j.acap.2018.11.006>
- Dabrowski, A. (2021). Teacher wellbeing during a pandemic: Surviving or thriving? *Social Education Research*, *2*(1), 35–40. <https://doi.org/10.37256/ser.212021588>
- Day, C., & Gu, Q. (2014). *Resilient teachers, resilient schools: Building and sustaining quality in testing times*. Routledge.
- Delali, O., Zungbey, D., Sokro, E., Akomeah, M., Ntow, O., & Osei-Bonsu, N. (2020). Emotional labour and turnover intention among teachers: The moderating role of team support. In J. Kantola, S. Nazir, & V. Salminen (Eds.), *International conference on applied human factors and ergonomics* (pp. 131–142). Springer. [https://doi.org/10.1007/978-3-030-50791-6\\_17](https://doi.org/10.1007/978-3-030-50791-6_17)
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, *86*(3), 499–512. <https://doi.org/10.1037/0021-9010.86.3.499>
- Eddy, C. L., Herman, K. C., & Reinke, W. M. (2019). Single-item teacher stress and coping measures: Concurrent and predictive validity and sensitivity to change. *Journal of School Psychology*, *76*, 17–32. <https://doi.org/10.1016/j.jsp.2019.05.001>
- Fan, J., & Smith, A. P. (2017). The impact of workload and fatigue on performance. In L. Longo & M. C. Leva (Eds.), *International symposium on human mental workload: Models and applications* (pp. 90–105). Springer.
- Fan, Y., & Cheng, C. (2017). Examining trends in Chinese secondary education: From test-oriented to comprehensive academic and personal student development. *US-China Education Review*, *7*(10), 453–462.
- Fisherman, S. (2015). Emotional well-being as a function of professional identity and burnout among homeroom and subject teachers. *Research Journal of Education*, *1*(5), 64–78.
- Friedman, I. A. (2003). Self-efficacy and burnout in teaching: The importance of interpersonal-relations efficacy. *Social Psychology of Education*, *6*(3), 191–215. <https://doi.org/10.1023/a:1024723124467>
- Gaillard, A. W. (2001). Stress, workload, and fatigue as three biobehavioral states: A general overview. In P. A. Hancock & P. A. Desmond (Eds.), *Stress, workload, and fatigue* (pp. 623–640). Lawrence Erlbaum Associates Publishers.
- García-Arroyo, J. A., Osca Segovia, A., & Peiró, J. M. (2019). Meta-analytical review of teacher burnout across 36 societies: The role of national learning assessments and gender egalitarianism. *Psychology & Health*, *34*(6), 733–753. <https://doi.org/10.1080/08870446.2019.1568013>

- Gong, J., Lu, Y., & Song, H. (2018). The effect of teacher gender on students' academic and noncognitive outcomes. *Journal of Labor Economics*, 36(3), 743–778. <https://doi.org/10.2139/ssrn.2844270>
- Guo, K., & Kilderry, A. (2018). Teacher accounts of parent involvement in children's education in China. *Teaching and Teacher Education*, 69, 95–103. <https://doi.org/10.1016/j.tate.2017.09.018>
- Halbesleben, J. R., Osburn, H. K., & Mumford, M. D. (2006). Action research as a burnout intervention: Reducing burnout in the Federal Fire Service. *The Journal of Applied Behavioral Science*, 42(2), 244–266. <https://doi.org/10.1177/0021886305285031>
- Han, L., Liu, M., & An, X. (2017). Centralized deployment and teacher incentives: Evidence from reforms in rural China. *Economic Development and Cultural Change*, 65(2), 297–337. <https://doi.org/10.1086/689448>
- Hansen, V., & Girgis, A. (2010). Can a single question effectively screen for burnout in Australian cancer care workers? *BMC Health Services Research*, 10(1), 1–4. <https://doi.org/10.1186/1472-6963-10-341>
- Hansen, V., & Pit, S. W. (2016). The single item burnout measure is a psychometrically sound screening tool for occupational burnout. *Health Scope*, 5(2), e32164. <https://doi.org/10.17795/jhealthscope-32164>
