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Motivational profiles of learners of multiple foreign languages: A self-determination theory perspective

Meng Liu^{a,*}, W.L.Quint Oga-Baldwin^b

^a Faculty of Education, University of Cambridge, Cambridge, UK

^b Faculty of Education and Integrated Arts and Sciences, Waseda University, Tokyo, Japan

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ABSTRACT

Adopting a person-centred and multilingual perspective, this study drew on self-determination theory and used latent profile analysis to investigate the motivational profiles of learners of multiple foreign languages. Chinese tertiary-level students (N = 523), concurrently studying English and a language other than English (LOTE), participated in the research. Latent profile analysis identified four groups for English motivation (High Quantity, Moderate Quality, Poor Quality and Amotivated) and three groups for LOTEs motivation (High Quantity, Medial and Amotivated). Our findings revealed high between-person and between-language heterogeneity in profile distribution, profile combination, and profile association with emotions. Specifically, negative emotion was more predictive of English motivational quality whereas positive emotion was more predictive of LOTEs motivational quality. Our results also suggest that making LOTEs compulsory is not sufficient to motivate students, as evidenced by the Medial profile being the normative profile unique to LOTEs. Regarding profile combinations, the best performing profile (High Quantity) was also the most likely shared profile by the same individual. While most learners had different profiles for different languages, it was extremely unlikely for the same individual to have profiles of opposite configurations. Our findings demonstrate the utility of combining person-centred techniques with a multilingual perceptive to produce a more nuanced and precise understanding of language learning motivation.

1. Introduction

Languages other than English (LOTEs) used to be the Cinderella of research on language learning motivation: The vast majority of the empirical investigations was devoted to the study of global English (Boo et al., 2015), contributing to what's been termed as a "monolingual bias" in language learning motivation research (Henry, 2017). Concerns have been raised regarding the validity of our understanding of motivation to learn a language, considering the majority of the evidential base has been built on English, a global language of a uniquely high-profile status, unparalleled by any other language (Dörnyei & Al-Hoorie, 2017; Ushioda, 2017). To address such imbalance, there have been a growing number of studies that turn to the learning of LOTEs instead, with the aim to understand the nature of motivation for the languages overshadowed by the global English (see Mendoza & Phung, 2019 for a review).

Acknowledging the contribution of such research to diversifying the evidence base with respect to the languages being studied, we argue that switching the target of investigation from English to LOTEs is significant but not sufficient: Concentrating on LOTEs alone

* Corresponding author. *E-mail address:* ml858@cam.ac.uk (M. Liu).

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does not fully capture many students' language learning experience. A critical yet under-explored dimension of such experience is the multilingual nature of the learners' linguistic repertoire. For students who are non-native English speakers, the learning of a LOTE is almost always in parallel with the learning of English (Dörnyei & Al-Hoorie, 2017, p. 457). Consequently, one unique characteristic of learning of a non-global language is the omnipresent influence of English. Therefore, we argue that a multilingual comparative perspective is a critical step, not only towards addressing the monolingual bias, but also towards empirically examining the inter-twined relationships between English and LOTEs, a crucial piece to the puzzle of multilingual motivation.

In alignment with a multilingual comparative perspective, we argue that it is also important to approach language motivation from a person-centred perspective. Self-determination theory (SDT; Deci and Ryan, 2000; Ryan & Deci, 2017) regards motivation as composed of a number of distinct but complementary forms of behavioural regulation with varying degrees of autonomy. A key tenet of SDT is that distinctive types of motivation work in conjunction, as opposed to in isolation to regulate behaviour (Ryan & Deci, 2017), thereby calling for holistic approaches to consider different motives as an interconnected whole. Latent profile analysis (LPA), a person-centred approach, is well-placed to achieve such purpose by identifying relatively homogenous subgroups based on the similarity of individuals' motivational configurations (e.g., Litalien et al., 2019). This analytic approach identifies profiles (or groups) of learners based on their corresponding levels of measured motives; In the case of self-determination theory variables, these are varying levels of controlled and autonomous motives. While there has been active person-centred research in domains of education such as physical education (e.g., Wang et al., 2016), little is known about the motivational configurations of language learners, not to mention the relationships between motivational configurations for learning English and LOTEs.

Combining person-centred and multilingual perspectives, we aim to understand motivation by considering simultaneously the languages in a learner's developing repertoire, a perspective that lends itself well to addressing many unanswered questions. For instance, for students learning English and a LOTE concurrently, are the motivational profiles language-specific or similar across the languages? What profile combinations can be identified? Do most learners have similar or different profiles across the languages? This study examined these questions to contribute to a better understanding of multilingual motivation.

2. Literature review

2.1. Self-determination theory

In SDT's taxonomy of motivation, three broad categories of motivation lie on a continuum of autonomy with amotivation and intrinsic motivation at the two ends and extrinsic motivation in between (Ryan & Deci, 2017, 2020). Amotivation represents the absence of intention to act while intrinsic motivation refers to the volitional engagement in an activity for its inherent satisfaction and pleasure. Extrinsic motivation is further separated into four types based on the regulatory style of behaviours, namely external regulation (driven by external rewards or punishments), introjected regulation (driven by approval from self and others), identified regulation (driven by personally endorsed value or objective) and integrated regulation (driven by objectives congruent with other core interests and values). External regulation and introjected regulation are conceptualised as controlled forms of motivation whereas intrinsic motivation, identified regulation, and integrated regulation are conceptualised as autonomous forms of motivation. According to SDT, these forms of motivation are not mutually exclusive but co-exist within individuals and interact to influence behaviours (Deci & Ryan, 2000).

Within language learning motivation research, the majority of studies have adopted a variable centred approach to investigate relationships between different forms of behavioural regulations and a variety of language learning outcomes (e.g., Noels et al., 2019). Findings concerning autonomous motivation have largely supported SDT by showing a positive connection between greater self-determination and better learning outcomes (Oga-Baldwin & Nakata, 2017; Oga-Baldwin et al., 2017).

2.2. Motivational profiles

In person-centred SDT literature, though various choices of profiling variables exist (e.g., whether amotivation is included, whether the full range of behavioural regulation is included), and profile solutions and labelling have varied, results have indicated four profiles common to numerous studies (e.g., González et al., 2012; Hayenga & Corpus, 2010; Ratelle et al., 2007). These profile compositions largely mirror the combinations of motivational quality and quantity proposed by Vansteenkiste et al. (2009). In line with SDT, the quality dimension is determined by which type of motivation dominates the profile. For instance, a profile characterised by a high level of autonomous motivation is considered high quality while a profile dominated by a high level of controlled motivation is considered low quality. The quantity dimension is used to describe a profile when no single type of motivation is dominant in the profile. The four profiles commonly identified in the literature are Good Quality (high autonomous, low controlled, low amotivation¹), Poor Quality (low autonomous, high controlled, high amotivation), High Quantity (high autonomous, high controlled, low amotivation), Low Quantity (low autonomous, low controlled, low amotivation). Recently, some additions have been introduced to this set of common profiles, including a primarily Amotivated profile (low autonomous, low controlled, high amotivation) (e.g., Gillet et al., 2017) and a moderately motivated profile (approaching the general population mean on all types of motivations) (e.g., Oga-Baldwin & Fryer, 2020; Wang et al., 2016). It should be noted that, given the idiographic nature of profiling (Howard & Hoffman, 2018; Molenaar, 2004), some

¹ Note that not all studies included amotivation but we still listed amotivation to provide a complete picture of the corresponding profile.

