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Motivation profiles of Chinese language teachers of non-Chinese speaking students and the associations with teacher well-being in Hong Kong

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The growing population of non-Chinese speaking (NCS) students in Hong Kong has presented substantial challenges for Chinese language teachers. Work motivation to teach NCS students has not gained much attention in previous studies but it is important for these teachers' well-being. This study aimed to identify the motivation profiles of Chinese language teachers of NCS students and examine the relationships between motivation profiles and teacher well-being (i.e., work engagement, job satisfaction, and organizational commitment), as well as the influence of demographic factors (i.e., gender, in-service training, and types of educational setting) on the motivation profiles. A total of 290 Chinese language teachers working with NCS students in Hong Kong primary schools participated in this study. Results showed that three motivation profiles were identified: de-motivated, mixed-motivated, and autonomous-motivated. Mixed-motivated teachers exhibited the highest levels of well-being, followed by autonomous-motivated teachers and demotivated teachers. Female teachers and teachers who had received in-service training related to teaching NCS students were more likely to belong to the mixed-motivated and autonomous-motivated profiles. Contributions and implications are discussed.

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Introduction

Hong Kong is a multicultural city, and the number of ethnic minority students ("non-Chinese speaking students, NCS", hereafter) is continuously increasing (Gao et al. 2019; Loh and Hung, 2020). Most of them are South and Southeast Asian, such as Indonesians, Filipinos, Indians, Pakistanis, Nepalese, and Thais (Liao et al. 2022; Loh et al. 2018). These students face significant challenges in their learning, particularly when it comes to studying Chinese as a second language (L2; Shum et al. 2016). Some studies have explored influencing factors of NCS students' Chinese language learning to enhance their academic performance, including ideal L2 self, learning engagement, and learning motivation (Shum et al. 2011; Zhu et al. 2023). However, there is a paucity of research on the factors from the perspective of teachers who teach NCS students. In the Hong Kong context, the Chinese language teachers of NCS students are usually those who teach L1 Chinese students. However, the substantial disparity in Chinese language proficiency between NCS students and their Chinese-speaking peers has created a significant gap in their learning progress, posing considerable challenges for teachers (Loh and Hung, 2020). Furthermore, research has found that only a limited number of teachers have received training specifically focused on teaching NCS students, resulting in a lack of relevant, effective teaching strategies for most Chinese language teachers (Loh and Hung, 2020). These challenges may undermine teachers' motivation to teach the Chinese language to NCS students. It has been widely recognized that teacher work motivation plays an important role in their well-being, student achievement, and school effectiveness (Han and Yin, 2016; Hartl and Holzberger, 2022). Therefore, it is of great importance to explore Chinese language teachers' work motivation, thereby exploring the ways of improving educational quality for NCS students.

Work motivation refers to internal or external forces that drive individuals to engage in work-related activities (Pinder, 2014). Existing studies have explored work motivation among teachers of second or foreign language teaching. For example, in the English as a foreign language (EFL) context, teachers' motivational practice was found to be associated with students' motivated behavior (Papi and Abdollahzadeh, 2012). In the Chinese as a foreign language (CFL) context, Zhang et al. (2020) investigated pre-service teachers' motivation to teach the Chinese language and found that age, annual family income, and frequency of contact with foreigners predicted their motivation. Also conducted among pre-service teachers, Gu et al.'s (2021) research discovered a six-factor motivation for both native and non-native CFL teachers, and the two types of teachers differed in the dimensions of extrinsic values and social influence.

However, two major research gaps remain in previous literature. First, in-service CFL teachers' work motivation needs to be explored, particularly in the Hong Kong context. Second, while most of the studies concerning language teachers' motivation adopted variable-centered approaches (e.g., Gu et al. 2021; Zhang et al. 2020), only a handful of studies utilized person-centered approaches (Lu and Geng, 2022). Compared to variable-centered approaches, which assume all sample individuals belong to a homogenous group and focus on examining the antecedents and outcomes of the variables, person-centered approaches aim to categorize individuals into different profiles, recognizing that members display different characteristics across these profiles (Ferguson et al. 2020). For example, adopting a person-centered approach, Lu and Geng (2022) categorized CFL teachers who teach in eight countries into four motivation profiles: self-devotion and social contribution, personal interest, personal utility, and immigration path. As a person-centered approach can provide an in-depth analysis of the nuances in individuals'

mentalities, one objective of this study is to identify work motivation profiles among Chinese language teachers of NCS students in Hong Kong.