- Higton, J., Leonardi, S., Choudhoury, A., Richards, N., Owen, D., & Sofroniou, N. (2017). *Teacher workload survey 2016*. Retrieved from [https://warwick.ac.uk/fac/soc/ier/people/down/publications/tws\\_2016\\_final\\_research\\_report\\_feb\\_2017.pdf](https://warwick.ac.uk/fac/soc/ier/people/down/publications/tws_2016_final_research_report_feb_2017.pdf)
- Hill, N. E., & Wang, M. T. (2015). From middle school to college: Developing aspirations, promoting engagement, and indirect pathways from parenting to post high school enrollment. *Developmental Psychology*, 51(2), 224–235. <https://doi.org/10.1037/a0038367>
- Ho, S. K. (2017). The relationship between teacher stress and burnout in Hong Kong: Positive humour and gender as moderators. *Educational Psychology*, 37(3), 272–286. <https://doi.org/10.1080/01443410.2015.1120859>
- Howard, S., & Johnson, B. (2004). Resilient teachers: Resisting stress and burnout. *Social Psychology of Education*, 7(4), 399–420. <https://doi.org/10.1007/s11218-004-0975-0>
- Jiang, J., Vauras, M., Volet, S., & Wang, Y. (2016). Teachers' emotions and emotion regulation strategies: Self- and students' perceptions. *Teaching and Teacher Education*, 54, 22–31. <https://doi.org/10.1016/j.tate.2015.11.008>
- Jin, P., Yeung, A. S., Tang, T. O., & Low, R. (2008). Identifying teachers at risk in Hong Kong: Psychosomatic symptoms and sources of stress. *Journal of Psychosomatic Research*, 65(4), 357–362. <https://doi.org/10.1016/j.jpsychores.2008.03.003>
- Ju, C., Lan, J., Li, Y., Feng, W., & You, X. (2015). The mediating role of workplace social support on the relationship between trait emotional intelligence and teacher burnout. *Teaching and Teacher Education*, 51, 58–67. <https://doi.org/10.1016/j.tate.2015.06.001>
- Judge, T. A., Weiss, H. M., Kammeyer-Mueller, J. D., & Hulin, C. L. (2017). Job attitudes, job satisfaction, and job affect: A century of continuity and of change. *Journal of Applied Psychology*, 102(3), 356–374. <https://doi.org/10.1037/apl0000181>
- Kember, D. (2004). Interpreting student workload and the factors which shape students' perceptions of their workload. *Studies in Higher Education*, 29(2), 165–184. <https://doi.org/10.1080/0307507042000190778>
- Kember, D., & Leung, D. Y. (2006). Characterising a teaching and learning environment conducive to making demands on students while not making their workload excessive. *Studies in Higher Education*, 31(2), 185–198. <https://doi.org/10.1080/03075070600572074>
- Kenny, D. A. (2012). *Mediation*. Retrieved from <http://davidakenny.net/cm/mediate.htm>
- Kline, R. B. (2015). *Principles and practice of structural equation modeling* (3rd ed.). Guilford.
- Klusmann, U., Aldrup, K., Roloff, J., Lüdtke, O., & Hamre, B. K. (2022). Does instructional quality mediate the link between teachers' emotional exhaustion and student outcomes? A large-scale study using teacher and student reports. *Journal of Educational Psychology*, 114(6), 1442–1460. <https://doi.org/10.1037/edu0000703>
- Knox, M., Willard-Grace, R., Huang, B., & Grumbach, K. (2018). Maslach burnout inventory and a self-defined, single-item burnout measure produce different clinician and staff burnout estimates. *Journal of General Internal Medicine*, 33(8), 1344–1351. <https://doi.org/10.1007/s11606-018-4507-6>
- Koeske, G. F., & Koeske, R. D. (1989). Construct validity of the Maslach Burnout Inventory: A critical review and reconceptualization. *The Journal of Applied Behavioral Science*, 25(2), 131–144. <https://doi.org/10.1177/0021886389252004>