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variation in profiles can be expected across samples.

Another critical finding unique to this research strand is the discovery of the potential capacity of autonomous motivation to buffer the negative influence of controlled motivation. For instance, in a study on French university students (Gillet et al., 2017), High Quantity (labelled as Strongly Motivated in the study) had similar academic grades to Good Quality (as Autonomous), and higher than Poor Quality (as Controlled). The findings showed that the combination of high levels of autonomous and controlled motivation (i.e., High Quantity) was associated with more positive outcomes than high levels of controlled motivation alone (i.e., Poor Quality). Similar patterns were demonstrated in other studies as well (Ratelle et al., 2007; Wang et al., 2016).

Regarding language learning motivation, there was only some initial evidence within and outside the SDT literature on motivational profiles. For instance, Zheng et al. (2020) studied the profiles of Chinese learners' multilingual motivation through a longitudinal Q methodology under the framework of complex dynamic systems theory. Their findings illustrate how language-specific motivations, and a higher-order multilingual self, interacted with one other as a system over time and how the instrumentalist discourse at the societal level in China and the utilitarian approach to language learning at the individual level are insufficient for sustained LOTE learning.

The only study with a fully-latent person-centred approach that involved simultaneous language learning within the SDT literature, to the best of our knowledge, was conducted by Oga-Baldwin and Fryer (2020) on Japanese students' motivation to learn English (L2) and Japanese (L1) in secondary schools. Five profiles, shared by both languages, were identified, including Good Quality, High Quantity, Poor Quality, Low Quantity and Moderate Motivation. The profiles across the two languages were similar in type and different only in terms of group size. For English learning, High Quantity had the highest level of self-efficacy and class grade, followed by Good Quality, Moderate, Poor Quality and Low Quantity whereas the discrepancies within the more adaptive profiles such as Good Quality and High Quantity were less noticeable for Japanese learning. Although there were a small portion of students with differing profiles, most students had similar motivational configurations across the two languages.

2.3. Multilingual motivation

Despite the increasing attention on LOTEs learning motivation (Mendoza & Phung, 2019), learners' simultaneous language learning experience remains under-explored. It is worth noting that even though the theoretical literature argues that English is detrimental to the learning of LOTEs (Dörnyei & Al-Hoorie, 2017; Ushioda, 2017), empirical findings suggest this may not always be the case. In some studies, the presence of English as a highly valued global language has been found to contribute to a detrimental effect on LOTEs motivation, rendering LOTEs learning in the shadow of global English (Henry, 2010, 2011; Sugita McEown et al., 2017; Zheng et al., 2019). For instance, in the study by Zheng et al. (2019) on language majors at an elite university in China, there were learners who majored in LOTEs but felt highly anxious because they had to suspend English learning to concentrate on learning a LOTE. In other cases, however, LOTEs motivation has been found to be stronger as a result of the presence of global English (Henry & Apelgren, 2008; Huang, 2019; Siridetkoon & Dewaele, 2018). In Siridetkoon and Dewaele's case study on university students in Thailand (2018), for example, the students felt that as the number of English users increased, there was a compelling need to master additional foreign languages to maintain "a competitive edge in the job market" (p. 324). Recently, there is also some evidence suggesting that motivation to learn English and a LOTE may not be fundamentally different. In a study on Korean secondary school learners (Al-Hoorie & Hiver, 2020), similar patterns of motivation were identified between motivation to learn English (L2) and Chinese (L3).

2.4. Foreign language education in China

The status of English as the foreign language of unparalleled instrumental value is long-established in China (Pan, 2015), evident in the widespread endorsement of English in educational curriculum and high-stake exams across all levels (e.g., Hu & McKay, 2012; Lam, 2002). In somewhat contrast to the persisting enthusiasm for learning English among individual learners, the same level of enthusiasm is no longer reflected at the policy level. Rather, there have been noticeable policy shifts towards other languages to facilitate China's globalisation campaign to enhance economic cooperation (e.g., the Belt and Road initiative; Gao & Zheng, 2019). What's worth noting is the instrumentalist ideology of languages, in which the value of languages is usually framed in terms of economic capital, which is not uncommon in other Asian contexts such as Singapore (Wee, 2003).

In the growing body of students engaged in learning English in conjunction with a LOTE, English major students constitute a significant proportion: With English as the biggest language programme in most, if not all universities, English majors constitute a population of over 570,000 (Wang, 2015), and thereby the target population of this study. For these students, a LOTE (L3), such as French or German, is a compulsory subject in the curriculum, with the expectation for the students to reach, after two years of learning (256 credit hours), a level equivalent to that of third-year LOTE major students (Zhao & Li, 2014).

3. The present study

This study extends person-centred SDT literature and variable-based language learning motivation literature by examining learners' motivational configurations for English and LOTEs and the associations between profiles for English and LOTEs, with the following research questions:

Research Question 1: What motivational profiles do learners have for learning English and LOTEs? Based on previous literature (e.g., Gillet et al., 2017; Litalien et al., 2019; Oga-Baldwin & Fryer, 2020), it was expected that profiles would conform to the available four common profiles. It should be noted that we also expected the possibility of additional profiles as the target population (i.e., simultaneous language learners) and context of this study (i.e., tertiary level, China) were different from previous studies.

Research Question 2: How do different profiles predict emotional experience and self-perceived competence in English and LOTEs?

Following the theoretical prediction of SDT (Ryan & Deci, 2017) and previous findings (e.g., Gillet et al., 2017; Litalien et al., 2019; Oga-Baldwin & Fryer, 2020), more self-determined profiles (i.e., those with high levels of autonomous motivation) were expected to be associated with more positive emotional experience and self-perceived competence than less self-determined profiles (i.e., those with high levels of controlled motivation or amotivation).

Research Question 3: To what extent are motivational profiles for English and LOTEs associated?