Moreover, to obtain a deeper understanding of the identified motivation profiles, on the one hand, this study examined the influence of demographic factors on the motivation profiles (see the section "Influence of Demographics on Teacher Work Motivation" for details). On the other hand, the relationships between motivation profiles and teacher well-being were examined to understand the significance of the profiles. Teacher well-being refers to effective and energized attitudes, emotions, and behaviors towards teaching work (Collie and Martin, 2017). It is a multidimensional construct and three common indicators (Hascher and Waber, 2021; Van Horn et al. 2004) were selected in this study: work engagement (a positive and fulfilling state of mind concerning work and encompassing traits of vigor, dedication, and absorption; Schaufeli et al. 2002), job satisfaction (the overall attitude and views of teachers toward their working conditions and profession; Song, 2007), and organizational commitment (individual's psychological contract with their organization; Meyer and Allen, 1991). All three indicators are considered important to student outcomes, school effectiveness, and teachers' long-term career satisfaction and retention in the teaching profession (Bogler and Berkovich, 2022; Perera et al. 2018; Toropova et al. 2021).

Literature review

Work motivation and the theoretical framework. Over the past half-century, a variety of theories have emerged to conceptualize work motivation. Early theories, such as the expectancy-valence theory (Vroom, 1964), viewed work motivation as a singular concept. While Porter and Lawler (1968) made a distinction between intrinsic and extrinsic motivation, they considered them to be additive. However, cognitive evaluation theory (Deci, 1975) challenged this viewpoint by highlighting the impact of extrinsic motivation on intrinsic motivation.

In contrast to the aforementioned theories that treat work motivation as a single factor or a binary construct, the self-determination theory (SDT; Deci and Ryan, 1985) is the most influential framework, considering work motivation as multidimensional. Based on SDT (Gagné and Deci, 2005), work motivation can be classified into three primary types: amotivation (i.e., a lack of intention or motivation towards an activity), extrinsic motivation (i.e., engaging in an activity for instrumental reasons), and intrinsic motivation (i.e., engaging in an activity for its inherent interest and enjoyment). Among them, extrinsic motivation can be further subdivided into four subtypes (i.e., external regulation, introjected regulation, identified regulation, and integrated regulation), and their levels of self-determination are increasing. External regulation signifies engaging in an activity for rewards or to avoid punishments; introjected regulation involves engaging in an activity to prevent feelings of guilt, shame, or embarrassment; identified regulation concerns engaging in an activity aligned with personal values or meanings; integrated regulation reflects engaging in an activity to turn a goal or value into one's own. Drawing upon the multi-dimensions of work motivation, both the SDT (Gagné and Deci, 2005) and relevant empirical research (Eyal and Roth, 2011) further supported two broad classifications: controlled motivation (including external and introjected regulation) versus autonomous motivation (including identified regulation and intrinsic motivation). In line with the previous studies (e.g., in de Wal et al. 2014; Xie et al. 2022), this study adopted the aforementioned four indicators of controlled and autonomous motivation to

conceptualize work motivation of Chinese language teachers of NCS students. This is because the specific motivation dimensions could provide more nuanced information when exploring motivation profiles.

In addition to conceptualizing the construct of work motivation, the SDT provides a theoretical framework to examine the relationships between work motivation and other variables. On the one hand, both individual differences and work environment serve as the antecedents of work motivation (Gagné and Deci, 2005), providing a theoretical basis for examining the influence of demographic factors on work motivation. On the other hand, work motivation is a crucial antecedent of work outcomes (Gagné and Deci, 2005), furnishing a theoretical foundation for examining the impact of work motivation on the three indicators (i.e., work engagement, job satisfaction, and organizational commitment) of teacher well-being.

Influence of demographics on teacher work motivation. In this study, gender, in-service training related to teaching NCS students, and educational setting were selected to examine their impacts on teachers' work motivation profiles due to the following reasons. Firstly, existing studies reported contradictory findings concerning the effect of gender on teachers' work motivation. For example, Al-Salameh (2014) found that female teachers exhibited higher levels of work motivation, while Han-dayani (2016) discovered that male teachers were more motivated compared to their female counterparts. However, the influence of gender on the motivation profiles of language teachers remains largely unexplored. This study, thus, filled this research gap to explore how gender works in profiling work motivation among Chinese language teachers of NCS students.

Secondly, in-service training has been found to significantly impact teachers' motivation (Iqbal et al. 2020; Kanyesigye et al. 2022). For instance, compared to teachers who did not receive in-service training, those attending in-service training showed greater motivation to employ various innovative pedagogical approaches (Kanyesigye et al. 2022). Specific to the multilingual context in Hong Kong, where teachers face greater challenges in language teaching for students with multicultural backgrounds, it is of great importance to examine how in-service training concerning teaching NCS students influences Chinese language teachers' work motivation.