- Kokkinos, C. M. (2006). Factor structure and psychometric properties of the Maslach Burnout Inventory-Educators Survey among elementary and secondary school teachers in Cyprus. *Stress and Health: Journal of the International Society for the Investigation of Stress*, 22(1), 25–33. <https://doi.org/10.1002/smi.1079>
- Kokkinos, C. M. (2007). Job stressors, personality and burnout in primary school teachers. *British Journal of Educational Psychology*, 77(1), 229–243. <https://doi.org/10.1348/000709905X90344>
- Kristensen, T. S., Borritz, M., Villadsen, E., & Christensen, K. B. (2005). The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. *Work & Stress*, 19(3), 192–207. <https://doi.org/10.1080/02678370500297720>
- Kyriacou, C. (2001). Teacher stress: Directions for future research. *Educational Review*, 53(1), 27–35. <https://doi.org/10.1080/00131910120033628>
- Kyriacou, C., & Sutcliffe, J. (1978). Teacher stress: Prevalence, sources, and symptoms. *British Journal of Educational Psychology*, 48(2), 159–167. <https://doi.org/10.1111/j.2044-8279.1978.tb02381.x>
- LaRossa, R., & Reitzes, D. C. (2009). Symbolic interactionism and family studies. In P. Boss, W. J. Doherty, R. LaRossa, W. R. Schumm, & S. K. Steinmetz (Eds.), *Sourcebook of family theories and methods* (pp. 135–166). Springer. [https://doi.org/10.1007/978-0-387-85764-0\\_6](https://doi.org/10.1007/978-0-387-85764-0_6)
- Lee, K. C., Fairman, K. A., & El-Ibiary, S. Y. (2020). Item analysis of emotional exhaustion in pharmacy practice faculty. *Currents in Pharmacy Teaching and Learning*, 12(5), 504–507. <https://doi.org/10.1016/j.cptl.2020.01.003>
- Lee, Y. H., Kwon, H. H., & Richards, K. A. R. (2019). Emotional intelligence, unpleasant emotions, emotional exhaustion, and job satisfaction in physical education teaching. *Journal of Teaching in Physical Education*, 38(3), 262–270. <https://doi.org/10.1123/jtpe.2018-0177>
- Li, C. H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior research methods*, 48(3), 936–949. <https://doi.org/10.3758/s13428-015-0619-7>
- Li, X. (2019). Teachers' workload and its' influencing factors: An empirical analysis based on the data of China Education Panel Survey (2014–2015 academic year). *Shanghai Education Research*, 382, 7–11. in Chinese.
- Liu, X. M., & Wang, W. Z. (2004). A study on teachers' occupational burnout and mental health. *Chinese Journal of Clinical Psychology*, 1(4), 357–361. <https://doi.org/10.3969/j.issn.1005-3611.2004.04.010> (In Chinese)
- Lindqvist, P., & Nordänger, U. K. (2006). Who dares to disconnect in the age of uncertainty? Teachers' recesses and 'off-the-clock' work. *Teachers and Teaching*, 12(6), 623–637. <https://doi.org/10.1080/13540600601029637>
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, 71(3), 543–562. <https://doi.org/10.1111/1467-8624.00164>
- Ma, G., & Wu, Q. (2019). Social capital and educational inequality of migrant children in contemporary China: A multilevel mediation analysis. *Children and Youth Services Review*, 99, 165–171. <https://doi.org/10.1016/j.childyouth.2019.02.002>
- Maslach, C. A. (1982). *Burnout: The cost of caring*. Prentice Hall.
- Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology*, 52(1), 397–422. <https://doi.org/10.1146/annurev.psych.52.1.397>
- Maxwell, S. E., Cole, D. A., & Mitchell, M. A. (2011). Bias in cross-sectional analyses of longitudinal mediation: Partial and complete mediation under an autoregressive model. *Multivariate Behavioral Research*, 46(5), 816–841. <https://doi.org/10.1080/00273171.2011.606716>
- Millsap, R. E. (2012). *Statistical approaches to measurement invariance*. Routledge.