While studies by both Oga-Baldwin and Fryer (2020) and Al-Hoorie and Hiver (2020) found high similarity between English and LOTEs motivation in secondary school settings, much of the theoretical literature on language learning suggests differences between languages (e.g., Dörnyei & Al-Hoorie, 2017; Ushioda, 2017). Considering the scarcity of studies with a similar design (i.e., person centred and in tertiary settings), no specific expectation was set for this question.

4. Method

4.1. Participants

The sample used in this study included 523 English major students ($n_{\text{female}} = 469$) at ordinary universities (second and third tier) in four cities in eastern China ($M_{\text{Age}} = 20.8$; SD = 0.97). It should be noted that the gender composition (i.e., female majority) is commonly observed in language programmes at university level in China. Non-key universities were specifically targeted because they have been represented less in previous literature but contribute to a major proportion of university students in China. All participants were Chinese, who were concurrently learning English and a LOTE ($n_{\text{French}} = 439$, $n_{\text{German}} = 84$) at the time of the study. The vast majority (86.6%) of the participants had a history of learning English for over 10 years whereas the history of LOTEs learning varied from one to four semesters ($n_{\text{one}} = 203$, $n_{\text{two}} = 133$, $n_{\text{three}} = 135$, $n_{\text{four}} = 52$). Previous exposure to French or German before university was rare (2.3%) but around one third (28.3%) of the respondents reported previous exposure to another foreign language (e.g., Japanese, Korean) for a short period of time (mostly less than six months).

4.2. Procedure

Data used in this study was obtained as part of a larger project. The project measured different constructs from multiple theoretical perspectives with only the outcome variables being shared to allow for a potential comparison of the explanatory power of different theories, which is beyond the scope of this article. Surveys were administered in class by LOTE classroom teachers via the Qualtrics platform. Participation in the survey was voluntary and informed consent was obtained individually at the beginning of the survey. Ethical clearance was obtained and permission to conduct research was granted by the Faculty of Education Standing Panel on Research Ethics at the University of Cambridge.

4.3. Measures

All constructs were measured separately for each of the two languages the participants were studying, with specific reference to the name of the target language in the instructions and items. With the exception of the Positive and Negative Emotions in Language Learning scale which was presented in English-Chinese bilingual format, all scales were presented in Chinese (i.e., participants' L1). Details of the translation and validation process, as well as the research instruments can be found in Appendix 2.

4.3.1. Language learning motivation

Language learning motivation for the two languages was measured using an modified and translated version of the Language Learning Orientations Scale (Noels et al., 2000). Four scales were used in the study to represent the continuum of autonomy according to SDT, namely amotivation, external regulation, introjected regulation, and intrinsic motivation. While previous studies have included primarily autonomous and controlled motives as amalgamations of regulation styles at each end of the continuum, we have elected to derive profiles from amotivation and introjected regulation as well. Introjected regulation was believed to have a greater face validity to the interdependent Chinese sample, while amotivation for language was regarded as common in a foreign language learning environment. To reduce the response burden, the three subscales involving intrinsic motivation were collapsed into one scale, with one item from each subscale. Similarly, only intrinsic motivation was used to represent autonomous motivation as it is considered the strongest pole in that continuum (Oga-Baldwin & Fryer, 2020; Ryan & Deci, 2017). Participants responded to 12 items for each language (e.g., "Because I would feel embarrassed or ashamed if I didn't know the [the target language]") on a 6-point Likert scale (1 = "Strongly Disagree" to 6 = "Strongly Agree"). Reliability for all scales ranged from acceptable to high (Cronbach's α s = .72 - .87).

4.3.2. Positive and negative emotion in language learning

Positive and negative emotions were adapted from Fredrickson's (2013) modified Differential Emotions Scale, which included 10 positive and 10 negative emotions. Each emotion was presented in the form of a synonymous trio. For instance, "joyful, glad and

happy" were grouped to capture the emotion "joy". Following previous L2 research that used this scale (MacIntyre & Vincze, 2017), participants were asked to indicate their frequency of experiencing each individual emotion on a 5-point Likert scale (1 = "Never" to 5 = "Everyday"). Reliability for all scales were high (Cronbach's α s = .86 - .90).

4.3.3. Self-perceived competence

Self-perceived competence was measured by four items for each language, representing the four basic language skills, namely reading, listening, speaking and writing. Respondents were asked to self-assess their level of each skill on a 6-point Likert scale (1 = "Beginner" to 6 = "Proficient"). Reliability (Cronbach's α) for L2 competence and L3 competence were .78 and .93 respectively.

4.4. Analyses

Preliminary analyses (e.g., CFA) were conducted to assess the psychometric properties of the scales used in this study, details of which are available in the online supplement. All latent modelling was performed in Mplus 8.3 while the rest was conducted in R (version 4.0.3).

To answer RQ1, latent profile analysis (LPA) was conducted to identify profiles of English and LOTEs learning motivation. LPA is a person-centred approach aimed at identifying heterogeneity within a population (Masyn, 2013). It is advantageous over K-means clustering techniques in that it is a probabilistic model-based approach for classification, with provides various diagnostics (e.g., BIC statistic) to help determine the optimal solution (Magidson & Vermunt, 2002). To maximise the information provided by the measurement scales and to increase statistical power, individual item scores, as opposed to scale mean scores, were used as input for the latent profile analysis (Tein et al., 2013).

Model selection was based on established and recommended practices (e.g., Asparouhov & Muthén, 2012; Marsh et al., 2009; Nylund et al., 2007) and a balanced choice was made based on substantive meaningfulness, theoretical conformity and statistical adequacy. Several information criterion indices and likelihood ratio tests are available, namely Akaike information criterion (AIC; Akaike, 1974), Consistent AIC (CAIC; Masyn, 2013), Bayesian information criterion (BIC; Schwarz, 1978), sample size adjusted BIC (aBIC; Sclove, 1987), Lo-Mendell-Rubin adjusted likelihood ratio test (aLMR; Lo et al., 2001; because LMR typically yields the same conclusion as aLMR, we only report aLMR), and bootstrapped likelihood ratio test (BLRT; McLachlan, 1987; McLachlan & Peel, 2004). Lower values for the AIC, CAIC, BIC, and aBIC indicate better model fit and significant likelihood ratio test p values indicate better model fit compared to the model with one fewer profile. Simulation studies demonstrate that CAIC, BIC, aBIC and BLRT are particularly effective (e.g., Nylund et al., 2007; Tein et al., 2013; Tofighi & Enders, 2007) whereas AIC and LMR/aLMR should not be used in class enumeration process for the tendency to over- and under-extract profiles under different circumstances (e.g., Diallo et al., 2016; Nylund et al., 2007; Tein et al., 2013; Tofighi & Enders, 2007). Similarly, entropy (Celeux & Soromenho, 1996), with higher values (ranging from 0 to 1) indicating better class separation, is not recommended for final model selection (Collins & Lanza, 2010). Following previous studies (e.g., Gillet et al., 2017), we report all available indicators to ensure transparency and facilitate comparisons with previous literature, but only referenced the recommended indices (i.e., CAIC, BIC, aBIC and BLRT) for model selection. In cases where information criteria continuously suggest the addition of profiles without reaching a minimum, "elbow plots" were used to assess the gains associated with additional profiles (Morin et al., 2011). Additionally, adequate profile size was considered to guard against potential over-extraction. No missing data treatment was involved as the survey used forced response option. During the class enumeration process, model identification for all models was checked with 1000 initial stage starts and 100 final stage starts in Mplus 8.3 and item response variances were constrained to be equal across profiles by default to improve model identification.