Besides, types of educational setting, which concern teachers' workplaces of teaching the Chinese language to NCS students, may also play a role in shaping their work motivation. In Hong Kong, there are two settings (i.e., pull-out approach and immersion approach) for NCS students to learn Chinese language (Loh et al. 2023). The pull-out approach refers to NCS students in mainstream schools learning Chinese language in a separate classroom; the immersion approach refers to NCS students learning Chinese language in mainstream classrooms together with their Chinese-speaking peers. It is unclear whether or not the two education settings could influence Chinese language teachers' work motivation profiles. This study bridged this research gap by examining the effect of educational setting on the motivation profiles of Hong Kong Chinese language teachers.

Work motivation and teacher well-being. As clarified in the Introduction section, work engagement, job satisfaction, and organizational commitment were selected as the three indicators of teacher well-being in this study. Many studies using variable-centered approaches examined the relationship between work motivation and work engagement. For example, by investigating teachers in mainland China, Li et al. (2015) found that work

engagement was negatively predicted by controlled motivation but positively predicted by autonomous motivation. Pourtousi and Ghanizadeh (2020) investigated Iranian EFL teachers and discovered that teachers' motivation positively predicted work engagement. Only two empirical studies employed person-centered approaches and explored the relationship between teachers' motivation profiles and work engagement. In de Wal et al. (2014) identified four motivation profiles (i.e., externally regulated, highly autonomous, moderately motivated, and extremely autonomous) among Dutch teachers and revealed that teachers with profiles exhibiting greater levels of identified regulation and intrinsic motivation displayed higher levels of engagement in professional learning. Shi et al. (2022) identified three motivation profiles (low value-high cost, moderate all, and high value-low cost) among Chinese kindergarten teachers. The authors discovered that the high value-low cost profile had the most positive impact on work engagement. However, there is a paucity of research that examined this relationship among CSL teachers; thus, the present study filled this research gap.

The influence of work motivation on job satisfaction has been intensively examined using variable-centered approaches. For instance, Liu and Onwuegbuzie (2014) found that teachers who were more intrinsically motivated showed higher levels of job satisfaction. A positive relationship between work motivation and job satisfaction also existed among EFL teachers (Farajzadeh and Alavinia, 2022; Noori et al. 2014). Using a person-centered approach, Zhang and Hirschi (2021) identified four motivation profiles among Chinese employees and indicated that employees in the highly motivated calling profile exhibited the highest job satisfaction, followed by those in the moderately motivated calling profile, the moderately externally motivated calling profile, and the externally motivated low calling profile. Howard et al. (2016) investigated Canadian and Belgian employees and also identified four motivation profiles. The highly motivated profile and the moderately autonomous profile scored the highest on job satisfaction, followed by the balanced profile and the amotivated profile (Howard et al. 2016). Such relationships, examined using a person-centered approach, have not yet been tested among any language teachers.

Existing studies that adopted variable-centered approaches have indicated that work motivation is an important predictor of organizational commitment (Fernet et al. 2012). Some studies examined this relationship using the specific dimensions of work motivation and organizational commitment. For example, normative commitment was found to be positively predicted by introjected regulation, whereas affective commitment was positively predicted by autonomous motivation (Gagné et al. 2008). A study investigating Chinese primary school teachers suggested that controlled motivation positively influenced maladaptive organizational commitments; autonomous motivation negatively influenced maladaptive organizational commitments and positively influenced adaptive organizational commitments (Xie, 2022). Despite the insightful findings, the relationship between work motivation profiles and organizational commitment among Chinese language teachers remains largely unexplored.

The present study. This study aimed to identify the different profiles of work motivation among Chinese language teachers of NCS students in Hong Kong, explore the differences in motivation profiles in terms of teacher well-being, and examine the influence of teachers' demographic factors on their motivation profiles. Three research questions were proposed as follows.

- (1) What work motivation profiles can be identified from Chinese language teachers of NCS students?

- (2) How are work motivation profiles correlated to teacher well-being (i.e., work engagement, job satisfaction, and organizational commitment)?
- (3) Do demographic factors (i.e., gender, in-service training, and educational setting) influence work motivation profile membership?

Methods

Participants and procedure. Ethics approval was obtained from the Institution with which the first author is affiliated. Then, the online consent form and the questionnaire were designed using the Wenjuanxing platform (<https://www.wjx.cn/>) to collect data. In the consent form, participants were informed of the purpose and significance of this study. They were also informed that their participation was entirely voluntary and they could terminate this survey at any time without any negative consequences. To protect their privacy, no personal data would be identified or disclosed.