- Morgantini, L. A., Naha, U., Wang, H., Francavilla, S., Acar, Ö., Flores, J. M., Crivellaro, S., Moreira, D., Abern, M., Eklund, M., Vigneswaran, H. T., & Weine, S. M. (2020). Factors contributing to healthcare professional burnout during the COVID-19 pandemic: A rapid turnaround global survey. *PLoS ONE*, 15(9), e0238217. <https://doi.org/10.1371/journal.pone.0238217>
- Msuya, O. W. (2016). Exploring levels of job satisfaction among teachers in public secondary schools in Tanzania. *International Journal of Educational Administration & Policy Studies*, 8(2), 9–16. <https://doi.org/10.5897/IJEAPS2015.0435>
- Mudau, A. V. (2016). Exploring teacher mass resignation and early retirement from public schools. *Dirasat: Human and Social Sciences*, 43(5), 2243–2254. <https://doi.org/10.12816/0035119>



- Muguongo, M. M., Muguna, A. T., & Muriithi, D. K. (2015). Effects of compensation on job satisfaction among secondary school teachers in Maara Sub-County of Tharaka Nithi County, Kenya. *Journal of Human Resource Management*, 3(6), 47–59. <https://doi.org/10.11648/j.jhrm.20150306.11>
- Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus user's guide*. Author.
- Naylor, C. (2001). *Teacher workload and stress: An international perspective on human costs and systemic failure*. BCTF Research Report. Retrieved January 22, 2022, from <https://files.eric.ed.gov/fulltext/ED464028.pdf>
- Philipp, A., & Kunter, M. (2013). How do teachers spend their time? A study on teachers' strategies of selection, optimisation, and compensation over their career cycle. *Teaching and Teacher Education*, 35, 1–12. <https://doi.org/10.1016/j.tate.2013.04.014>
- Pines, O., Yoon, H. J., & Inouye, M. (1988). Expression of double-stranded-RNA-specific RNase III of *Escherichia coli* is lethal to *Saccharomyces cerevisiae*. *Journal of Bacteriology*, 170(7), 2989–2993. <https://doi.org/10.1128/jb.170.7.2989-2993.1988>
- Pogere, E. F., López-Sangil, M. C., García-Senorán, M. M., & González, A. (2019). Teachers' job stressors and coping strategies: Their structural relationships with emotional exhaustion and autonomy support. *Teaching and Teacher Education*, 85, 269–280. <https://doi.org/10.1016/j.tate.2019.07.001>
- Popper-Giveon, A., & Shayshon, B. (2017). Educator versus subject matter teacher: The conflict between two sub-identities in becoming a teacher. *Teachers and Teaching*, 23(5), 532–548. <https://doi.org/10.1080/13540602.2016.1218841>
- Preacher, K. J., & Hayes, A. F. (2008). Contemporary approaches to assessing mediation in communication research. In A. F. Hayes, M. D. Slater, & L. B. Snyder (Eds.), *The Sage sourcebook of advanced data analysis methods for communication research* (pp. 13–54). Sage.
- Pressley, T. (2021). Factors contributing to teacher burnout during COVID-19. *Educational Researcher*, 50(5), 325–327. <https://doi.org/10.3102/0013189X211004138>
- Rohland, B. M., Kruse, G. R., & Rohrer, J. E. (2004). Validation of a single-item measure of burnout against the Maslach Burnout Inventory among physicians. *Stress and Health: Journal of the International Society for the Investigation of Stress*, 20(2), 75–79. <https://doi.org/10.1002/smi.1002>
- Rossi, A., & Mannarini, S. (2019). The Italian version of the attitudes toward seeking professional psychological help scale-short form: The first contribution to measurement invariance. *Measurement*, 26(1), 93–100. <https://doi.org/10.4473/TPM26.1.5>
- Schaufeli, W. B. (2017). Burnout: A short socio-cultural history. In S. Neckel, A. K. Schaner, & G. Wagner (Eds.), *Burnout, Fatigue, Exhaustion: An Interdisciplinary Perspective on a Modern Affliction* (2nd ed., pp. 105–127). Cham: Springer.
- Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior*, 25(3), 293–315. <https://doi.org/10.2307/4093692>
- Schaufeli, W. B., Bakker, A. B., & Rhenen, W. V. (2009). How changes in job demands and resources predict burnout, work engagement, and sickness absenteeism. *Journal of Organizational Behavior*, 30(7), 893–917. <https://doi.org/10.2307/41683873>
- Schaufeli, W. B., & Taris, T. W. (2014). A critical review of the job demands-resources model: Implications for improving work and health. In G. Bauser & O. Hämmig (Eds.), *Bridging occupational, organizational and public health* (pp. 43–68). Springer. [https://doi.org/10.1007/978-94-007-5640-3\\_4](https://doi.org/10.1007/978-94-007-5640-3_4)
- School of Public Administration and Policy, Renmin University of China. (2005). *A national large-scale survey of occupational stress and mental health among Chinese teachers in 2005*. Retrieved from <http://edu.sina.com.cn/l/2005-08-26/1106125866.html>
- Shackleton, N., Bonell, C., Jamal, F., Allen, E., Mathiot, A., Elbourne, D., & Viner, R. (2019). Teacher burnout and contextual and compositional elements of school environment. *Journal of School Health*, 89(12), 977–993. <https://doi.org/10.1111/josh.12839>
- Shi, X. (2021). Can a non-core subject teacher serve as a homeroom teacher? Discussion on the dispute between core and non-core subject teacher as homeroom teacher. *Science Insights Education Frontiers*, 8(1), 989–1000. <https://doi.org/10.15354/sief.21.or003>
- Shirom, A. (1989). Burnout in work organizations. In C. L. Cooper & I. Robertson (Eds.), *International review of industrial and organizational psychology* (pp. 25–48). Wiley.
- Skaalvik, E. M., & Skaalvik, S. (2011). Teacher job satisfaction and motivation to leave the teaching profession: Relations with school context, feeling of belonging, and emotional exhaustion. *Teaching and Teacher Education*, 27(6), 1029–1038. <https://doi.org/10.1016/j.tate.2011.04.001>

- Skaalvik, E. M., & Skaalvik, S. (2016). Teacher stress and teacher self-efficacy as predictors of engagement, emotional exhaustion, and motivation to leave the teaching profession. *Creative Education, 7*(13), 1785–1799. <https://doi.org/10.4236/ce.2016.713182>
- Skaalvik, E. M., & Skaalvik, S. (2017). Still motivated to teach? A study of school context variables, stress and job satisfaction among teachers in senior high school. *Social Psychology of Education, 20*(1), 15–37. <https://doi.org/10.1007/s11218-016-9363-9>
- Smith, R. W., & Bugni, V. (2006). Symbolic interaction theory and architecture. *Symbolic Interaction, 29*(2), 123–155.
- Song, H., Gu, Q., & Zhang, Z. (2020). An exploratory study of teachers' subjective wellbeing: Understanding the links between teachers' income satisfaction, altruism, self-efficacy and work satisfaction. *Teachers and Teaching, 26*(1), 3–31. <https://doi.org/10.1080/13540602.2020.1719059>
- Sonnentag, S. (2005). Burnout research: Adding an off-work and day-level perspective. *Work & Stress, 19*(3), 271–275. <https://doi.org/10.1080/02678370500386473>
- Sonnentag, S., & Fritz, C. (2015). Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior, 36*(S1), S72–S103. <https://doi.org/10.1002/job.1924>
- Steinhardt, M. A., Jaggars, S. E. S., Faulk, K. E., & Gloria, C. T. (2011). Chronic work stress and depressive symptoms: Assessing the mediating role of teacher burnout. *Stress and Health, 27*(5), 420–429. <https://doi.org/10.1002/smi.1394>
- Tatar, M., & Horenczyk, G. (2003). Diversity-related burnout among teachers. *Teaching & Teacher Education, 19*(4), 397–408. [https://doi.org/10.1016/S0742-051X\(03\)00024-6](https://doi.org/10.1016/S0742-051X(03)00024-6)
- Timms, C., Brough, P., & Graham, D. (2012). Burnt-out but engaged: The co-existence of psychological burnout and engagement. *Journal of Educational Administration, 50*(3), 327–345. <https://doi.org/10.1108/09578231211223338>
- Tong, X. (2017). A study on the working time of junior middle school teachers and its influencing factors—An analysis based on China Education Panel Survey (CEPS). *Research on Teacher Education, 29*, 107–112.