To address RQ2, profile membership was used to predict outcome variables, in order to better understand the utility of the profile solutions and the differences across the subgroups. The approach proposed by Bolck et al. (2004) was adopted, following the manual auxiliary 3-step approach described by Asparouhov and Muthén (2014), as it is recommended as the optimal and most robust for predicting continuous distal outcomes from profile solutions (Bakk & Vermunt, 2016).

With respect to RQ3, we expanded the traditional LPA model to examine how English profiles and LOTEs profiles are associated. We decided to stay within the LPA framework, over alternatives that require modal assignments for profile membership, to better take into account classification errors. Specifically, English profile membership was conditioned on LOTEs profile membership and vice versa, following the manual auxiliary 3-step approach described by Asparouhov and Muthén (2014). For readers familiar with latent class analysis (LCA) and its longitudinal extension latent transition analysis (LTA) (Collins & Lanza, 2010) as well as latent profile transition analysis (LPTA) (Morin & Litalien, 2017), this approach is mathematically equivalent and conceptually similar: conditioning one latent categorical variable on another. Readers could refer to the study by Foti et al. (2012) for a published example of such application in assessing the association between two sets of profiles.

5. Results

5.1. Preliminary analyses

Confirmatory factor analysis was conducted on all scales to verify the psychometric properties, the result of which is reported in Table S1 (Appendix 1). Two items in the positive emotion scales, namely English and LOTEs 'awe, wonder, amazement', were excluded from subsequent analyses due to factor loading lower than .50. Descriptive statistics and pairwise correlations for all variables are reported in Table S2 (Appendix 1).

Table 1Model fit information for latent profile analysis.

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	No. Of profiles	Log-likelihood	No. Of parameters	AIC	CAIC	BIC	aBIC	BLRT	aLMR	Entropy	Class prevalence (%)
English profiles	1	-8899.252	24	17846.505	17972.74	17948.735	17872.553	_	-	-	100
	2	-8450.162	37	16974.324	17168.93	17131.928	17014.482	.000	.0421	.801	51.3, 48.7
	3	-8280.530	50	16661.061	16924.04	16874.040	16715.328	.000	.1619	.798	25.8, 41.6, 32.5
	4	-8165.494	63	16456.989	16788.34	16725.342	16525.366	.000	.2808	.805	22.8, 24, 23.2, 30
	5	-8071.241	76	16294.481	16694.21	16618.210	16376.968	.000	.6091	.820	22.7, 21.8, 9, 23.5, 23
LOTEs profiles	1	-8899.252	24	17846.505	17972.74	17948.735	17872.553	-	-	-	100
	2	-8488.676	37	17051.351	17245.96	17208.956	17091.509	.000	.0231	.836	25, 75
	3	-8239.790	50	16579.580	16842.56	16792.559	16633.847	.000	.0810	.875	11.4, 29.2, 59.4
	4	-8075.632	63	16277.264	16608.62	16545.617	16345.640	.000	.2268	.894	9.9, 6.8, 59.3, 24
	5	-7949.202	76	16050.405	16450.13	16374.133	16132.891	.000	.6840	.849	5.4, 11.8, 33.7, 18.2, 30.9

Note. Dashes indicate criterion was not applicable; selected model displayed in bold; AIC = Akaike information criterion; CAIC = Consistent AIC; BIC = Bayesian information criterion; aBIC = sample size adjusted BIC; aLMR = Lo-Mendell-Rubin adjusted likelihood ratio test; BLRT = bootstrapped likelihood ratio test.

5.2. Latent profile solutions

To identify the optimal number of profiles, models were fit and compared iteratively starting from 1-profile solution, the summary of which is provided in Table 1. For English profiles, BLRT and information criteria suggested improvement in model fit as the number of profiles increased and therefore an elbow plot was used to better assess the gains of additional profiles (Fig. S1, Appendix 1). Decrements of values of BIC, aBIC and AIC attenuated between 2-profile and 4-profile solutions, and all three profiles were substantively assessed. The 4-profile solution was superior to the other two profiles: The four groups were adequately sized (i.e., no sign of potential over-extraction) and with theoretically meaningful profile composition. Specifically, the 4-profile solution identified a "Poor Quality" profile (i.e., dominated by high external regulation), in addition to the profiles present in the 3-profile solution and was thus of higher theoretical utility. Taking a balanced consideration between statistical fit and substantive interpretation, the 4-profile solution was selected as optimal to describe English motivation.

Regarding LOTEs profiles, BLRT and information criteria indicated improved model fit as the number of profiles. Upon inspection of the elbow plot (Fig. S1, Appendix 1), decrements of BIC, aBIC and AIC values attenuated between 2-profile and 4-profile solutions and hence the three profiles were further evaluated. The 3-profile solution was superior to the other two profiles: The three profiles were adequately sized (i.e., no sign of potential over-extraction), with theoretically meaningful profile composition. In contrast, profile size in the 2-profile and 4-profile solution was less evenly distributed, and the 4-profile solution had two small sized group (less than 10%), indicating potential over-extraction. Compared with the 2-profile solution, 3-profile solution identified a "Medial" profile (i.e., close to average level across the indicators) and deemed as more theoretically informative. Taking a balanced consideration between statistical fit and substantive interpretation, the 3-profile solution was selected as optimal to describe LOTEs motivation.

Parameter estimates for English profiles are presented in Table 2 and Fig. 1. The four profiles were named based on their characteristics of motivational quality and quantity: There were 22.8% of the students in the *Amotivated* group, characterised by a high level of amotivation being the dominant type of motivation; There were 24% of the students in the *High Quantity* group, with high levels of intrinsic, introjected and external motivation (i.e., driven by both autonomous and controlled motivation) and low amotivation; There were 23.2% of the students in the *Moderate Quality* group, dominated by a moderate level of intrinsic motivation, with low levels of the other types of motivation; Lastly there were 30% of students in the *Poor Quality* group, dominated by a high level of external regulation, with low to moderate levels of other types of motivation.