The online survey was distributed to Chinese language teachers who participated in the training programs (i.e., Professional Development Project on Enhancing Non-Chinese Speaking Students' Language Competency) organized by a project team supported by the Hong Kong Education Bureau. A total of 290 teachers who taught Chinese language in Cantonese in primary schools completed the survey. Among them, 48 were male teachers and 242 were female teachers; 104 teachers had participated in in-service training concerning teaching NCS students, while 186 had no such experience; 64 teachers taught Chinese language for NCS students through pull-out approaches, and 226 teachers taught them through immersion approaches. Their length of service ranged from 1 to 40 years ($M = 10.00$, $SD = 9.42$).

Inventories

Multidimensional Work Motivation Scale (MWMS). The MWMS was developed by Gagné et al. (2015), and it showed good psychometric properties in previous studies when measuring teachers (Neves and Coimbra, 2018). Xie et al.'s (2022) study suggested that the Chinese version of the MWMS had good reliability and validity when assessing Chinese teachers; thus, it was adopted in this study. The MWMS comprises 16 items measuring four dimensions: external regulation (meaning that teaching NCS students for rewards or to avoid punishments, sample item: "To get others' (e.g., school leaders, colleagues, families, and students) approval"), introjected regulation (meaning that teaching NCS students to prevent feelings of guilt, shame, or embarrassment, sample item: "Because otherwise I will feel ashamed of myself"), identified regulation (meaning that teaching NCS students aligns with personal values or meanings, sample item: "Because putting efforts in this job aligns with my personal values"), and intrinsic motivation (meaning that teaching NCS students for its inherent interest and enjoyment, sample item: "Because I have fun doing my job"). Teachers were required to evaluate each item on a seven-point Likert scale (1 = "not at all" and 7 = "completely") when answering the question stem "As a Chinese language teacher teaching NCS students, why do you or would you put efforts into your job?". In the present study, the Cronbach alpha coefficients of the MWMS were 0.91 for external regulation, 0.84 for introjected regulation, 0.94 for identified regulation, and 0.93 for intrinsic motivation. The results of confirmatory factor analysis showed good model fit indices: $\chi^2 = 261.61$, $p < 0.001$, $df = 91$, $TLI = 0.95$, $CFI = 0.96$, $RMSEA = 0.08$, and $SRMR = 0.06$.

Utrecht Work Engagement Scale-9 (UWES-9). Work engagement was measured by the UWES-9 (Schaufeli et al. 2006), which has

been widely proven to have good psychometric properties in both the English version (Schaufeli et al. 2006) and the Chinese version (Fong and Ng, 2012). The UWES-9 comprises nine items measuring three dimensions: vigor (three items, sample item "At my work, I feel bursting with energy"), dedication (three items, sample item "My job inspires me"), and absorption (three items, sample item "I am immersed in my work"). The Participants rated themselves on a seven-point Likert scale (1 = "completely disagree" and 7 = "completely agree") to indicate the degree to which they agreed with each item. In this study, the Cronbach alpha coefficient of the UWES-9 was 0.95. The results of confirmatory factor analysis showed good model fit indices: $\chi^2 = 49.94$, $p < 0.001$, $df = 19$, $TLI = 0.98$, $CFI = 0.99$, $RMSEA = 0.07$, and $SRMR = 0.02$.

Job Satisfaction Scale (JSS). Ho and Au (2006) adapted Diener et al.'s (1985) Life Satisfaction Scale to measure Hong Kong teachers' job satisfaction. The adapted scale has satisfactory reliability and validity, and it was adopted in this study. The JSS consists of five items (sample item "In most ways, being a teacher is close to my ideal.") that require teachers to respond on a seven-point Likert scale (1 = "completely disagree" and 7 = "completely agree"). In this study, the Cronbach alpha coefficient of the JSS was 0.89. The results of confirmatory factor analysis showed good model fit indices: $\chi^2 = 11.96$, $p < 0.05$, $df = 4$, $TLI = 0.98$, $CFI = 0.99$, $RMSEA = 0.08$, and $SRMR = 0.02$.

Organizational Commitment Inventory (OCI). The affective commitment subscale (three items, sample item "I have strong sense of belonging in the school") of the OCI (Xie, 2022) was adopted in this study. This is because the affective commitment has been more strongly related to other variables than other commitment components (Fernet et al. 2012). To reduce the length of the survey, the affective commitment subscale was selected to represent organizational commitment. The OCI has shown good psychometric properties in previous studies when measuring Chinese teachers (Xie, 2022; Xie and Zhang, 2022). The teachers were invited to rate themselves on a five-point Likert scale ranging from "1" (completely disagree) to "5" (completely agree). In this study, the Cronbach alpha coefficient of the affective commitment subscale was 0.91. The results of confirmatory factor analysis showed that it is a saturated model.