- Wang, Y., Ramos, A., Wu, H., Liu, L., Yang, X., Wang, J., & Wang, L. (2015). Relationship between occupational stress and burnout among Chinese teachers: A cross-sectional survey in Liaoning, China. *International Archives of Occupational and Environmental Health, 88*(5), 589–597. <https://doi.org/10.1007/s00420-014-0987-9>
- West, C. P., Dyrbye, L. N., Satele, D. V., Sloan, J. A., & Shanafelt, T. D. (2012). Concurrent validity of single-item measures of emotional exhaustion and depersonalization in burnout assessment. *Journal of General Internal Medicine, 27*(11), 1445–1452. <https://doi.org/10.1007/s11606-012-2015-7>
- West, C. P., Dyrbye, L. N., Sloan, J. A., & Shanafelt, T. D. (2009). Single item measures of emotional exhaustion and depersonalization are useful for assessing burnout in medical professionals. *Journal of General Internal Medicine, 24*(12), 1318–1321. <https://doi.org/10.1007/s11606-009-1129-z>
- White, J. M., & Klein, D. M. (2008). The symbolic interaction framework. In J. M. White & D. M. Klein (Eds.), *Family theories* (3rd ed., pp. 151–177). Sage.
- Wolfram, M., Bellingrath, S., Feuerhahn, N., & Kudielka, B. M. (2013). Emotional exhaustion and overcommitment to work are differentially associated with hypothalamus–pituitary–adrenal (HPA) axis responses to a low-dose ACTH1–24 (Synacthen) and dexamethasone–CRH test in healthy school teachers. *Stress, 16*(1), 54–64. <https://doi.org/10.3109/10253890.2012.683465>
- Wu, X. C., Qi, Y. J., & Zang, W. W. (2019). Overall features and influencing factors of primary and secondary school teachers' job burnout in China. *Journal of South China Normal University (social Science Edition), 1*, 37–42. in Chinese.
- Xu, F. M., Ji, F., & Chao, Q. L. (2004). The development of job burnout questionnaire in primary and secondary teachers. *Chinese Journal of Clinical Psychology, 12*(1), 13–14. <https://doi.org/10.3969/j.issn.1005-3611.2004.01.004> in Chinese.
- Xu, F. M., Zhu, C. S., Huang, W. F., & Shao, L. C. (2005). Teachers' job burnout and related factors in primary and secondary schools. *Chinese Mental Health Journal, 19*(5), 324–326. <https://doi.org/10.3321/j.issn:1000-6729.2005.05.010> in Chinese.
- Ye, J., & Zhao, D. (2019). Developing different identity trajectories: Lessons from the Chinese teachers. *Teachers and Teaching, 25*(1), 34–53. <https://doi.org/10.1080/13540602.2018.1532408>
- Yin, H., & Huang, S. (2021). Applying structural equation modelling to research on teaching and teacher education: Looking back and forward. *Teaching and Teacher Education, 107*, 103438. <https://doi.org/10.1016/j.tate.2021.103438>

- Yin, H. B., & Lee, J. C. K. (2012). Be passionate, but be rational as well: Emotional rules for Chinese teachers' work. *Teaching and Teacher Education*, 28(1), 56–65. <https://doi.org/10.1016/j.tate.2011.08.005>
- Yong, Z., & Yue, Y. (2007). Causes for burnout among secondary and elementary school teachers and preventive strategies. *Chinese Education & Society*, 40(5), 78–85. <https://doi.org/10.2753/ced1061-1932400508>
- Yu, X., Wang, P., Zhai, X., Dai, H., & Yang, Q. (2015). The effect of work stress on job burnout among teachers: The mediating role of self-efficacy. *Social Indicators Research*, 122(3), 701–708. <https://doi.org/10.1007/s11205-014-0716-5>
- Zadok Boneh, M., Feniger-Schaal, R., Aviram Bivas, T., & Danial-Saad, A. (2021). Teachers under stress during the COVID-19: Cultural differences. *Teachers and Teaching*. <https://doi.org/10.1080/13540602.2021.2017275>
- Zhang, J., Yang, Z., & Ling, H. (2014). Work stress, job satisfaction and job burnout in primary and middle school teachers. *Chinese Journal of Clinical Psychology*, 22(5), 920–922. in Chinese.
- Zhang, Q., & Zhu, W. (2007). Teacher stress, burnout, and social support in Chinese secondary education. *Human Communication*, 10(4), 487–496.

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