Information regarding LOTEs profiles are presented in Table 3 and Fig. 2. Again, the profiles were named based on their characteristics of motivational quality and quantity: 11.4% of the students were in the *Amotivated* group, characterised by a high level of amotivation being the dominant type of motivation; 29.2% of the students were found in the *High Quantity* group, with high levels of intrinsic, introjected and external motivation and low amotivation; 59.4% of the students presented in the *Medial* group, with moderate levels of all types of motivation, a pattern unique to LOTEs.

Profile indicator	Profile	1		2		3		4		
rionic indicator	prevalence	Amotivated	Amotivated		High Quantity		Moderate Quality		Poor Quality	
		22.8%		24%		23.2%		30%		
	SD	Profile mean 95% CI	Z- score	Profile mean 95% CI	Z- score	Profile mean 95% CI	Z- score	Profile mean 95% CI	Z- score	
L2_intrinsic_1	0.74	3.57 [3.37,3.76]	-0.78	5.17 [4.86,5.48]	0.92	4.52 [4.08,4.96]	0.23	4.01 [3.81,4.22]	-0.31	
L2_intrinsic_2	0.72	3.74 [3.55,3.93]	-0.79	5.27 [5,5.54]	0.88	4.71 [4.27,5.15]	0.27	4.2 [3.98,4.42]	-0.30	
L2_intrinsic_3	0.78	3.67 [3.41,3.92]	-0.76	5.15 [4.87,5.42]	0.76	4.83 [4.43,5.22]	0.44	4.05 [3.81,4.29]	-0.36	
L2_introjected_1	1.11	3.59 [3.3,3.89]	-0.20	4.69 [4.44,4.95]	0.70	3.36 [2.85,3.87]	-0.40	3.73 [3.28,4.19]	-0.09	
L2_introjected_2	1.05	3.66 [3.45,3.88]	-0.25	4.75 [4.53,4.97]	0.70	3.65 [3.14,4.15]	-0.26	3.77 [3.35,4.2]	-0.16	
L2_introjected_3	1.06	3.87 [3.64,4.1]	-0.37	5.09 [4.86,5.33]	0.69	4.02 [3.49,4.55]	-0.24	4.21 [3.81,4.62]	-0.07	
L2_external_1	0.61	4.05 [3.87,4.24]	-0.77	5.45 [5.13,5.76]	0.79	4.01 [3.76,4.27]	-0.81	5.26 [5.1,5.43]	0.58	
L2_external_2	0.55	4.08 [3.92,4.24]	-0.84	5.53 [5.22,5.83]	0.85	4.11 [3.88,4.33]	-0.81	5.31 [5.15,5.48]	0.60	
L2_external_3	0.71	4.04 [3.89,4.19]	-0.77	5.4 [5.17,5.64]	0.74	4.26 [4,4.53]	-0.53	5.11 [4.91,5.31]	0.41	
L2_amotivation_1	0.71	2.81 [2.4,3.22]	1.02	1.35 [1.21,1.5]	-0.60	1.45 [1.21,1.69]	-0.49	1.95 [1.75,2.16]	0.07	
L2_amotivation_2	0.99	3.35 [2.87,3.83]	0.80	1.87 [1.67,2.08]	-0.49	1.93 [1.63,2.22]	-0.44	2.56 [2.28,2.84]	0.11	
L2_amotivation_3	0.98	2.96 [2.66,3.26]	0.70	1.76 [1.48,2.03]	-0.40	1.76 [1.44,2.07]	-0.40	2.3 [2.04,2.56]	0.10	

Table 2

Parameter estimates for English (L2) profiles.



Fig. 1. English (L2) profile compositions.

Table 3 Parameter estimates for LOTEs (L3) profiles.

Profile indicator	Profile prevalence	1 Amotivated 11.4%		2 High Quantity		3 Medial 59.4%		
				29.2%				
	SD	Profile mean 95% CI	Z-score	Profile mean 95% CI	Z-score	Profile mean 95% CI	Z-score	
L3_intrinsic_1	0.91	3.17 [2.75,3.59]	-0.76	4.48 [4.27,4.69]	0.57	3.79 [3.66,3.92]	-0.14	
L3_intrinsic_2	0.88	3.62 [3.1,4.14]	-0.65	4.91 [4.66,5.16]	0.70	4.03 [3.89,4.16]	-0.22	
L3_intrinsic_3	0.88	3.56 [3.02,4.1]	-0.59	4.84 [4.59,5.1]	0.71	3.90 [3.75,4.05]	-0.24	
L3_introjected_1	0.96	1.91 [1.59,2.24]	-0.78	2.84 [2.57,3.1]	0.11	2.83 [2.69,2.97]	0.10	
L3_introjected_2	0.95	2.00 [1.65,2.36]	-0.77	3.16 [2.85,3.48]	0.29	2.85 [2.72,2.98]	0.00	
L3_introjected_3	0.95	1.98 [1.67,2.29]	-0.86	3.22 [2.91,3.54]	0.25	3.00 [2.86,3.13]	0.04	
L3_external_1	0.62	2.20 [1.87,2.53]	-1.80	5.13 [4.94,5.32]	0.92	4.03 [3.88,4.18]	-0.11	
L3_external_2	0.62	2.47 [2.1,2.85]	-1.71	5.31 [5.15,5.47]	0.96	4.13 [3.97,4.3]	-0.15	
L3_external_3	0.69	2.47 [2.12,2.81]	-1.62	5.11 [4.89,5.33]	0.87	4.06 [3.92,4.19]	-0.12	
L3_amotivation_1	0.92	2.65 [2.21,3.1]	0.32	1.75 [1.56,1.95]	-0.62	2.58 [2.43,2.73]	0.24	
L3_amotivation_2	0.94	3.34 [2.93,3.75]	0.45	2.40 [2.16,2.65]	-0.49	3.05 [2.91,3.19]	0.16	
L3_amotivation_3	0.93	2.53 [1.96,3.09]	0.12	1.80 [1.62,1.98]	-0.55	2.66 [2.46,2.86]	0.25	

Taken together, these profiles were largely consistent with previous findings (e.g., Oga-Baldwin & Fryer, 2020; Vansteenkiste et al., 2009) and confirmed our expectation for RQ1. Comparing between the two languages, however, led to unique findings beyond previous literature. There was only moderate degree of similarity between the English and LOTEs profiles, i.e., the commonly shared Amotivated and High Quantity profile, in contrast to the highly similar profiles between first and foreign languages in Oga-Baldwin and Fryer's study (2020). In particular, LOTEs profiles were less evenly distributed than English profiles and the patterns of Medial suggests that for many learners (around 60%), there was no singularly dominant type of motivation in their LOTEs motivation system, a pattern that was not present in English motivation.



Fig. 2. LOTEs (L3) profile compositions.