Data analysis. SPSS 26.0 and Mplus 7.4 (Muthén and Muthén, 1998–2012) were used to analyze data. First, descriptive statistics including means, standard deviations, and zero-order correlations were calculated. Second, LPA was carried out with one to four profile solutions using external regulation, introjected regulation, identified regulation, and intrinsic motivation as indicators. Akaike information criterion (AIC), Bayesian information criterion (BIC), sample-size adjusted BIC (ABIC), Lo–Mendell–Rubin likelihood ratio test (LMR), bootstrap likelihood ratio test (BLRT), and entropy value were used to identify the optimal number of groups (Howard et al. 2016). Third, univariate analysis of variance (ANOVA) was conducted to examine the differences in the motivation profiles in terms of teacher well-being. Finally, multinomial logistic regression was performed to examine the influence of demographic factors (i.e., gender, in-service training, and school type) on the likelihood of profile membership of work motivation.

Results

Descriptive statistics. The values of means, standard deviations, kurtosis, skewness, and zero-order correlations of each variable are displayed in Table 1. The results indicated that the data were

Table 1 Descriptive Statistics and Zero-order Correlations among Key Variables.

Variable	M	SD	K	S	1	2	3	4	5	6	7
1. External regulation	4.27	1.25	0.24	-0.30	1						
2. Introjected regulation	4.82	1.10	0.71	-0.53	0.73***	1					
3. Identified regulation	5.60	0.99	0.61	-0.68	0.29***	0.54***	1				
4. Intrinsic motivation	5.16	1.10	1.08	-0.73	0.37***	0.61***	0.67***	1			
5. Work engagement	4.79	1.14	0.74	-0.47	0.26***	0.39***	0.36***	0.59***	1		
6. Job satisfaction	5.10	1.00	0.74	-0.47	0.26***	0.40***	0.43***	0.57***	0.76***	1	
7. Organizational commitment	3.37	0.93	-0.23	-0.41	0.29***	0.37***	0.32***	0.46***	0.71***	0.57***	1

K = kurtosis, S = skewness. ***p < 0.001.

Table 2 Comparisons of Model Fit Indices for Latent Profiles of Work Motivation.

No. of profiles	No. of free parameters	AIC	BIC	aBIC	pLMR	pBLRT	Entropy	Class size per profile
1	8	3534.725	3564.084	3538.714	-	-	-	290
2	13	3293.671	3341.380	3300.154	0.057	0.053	0.752	88/202
3	18	3170.900	3236.958	3179.877	0.005	0.004	0.836	15/108/167
4	23	3100.485	3184.892	3111.955	0.017	0.014	0.879	15/158/9/108

Bold values mean that the third solution was adopted in this study.

Table 3 Means and standard errors for the three work motivation profiles.

	Profile 1: De-motivated M (SE)	Profile 2: Mixed-motivated M (SE)	Profile 3: Autonomous-motivated M (SE)
External regulation	2.803 (0.366)	5.130 (0.181)	3.821 (0.085)
Introjected regulation	2.793 (0.342)	5.757 (0.108)	4.369 (0.088)
Identified regulation	3.350 (0.210)	6.344 (0.067)	5.301 (0.089)
Intrinsic motivation	2.706 (0.318)	5.952 (0.101)	4.840 (0.088)

normally distributed. Four dimensions of work motivation (i.e., external regulation, introjected regulation, identified regulation, and intrinsic motivation) were positively correlated with the three indicators of teacher well-being (i.e., work engagement, job satisfaction, and organizational commitment). Generally, the more autonomous the motivation, the higher the levels of well-being.

Profiles of work motivation among Chinese language teachers of NCS students. Using four dimensions of work motivation as indicators, the LPA was performed to categorize the 290 Chinese language teachers into distinct groups. Table 2 shows the fit indices for selecting the models estimated using one-to-four-group solutions. As expected, the AIC, BIC, and ABIC values for the four solutions consistently decreased. The *p*-values of LMR and BLRT for the third profile solution had the highest level of significance. Furthermore, the entropy value of the third solution was higher than 0.8, indicating a classification accuracy of over 90% (Lubke and Muthén, 2007). As a result, the third profile solution was selected in this study.

The latent means for the four dimensions of work motivation in the three profiles are presented in Table 3 and Fig. 1. Profile 1 was labeled de-motivated because teachers in this profile displayed the lowest scores for all four motivation dimensions, indicating that teachers lacked the motivation to teach NCS students. Profile 2 was labeled mixed-motivated because teachers in this profile scored the highest on all four motivation dimensions, suggesting that their motivation to teach NCS students was both externally and internally driven. Profile 3 was labeled autonomous-motivated because teachers in this profile scored relatively higher on identified regulation and

intrinsic motivation (i.e., two types of autonomous motivation), indicating that their motivation to teach NCS students was driven autonomously.