5.3. Outcomes of profile membership

For RQ2, outcome variables were compared across the profiles, following the procedure of the BCH manual approach (Asparouhov and Muthén, 2014; Bolck et al., 2004). Pairwise Wald tests were performed to formally evaluate whether the differences in emotional experience and perceived competence across the four groups were statistically significant, with corresponding effect sizes (Cohen's *d*) reported to facilitate interpretation.

Model results regarding English are shown in Table 4 and Fig. 3. There were significant and substantial differences across the groups in L2 positive emotion, negative emotion and self-perceived competence, though not all pair-wise comparisons were significant (e.g., High Quantity and Moderate Quality had similarly low levels of negative emotion).

Overall, medium and large differences were found in negative emotion while small and medium differences were found in self-

Table 4

Results from secondary model with	outcome variables for	English	(L2) profiles
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Profile	L2 positive emotion		L2 negative emotion		L2 self-perceived competence		
	M 95% CI Z-score	SD	M 95% CI Z-score	SD	M 95% CI Z-score	SD	
1 Amotivated	2.96 [2.8,3.11] 0.13	0.76	2.98 [2.84,3.12] 0.52	0.68	2.93 [2.83,3.03] -0.26	0.48	
2 High Quantity	3.16 [2.95,3.36] 0.34	1.02	2.23 [2.06,2.4] -0.38	0.87	3.33 [3.21,3.45] 0.45	0.60	
3 Moderate Quality	2.54 [2.35,2.73] -0.32	0.92	2.22 [2.06,2.39] -0.38	0.78	3.15 [3.04,3.27] 0.13	0.54	
4 Poor Quality	2.73 [2.57,2.89] -0.12	0.90	2.71 [2.57,2.85] 0.20	0.76	2.93 [2.83,3.03] -0.26	0.56	
Pairwise mean comparison	Wald test (p value)	Cohen's d	Wald test (p value)	Cohen's d	Wald test (p value)	Cohen's d	
1 vs. 2 1 vs. 3 1 vs. 4 2 vs. 3 2 vs. 3 2 vs. 4 3 vs. 4	2.36 (.125) 9.99 (.002) 3.66 (.056) 17.98 (<.001) 8.98 (.003) 2.11 (.146)	-0.22 0.50 0.27 0.64 0.44 -0.21	$\begin{array}{c} 43.63 \ (<.001) \\ 41.95 \ (<.001) \\ 6.81 \ (.009) \\ 0.003 \ (.958) \\ 15.52 \ (<.001) \\ 17.94 \ (<.001) \end{array}$	0.96 1.03 0.38 0.01 -0.58 -0.63	$\begin{array}{c} 26.67 \ (<.001) \\ 7.86 \ (.005) \\ 0.001 \ (.970) \\ 4.38 \ (.036) \\ 22.43 \ (<.001) \\ 7.95 \ (.005) \end{array}$	-0.75 -0.44 0.01 0.32 0.70 0.41	

Note. BCH manual approach was used to obtain the mean and variance estimates for the outcome variables. df = 1 for all Wald tests. Exact p values are displayed.



Fig. 3. Emotional experience and self-perceived competence in English (L2).

perceived competence and positive emotion, according to Plonsky and Oswald's (2014) recommendation for L2 research (small (d = 0.40), medium (d = 0.70), large (d = 1.00); 2014). High Quantity and Moderate Quality profiles were associated with more adaptive outcomes (i.e., higher competence and lower negative emotion) whereas Amotivated and Poor Quality were associated with less adaptive outcomes (i.e., lower competence and higher negative emotion), supporting our hypothesis that more self-determined profiles are largely associated with more positive learning outcomes. It is worth noting that the Moderate Quality group reported the lowest level of positive emotion, with small to medium differences from the other groups. This pattern suggests that a moderate level of autonomous motivation alone is not necessarily associated with positive experience in learning a language. Rather, it was a high level of both autonomous and controlled motivation (i.e., High Quantity) that predicted the most adaptive outcomes.

Model results regarding LOTEs can be found in Table 5 and Fig. 4. There were significant and substantial differences across the groups in all three outcomes, though not all pairwise comparisons were significant (e.g., the High Quantity and Medial groups had similar levels of self-perceived competence).

Table 5	
Results from secondary model with outcome variables for LOTEs (L	3) profiles.

Profile	L3 positive emotion		L3 negative emotion		L3 self-perceived competence		
	M 95% CI Z-score	SD	M 95% CI Z-score	SD	M 95% CI Z-score	SD	
1 Amotivated	3.43 [3.12,3.73] -0.81	1.16	3.26 [3.11,3.41] -0.10	0.57	2.26 [2.1,2.42] -0.25	0.60	
2 High Quantity	4.84 [4.73,4.95] 0.90	0.59	3.48 [3.37,3.58] 0.30	0.60	2.38 [2.28,2.49] -0.03	0.63	
3 Medial	3.86 [3.79,3.93] -0.28	0.56	3.25 [3.19,3.31] -0.13	0.47	2.43 [2.37,2.5] 0.06	0.54	
Pairwise mean comparison	Wald test (p value)	Cohen's d	Wald test (p value)	Cohen's d	Wald test (p value)	Cohen's d	
1 vs. 2	71.98 (<.001)	-1.53	5.35 (.021)	-0.37	1.66 (.198)	-0.21	
1 vs. 3	7.20 (.007)	-0.48	0.02 (.882)	0.02	3.81 (.051)	-0.31	
2 vs. 3	189.97 (<.001)	1.70	13.11 (<.001)	0.42	0.52 (.473)	-0.08	

Note. BCH manual approach was used to obtain the mean and variance estimates for the outcome variables. df = 1 for all Wald tests. Exact p values are displayed.



Fig. 4. Emotional experience and self-perceived competence in LOTEs (L3).

Overall, large differences were found in positive emotion while small differences were found in negative emotion and self-perceived competence. Judging from positive emotion and competence, High Quantity and Medial were associated with more adaptive outcomes (i.e., higher positive emotion and competence) whereas Amotivated was associated with less adaptive outcomes (i.e., lower positive emotion and competence), again, confirming our expectation.

The difference of patterns between English and LOTEs motivation is noticeable. Even though the Amotivated and High Quantity

Table 6

Conditional membership probabilities for English profile given LOTEs profile and for LOTEs profile given English profile.

		LOTEs Profile					
			1 Amotivated	2 High Quantity	3 Medial		
English Profile	1 Amotiveted		.15	.03	.82		
	2 High Ouantity		.07	.59	.34		
	3 Moderate Quality	.19		.15	.66		
	4 Poor Quality		.07	.22	.72		
		English Profile					
		1 Amotivated	2 High Quantity	3 Moderate Quality	4 Poor Quality		
LOTEs Profile	1 Amotivated	.30	.14	.39	.18		
	2 High Quantity	.03	.55	.15	.28		
	3 Medial	.30	.12	.24	.35		

Note. An entry in the table is interpreted as the probability of being a member of a particular column profile conditional on being a member of a particular row profile.

profiles were present in both English and LOTEs learning, they manifested differently in learning outcomes. For instance, the LOTEs High Quantity profile was associated with higher negative emotion whereas the English High Quantity profile was associated with lower negative emotion. This pattern suggests the more nuanced differences between English and LOTEs learning even when the motivational configurations were similar, which merits further exploration.

5.4. Conditional membership probabilities

To examine how English motivation and LOTEs motivation were related to one another (RQ3), the two constructs were modelled with LPA simultaneously. The association between English and LOTEs profiles was examined in two ways. First, LOTEs profile membership was conditioned on English profile membership. This provides the probabilities of having particular LOTEs profiles given a particular English profile. Second, English profile membership was conditioned on LOTEs profile membership. This provides the probabilities of having particular English profiles given a particular LOTEs profile. Results are presented in Table 6 and Fig. 5.

Regarding the two profiles present in both English and LOTEs, i.e., Amotivated and High Quantity, the dependence between English High Quantity and LOTEs High Quantity was moderately strong (P(L3 High Quantity | L2 High Quantity) = .59, P(L2 High Quantity | L3 High Quantity) = .55), while the dependence between English Amotivated and LOTEs Amotivated was comparatively weak (P(L3 Amotivated | L2 Amotivated) = .15, P(L2 Amotivated | L3 Amotivated) = .30), meaning it was more likely for learners at the higher end of the spectrum to share motivational compositions between the languages than learners at the lower end (for either language).

Regarding cross-combinations of profiles across the languages, High Quantity and Amotivated were the least likely combination (conditional probabilities .03-.14, proportion of such combinations less than 2%; Fig. 5), meaning it was highly unlikely for learners to have two profiles of the opposite compositions. For learners with the middle range profiles (e.g., Moderate Quality, Medial), a variety of combinations of different profiles were possible, without particularly strong dependence.

6. Discussion

6.1. Motivational profiles for multiple languages

In this study, we aimed to identify Chinese university language learners' motivational profiles according to configurations of motivational regulation under the SDT framework (Ryan & Deci, 2017). Results indicated five distinct profiles across English and the other languages. Keeping with prior studies (e.g., Gillet et al., 2017; Oga-Baldwin & Fryer, 2020), we have labelled these Amotivated, Poor Quality, Moderate Quality, Medial, and High Quantity. For both English and LOTEs, High Quantity was representative of high levels of both autonomous and controlled forms of regulation, whereas Poor Quality for English alone was characterised by a high level of controlled motivation as the dominant indicator. These two profiles corresponded to findings from a wide range of studies (e.g., Hayenga & Corpus, 2010; Liu et al., 2009; Oga-Baldwin & Fryer, 2020; Ratelle et al., 2007; Vansteenkiste et al., 2009). Moderate Quality was characterised by a moderate level of autonomous motivation as the dominant indicator for the Amotivated profile in both English and LOTEs. These three profiles corresponded to a few studies in the previous literature (e.g., Gillet et al., 2017; Oga-Baldwin & Fryer, 2020; Ratelle et al., 2007). The variety of profiles in addition to the prototypical profiles in the literature potentially stems from the comprehensive range of motivations measured in our study - amotivation is commonly omitted in profiling studies (*cf.* Gillet et al., 2017). Additionally, the multilingual comparative perspective contributes to a more nuanced understanding of language-specific motivational configurations (*cf.* Oga-Baldwin & Fryer, 2020).

Our findings also show continuity with the SDT theoretical literature particularly in terms of the role of competence. In English, students with higher reported competence also reported greater intrinsic motivation, while those with lower perceived ability showed more maladaptive motivational patterns. Interestingly, even with a lack of positive emotions during their English learning, the Moderate Quality group remained autonomously motivated. This finding confirms previous findings on the importance of intrinsic motivation for developing competence beliefs (Fryer & Oga-Baldwin, 2019), and corroborates self-determination theory's positioning of competence as a basic need for sustainable, autonomous motivation (Ryan & Deci, 2017).

6.2. Specificity of language learning motivation

One of the main findings of this study is the high degree of heterogeneity in motivational configurations, as manifested in profile distribution, profile combination and profile association with emotions. There were four distinct profiles for English motivation, more or less evenly distributed, whereas there were three for LOTEs, with Medial being the majority group. In terms of profile combinations, only learners with High Quantity motivation were likely to have a similar profile across languages (Table 6, Fig. 5). For learners with moderate or low overall quantity of motivation, the profiles varied across the languages. In other words, for the majority of students, their learning motivation was language-specific. It is important to note that such specificity is not without boundaries: The combination of extreme opposites (i.e., High Quantity in one and Amotivated in another) was highly unlikely (Table 6, Fig. 5), indicating that there could be some level of generalised motivation for school that constrained the divergence of profiles for the same individual. Future research should incorporate a measure of generalised motivation for school (*cf. Chanal & Guay*, 2015) to verify this hypothesis.

Emotions were also differentially associated with the profiles. English High Quantity was associated with high positive emotion and low negative emotion whereas LOTEs High Quantity showed both high positive and negative emotion. Similarly, English Amotivated



Fig. 5. Associations between English (L2) and LOTEs (L3) profiles

Note. Bandwidths are proportional to shared membership between L2 and L3 profiles, percentages greater than 5% are displayed on the right for visual clarity.

was associated with high negative emotion while LOTEs Amotivated showed low positive emotion. The effect sizes of pairwise differences across all profiles seem to tell the same story (Table 4, Table 5): Profiles in English were differentiated more in negative emotion while those in LOTEs differed more in positive emotion. This pattern could be a result of English motives being much more internalised by learners than LOTEs. In previous studies on emotions of Chinese foreign language learners (Jiang & Dewaele, 2019), positive emotions (e.g., enjoyment) are more strongly connected with learner-external variables (e.g., teacher friendliness) while negative emotions (e.g., anxiety) associate more with learner-internal variables (e.g., attitude towards English), which could explain why negative emotion was more relevant to English profiles while positive emotion more so to LOTEs profiles. The fact that these students were English majors means English might be more internalised and personally relevant to these learners than the other languages (*cf.* Liu, 2020 for a discussion on the differential role of emotions in English and LOTEs), and thus well-developed underlying attitudes may associate more with motivational configurations. This finding also corroborates variable-based studies that found positive and negative emotion as distinct dimensions, rather than two opposite ends of the same underlying construct (e.g., Dewaele & MacIntyre, 2014, 2016; Liu, 2020; MacIntyre, Ross, & Clément, 2020).