Associations of work motivation profiles with teacher well-being. The ANOVA was carried out to examine the differences among the three identified profiles of work motivation in three aspects of teacher well-being (i.e., work engagement, job satisfaction, and organizational commitment). The results (see Table 4) suggested that teachers who belong to the mixed-motivated profile scored highest on teacher well-being, while those who belong to the de-motivated profile scored lowest on teacher well-being. According to Cohen (2013), the effect sizes (see the value of η^2 in Table 4) ranged from medium to large.

Influencing factors of work motivation profiles membership. Table 5 shows the results of the multinomial logistic regression regarding the influence of three demographic factors (i.e., gender, in-service training, and school type) on work motivation profile membership. Significant differences were discovered in gender and in-service training. Regarding gender, when taking demotivated profile as the reference group, female teachers were more likely to belong to the profiles of mixed-motivated (4.48 times) and autonomous-motivated (3.31 times) compared to male teachers. In terms of in-service training, when taking the de-motivated profile as the reference group, teachers with in-service training experiences were 8.235 times more likely to belong to the mixed-motivated profile and 8.481 times more likely to belong to the autonomous-motivated profile. No significant result was found in the educational setting.

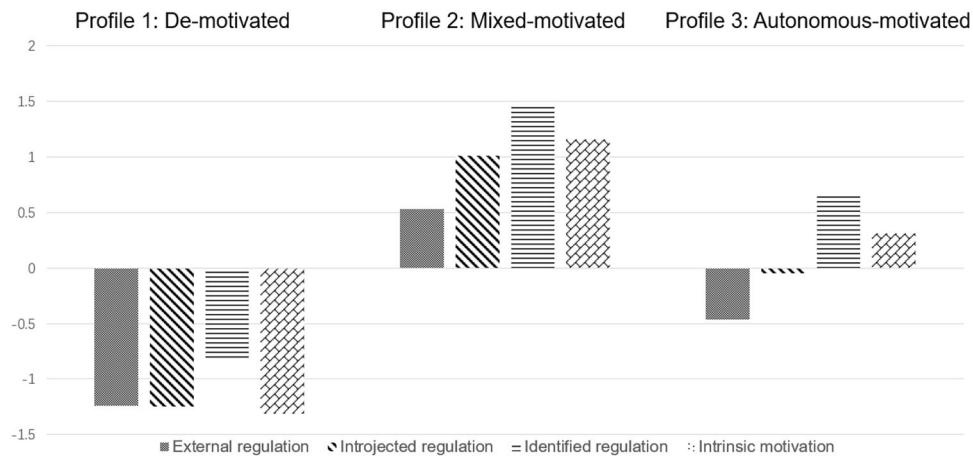


Fig. 1 The three-profile solution of work motivation among Chinese language teachers.

Table 4 Differences in Teacher Well-being across the Three Profiles of Work Motivation.

	Work engagement M (SD)	Job satisfaction M (SD)	Organizational commitment M (SD)
Profile 1	3.54 (1.54)	3.91 (1.41)	2.53 (1.00)
Profile 2	5.36 (1.07)	5.62 (0.85)	3.77 (0.88)
Profile 3	4.53 (0.95)	4.88 (0.87)	3.19 (0.84)
F	33.07***	36.70***	22.24***
η^2	0.19	0.20	0.13
Post hoc	2 > 3 > 1	2 > 3 > 1	2 > 3 > 1

*** $p < 0.001$.

Discussion

The present study identified three profiles of work motivation: de-motivated, mixed-motivated, and autonomous-motivated. Among the three profiles, mixed-motivated teachers exhibited the highest levels of well-being, followed by autonomous-motivated teachers and de-motivated teachers. Female teachers and teachers who had participated in in-service training were more likely to belong to the mixed-motivated and autonomous-motivated profiles. The findings are discussed below.

Compared to existing studies categorizing teachers' motivation into four profiles (in de Wal et al. 2014; Van den Berghe et al. 2014), the present study identified three motivation profiles: de-motivated, mixed-motivated, and autonomous-motivated. This emphasizes the unique characteristics of Hong Kong Chinese language teachers of NCS students.