Our evidence aligns with the previous finding that older students do indeed show more nuance than younger students (e.g., Corpus & Wormington, 2014; Gillet et al., 2017; Oga-Baldwin & Fryer, 2020), which could explain why evidence of high similarity of motivation between languages has been found in secondary, but not tertiary settings. More research is needed to further explore the role of education stages in shaping the specificity of language learning motivation.

6.3. The High Quantity profile and the Chinese context

Of particular significance is the High Quantity profile, the best performing in both languages and the most likely shared profile by the same individual. Previous studies have found High Quantity to be comparable to Good Quality in terms of learning outcomes (e.g., Gillet et al., 2017). Even though this sample did not show a Good Quality profile to fully replicate this pattern, High Quantity showed higher positive emotion for English and LOTEs and higher confidence in their English. This seems to corroborate previous findings that autonomous motivation could mitigate the negative effect of controlled motivation (Gillet et al., 2017; Oga-Baldwin & Fryer, 2020).

The High Quantity group outperformed the Moderate Quality group in having stronger positive emotions and higher competence while having similar levels of negative emotion. This pattern suggests that among Chinese students, motivational quantity may matter more than previously thought for learning languages in the SDT framework. Considering the significant role of affective engagement to

learning (e.g., Noels, Lou, et al., 2019), and the benefits of positive emotions in language learning (MacIntyre et al., 2020), we can hypothesise that within the Chinese social environment, High Quantity motivation, despite a high level of controlled motivation, may still lead to positive learning outcomes. The interdependent, reciprocal responsibilities of collectivist Confucian heritage societies (Hau & Ho, 2010; Hwang, 2011) may drive learners in many situations to excel through both internalised and external motives. The absence of the Good Quality profile in both English and LOTEs corroborates this idea as well: The prevalent instrumentalist language ideology where learning English is associated with economic return or an "additional competitive edge in the job market" in the case of LOTEs (Siridetkoon & Dewaele, 2018) possibly thwarted the development of a Good Quality profile in this context. Future replications and longitudinal studies using achievement measures are necessary to confirm this hypothesis (*cf.* Zheng et al., 2020).

6.4. The Medial profile and compulsory LOTEs learning

In contrast to English, there was a normative (majority) group found in LOTEs learning, namely the Medial profile. The moderate quantity of both controlled and autonomous motivation for LOTEs is akin to results found by Oga-Baldwin and Fryer (2020) indicating that LOTEs learning may be perceived by the learners as "just another school subject" (p. 8). Students in the Medial group felt neither enjoyment nor coercion to learn additional foreign languages, corroborated by their moderate level of emotional experience and self-perceived competence in LOTEs. In this sense, making LOTEs learning compulsory did not increase the relevance of the language to most students. From a practical perspective, the prevalence of the Medial group in LOTEs suggests that more effort is needed to enhance the motivation for other languages, especially considering their disadvantaged position under the shadow of global English (e. g., Dörnyei & Al-Hoorie, 2017). While well-intentioned school policies require LOTEs in many settings, the results here do not support compulsory additional language courses as a sufficient way to motivate the learners.

6.5. Pedagogical implications

The presence of less adaptive motivational profiles (e.g., Amotivated, Poor Quality, Medial) in both English and LOTEs calls for greater pedagogical efforts to enhance students' motivational quality. What these profiles have in common is the lack of intrinsic motivation and internalisation of language learning motives. Focusing on improving the immediate classroom experience through autonomy supportive teaching (Reeve & Cheon, 2021) to increase positive emotion while building student competence may benefit these learners in less adaptive profiles. Previous literature has demonstrated that autonomy-supportive teaching is not only malleable or learnable through training but can also lead to student, classroom climate and teacher benefits (Reeve & Cheon, 2021).

The role different emotions played in English and LOTEs learning is also worth noting. Particularly, our results suggest that for English learning, it is not positive emotion but negative emotion that differentiates motivational quality, which suggests that for English teachers, helping students to address negative emotions may be a more effective pathway to better motivational quality and persistent learning. In contrast, the greater role of positive emotion in relation to LOTEs motivational quality indicates that efforts to enhance greater positive emotion may be prioritised by LOTEs teachers.

The association of motivational profiles between English and LOTEs is also of practical implication. The fact that the High Quantity profile, the most adaptive profile in this study, is also the most likely shared profile by the same individual speaks to the promise of coordinating educational efforts across different language courses. Our finding that it is extremely unlikely for the same individual to have the opposite motivational compositions in the two languages suggests the possibility that if motivational quality can be improved for one language, the other language may also benefit. Such findings echo research working on multilingual pedagogy where teachers of different languages work together to enhance students' learning of multiple languages (e.g., Haukås, 2016).

6.6. Limitations and future research directions

It is important to note the limitations of this study. As a survey study, findings should be interpreted within the potential frame of social desirability and self-report biases. Future research can corroborate these findings with achievement scores or observed class-room behaviours. Second, the sample only included simultaneous language learners with English as a major, and thus replication on learners with LOTEs or non-language subjects as a major should be conducted to assess the extent to which the findings could generalise. As mentioned earlier, longitudinal research is necessary to test not only the robustness but also the stability of these profiles and to examine our proposed hypotheses. Lastly, more research is required that examines different educational settings to better refine the boundaries of the domain specificity of learning motivation (*cf.* Al-Hoorie & Hiver, 2020; Chanal & Guay, 2015).

7. Conclusion

Our study is one of the first to examine the motivational profiles of learners across multiple foreign languages from a person-centred perspective, complementing previous literature both substantively and methodologically. We have used the most up-to-date statistical methods to derive accurate profiles and profile associations, leading to a better understanding of the heterogeneity both within the population of language learners and between different languages. Specifically, a high degree of heterogeneity was observed in profile distribution, profile combination, and the role of emotions, with different pedagogical implications for teachers of different languages. The High Quantity profile, being the best performing and mostly likely shared by the same individual, points to the power of the synergy between different types of motivation across the languages, echoing the call for a multilingual approach to foreign language education (e.g., Haukås, 2016). The Medial profile, unique to LOTEs, reminds us that making LOTEs compulsory is not sufficient to

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motivate students toward the new language; English major students are likely to perceive this as simply an additional curricular burden. Taken together, our findings provide a complement to previous variable-centred results, showing the utility of combining person-centred and comparative perspective to produce a more nuanced picture of multilingual motivation. With this more precise understanding of the internal and external forces which define learners' motives, educators and administrators can better tailor the school experience to promote maximal well-being and learning.

Author contributions

Meng Liu: Conceptualisation, Methodology, Formal Analysis, Visualisation, Writing. W. L. Quint Oga-Baldwin: Conceptualisation, Writing- Reviewing and Editing.

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Appendix A. Supplementary data

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