Teachers in the demotivated profile showed the lowest scores on the four motivation dimensions (i.e., external regulation, introjected regulation, identified regulation, and intrinsic motivation). It indicated that Chinese language teachers in this profile had a lower level of motivation to work with NCS students. One reason might be the absence of comprehensive teaching materials, methods, and a second language curriculum that aligns with the mainstream curriculum (Loh and Hung, 2020). It means that teachers have to face a heavy and "additional" workload to integrate the second language learning framework into the school-based curriculum (Loh and Hung, 2020). Another possible reason is that most teachers are L1 Chinese language teachers, and they are assigned by school leaders to teach NCS students. Their lack of competence in teaching L2 Chinese language (Loh and Hung, 2020) and limited knowledge of the culture and language of the NCS students (Tse et al. 2020) may hinder their work motivation.

It is also found that de-motivated teachers exhibited the lowest levels of well-being, which is also consistent with previous findings (Hornstra et al. 2018). Although the de-motivated profile showed a maladaptive value, a positive finding of this study is that only 15 teachers belong to this profile. It implies that the situation is relatively optimistic in Hong Kong, where Chinese language teachers teach NCS students in their classes.

The mixed-motivated profile shows relatively high scores on all four dimensions. It indicates that teachers' motivation to teach NCS students in this profile is driven by both controlled and autonomous motivation at the same time. This profile is similar to that in previous studies. For example, Abós et al.'s (2019) "autonomous-controlled motivated" profile and Howard et al.'s (2016) "highly motivated" profile showed relatively high scores on both controlled and autonomous motivation. In addition, the adaptive value of the mixed-motivated profile was the highest in this study. It implies that controlled motivation and autonomous motivation are not in opposition to each other (Gagné and Deci, 2005), and both of them are needed by Hong Kong Chinese language teachers of NCS students.

The autonomous-motivated profile is also similar to autonomous motivation, which is a motivation type in studies using variable-centered approaches (Xie, 2022). It implies that the motivation to teach NCS students of teachers in the autonomous-motivated profile is mainly driven by their recognition of the value (e.g., the need for students to be integrated into the mainstream society) of teaching these students (i.e., identified regulation) and their enjoyment of this work (i.e., intrinsic motivation). Similar profiles have also been identified in previous studies, such as the "relatively autonomously motivated" profile (Abós et al. 2019) and the "highly autonomous" profile (in de Wal et al. 2014). All these profiles showed high scores on both identified regulation and intrinsic motivation. However, different from the previous studies (Abós et al. 2019), the autonomous-motivated profile did not show the highest adaptive value in terms of teacher well-being in this research. Two possible reasons might explain this result. First, although teachers in this profile scored high on both identified regulation and intrinsic motivation, the two scores were not higher than those in the mixed-motivated profile (see Fig. 1). Thus, their adaptive value may be affected accordingly. Second, this finding might be population-specific. For Chinese language teachers of NCS students in Hong Kong, their work motivation is not enough to be driven by autonomous motivation alone, and they also need controlled motivation. The mixed-motivated profile indeed shows this feature. However, since this is the first study to explore the motivation profiles of Hong Kong teachers, this finding needs to be verified by future studies.

Table 5 Multinomial Logistic Regression Results of the Influence of Demographic Factors on Profiles of Work Motivation.

Profile 2 vs. Profile 1			Profile 3 vs. Profile 1			Profile 2 vs. Profile 3			
Coeff.	SE	OR	Coeff.	SE	OR	Coeff.	SE	OR	
Gender	-1.499	0.600	0.223*	-1.197	0.566	0.302*	-0.302	0.354	0.739
Training	2.108	1.054	8.235*	2.138	1.047	8.481*	-0.029	0.255	0.589
Types	0.280	0.554	1.323	0.267	0.541	1.306	0.013	0.252	1.013

Profile 1 = de-motivated, Profile 2 mixed-motivated, Profile 3 autonomous-motivated; Coeff. coefficient, SE standard error of the coefficient, OR odds ratio; Training in-service training, Types types of educational setting; * $p < 0.05$.

Moreover, this study revealed that gender and in-service training concerning teaching NCS students were the two primary factors statistically predicting motivation profile membership. In terms of gender, female teachers were more likely to belong to adaptive motivation profiles (e.g., mixed-motivated). This finding is consistent with Al-Salameh's (2014) study showing that female teachers showed higher levels of work motivation than male teachers. It indicates that female Chinese language teachers are more motivated to teach NCS students. With respect to in-service training, the findings suggested that teachers who had participated in in-service training related to teaching NCS students tended to be categorized into adaptive motivation profiles (e.g., mixed-motivated). It could be explained by Bandura's (1977) self-efficacy theory, stating that vicarious experiences and verbal persuasion are crucial sources for one's capability to perform an action and thereby motivate them to do so. Thus, it is reasonable that in-service training programs could increase teachers' vicarious experiences and that teachers receive effective verbal persuasion via these programs, thereby enhancing their adaptive motivation to educate NCS students.

Limitations and future directions. Four limitations of this research need to be overcome in future studies. First, the participants of this study were Chinese language teachers of NCS students in Hong Kong. The findings may not be generalized to such teachers in other regions. Future studies could explore teachers' motivation profiles outside Hong Kong.

Second, this study identified three profiles using a quantitative research method. However, the explanations for why Chinese language teachers belong to a certain profile (e.g., de-motivated) were not yielded through their voices. Future studies may consider using a qualitative method (e.g., semi-structured interview) to further explore the reasons why they belong to a certain profile.

Third, when examining the influencing factors of teachers' motivation profile membership, the present study suggested that gender and in-service training mattered. However, the selected factors in this study did not distinguish the mixed-motivated profile from the autonomous-motivated profile. Future studies could select other factors (e.g., age and educational qualifications) to further explore the determinants of Chinese language teachers' motivation profile membership.

Fourth, the methodological limitations of this study need to be addressed. On the one hand, all inventories adopted were self-report ones, which may lead to social desirability bias. Future research could use other-report instruments to assess work motivation and teacher well-being. On the other hand, a cross-sectional research design was employed in this study, so that the statistical causality cannot be established. Future research may use longitudinal designs to examine the relationships among work motivation profiles, demographic factors, and teacher well-being.

Contributions and implications. Despite the above limitations, this study has theoretical contributions and practical implications. Theoretically, this study is a pioneering effort in utilizing a

person-centered approach to explore work motivation among Chinese language teachers of NCS students. The findings of this study provide valuable insights that extend our knowledge and comprehension of work motivation in this specific group of teachers, thereby contributing to the enrichment of the existing literature. Moreover, this study offers empirical evidence supporting the SDT by identifying distinct work motivation profiles, investigating the impact of demographic factors on these profiles, and examining the differences in teacher well-being across the profiles.

Practically, first, considering that Chinese language teachers in the mixed-motivated profile displayed the most adaptive value in teacher well-being, it calls for cultivating both teachers' controlled motivation and autonomous motivation. To enhance teachers' controlled motivation, school principals could provide tangible or intangible rewards for Chinese language teachers who teach NCS students. This may include offering bonuses or creating opportunities for title promotion for teachers whose classes have NCS students. To foster autonomous motivation, principals are advised to emphasize the value and significance of teaching the Chinese language to NCS students, helping teachers understand the importance of their role in this context.

Second, the findings indicated that compared to male teachers, female teachers were more likely to belong to adaptive motivation profiles (e.g., mixed-motivated profile). Therefore, it is recommended to develop interventions specifically targeting male Chinese language teachers to enhance their motivation in teaching NCS students. Schools should also pay more attention to providing relevant resources, strategies, and guidance for male teachers. Additionally, female teachers are encouraged to share their experiences and insights with male colleagues on effectively teaching NCS students.

Finally, this study also revealed that teachers who had received in-service training related to teaching NCS students were more likely to belong to adaptive motivation profiles. In light of this, educational authorities and schools are suggested to organize more targeted in-service training programs for Chinese language teachers focusing on the teaching of NCS students. For example, the training program could be structured as a summer certificate course or arranged across weekends. The training content could include session 1: "Why it matters: the long-term impact of Chinese language education for NCS students", session 2: "Evidence-based classroom strategies (e.g., differentiated instruction)", and session 3: "Resource walk-through: accessing and adapting existing NCS teaching materials from the EDB, NGOs, and open-source websites". By providing teachers with the necessary knowledge, skills, and resources through in-service training, schools can empower them to better meet the needs of NCS students and enhance their motivation.

Data availability

The datasets generated for this study are available from the corresponding author upon request.

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Author contributions

Conceptualization, XZ, YY, and ZX; methodology, YY and ZX; software, ZX; validation, XZ and YY; formal analysis, ZX; investigation, XZ, SDC, and ZX; resources, XZ and SDC; funding acquisition, XZ; writing-original draft preparation, XZ and ZX; writing-review and editing, YY and SDC. All authors have read and agreed to the final version of the manuscript.

Competing interests

The authors declare no competing interests.

Ethical approval

Ethics approval for this study has been obtained from the Institutional Review Board of The Hong Kong Polytechnic University (Number: HSEARS2021102003) on 8 November 2021. This study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed consent

All participants signed the electronic consent form between 21 October 2023 and 4 November 2023. They were informed of the purpose, procedure, and significance of this study. They were also informed that their participation was entirely voluntary and they could terminate this survey at any time without any negative consequences; no personal data would be identified or disclosed.

Additional information

Supplementary information The online version contains supplementary material available at <https://doi.org/10.1057/s41599-025-06036-8>.

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