Profiles of language learning motivation: Are new and own languages different?

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Abstract

Numerous theorists have offered opinions about motivational differences between learning a new language and other school subjects. At the same time, little empirical evidence for the differences has been brought forward. In this study, we aimed to address these motivational differences and similarities between learning a new (foreign) language and learning one's own language in formal school settings using the framework of self- determination theory. Rather than comparing variable level differences, we investigated a representative sample of Japanese secondary school students (n = 830) to demonstrate person-centered differences using latent profile analysis. Results indicated the sample was divided into five theoretically consistent subgroups, with similar patterns of motivation and achievement across language domains. Roughly 55% of the sample fit into the same subgroups for each subject, indicating that the majority of students' motivation for learning a language was similar across the two school subjects.

1. Introduction

For many students and teachers, learning a new language in school may seem quite different from learning their own language. There has long been discussion of and commentary on the differences between learning a mother tongue and learning a foreign language (Ushioda, 2012), with particular emphasis on the psychological aspects which differentiate languages. For many children and young adults, school is the primary contact with new languages, especially in monolingual settings such as much of the United States, the UK, Japan, China, Korea, and numerous others. In these countries, learners have little contact with the new language outside of the school setting. The measure of growth, change, and improvement in these settings is often guided by the same affordances and constraints as any other school subject, and learning the new language thus becomes contingent on the structures and strictures of the school setting, rather than the broader context of the communicative realities a new language provides.

Thus students' motivation to learn a new language in school and achievement in that domain may depend more on the school setting than the actual content of the language. Studies of motivation, ability-beliefs, and achievement looking at cross-subject differences have suggested that individuals' affinities for school subjects may be regulated more strongly by their abilities and interests, while subjects where they feel a weaker sense of competence and enjoyment are more related to their general motivation for schooling (Chanal & Guay, 2015). To understand the specific motivation for learning a foreign language and subsequent language learning achievement in a school context, a comparison of individuals' motivational profiles for different school subjects can elucidate the nature of these differences and similarities.

Secondary school students may demonstrate a variety of different motivations to learn, related to their experiences in schools (Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009). Studies have investigated motivational profiles for specific school subjects such as physical education (Wang, Morin, Ryan, & Liu, 2016), but not for cross-domain motives. Likewise, researchers have compared motivation to learn two different new languages (Dörnyei & Chan, 2013), motivation for independent reading in two languages (Takase, 2007), and willingness to communicate in two languages in immersion settings (Macintyre et al., 2002), all finding some degree of correlation between language learning motives. One study among Korean university students demonstrated correlations between motives to read in Korean and English (Kim, 2011), with the largest differences related to language proficiency. At the same time contentions regarding the motivational differences between languages remain a strong and fundamental justification for foreign language researchers to continue working in their own specialized paradigms (Ushioda, 2012). Empirically, the question remains as to how monolingual children in compulsory settings (i.e., how most of the world learns a new language) are motivated to learn new languages and how this differs from comparable school subjects. To answer this question this, we compare profiles of Japanese secondary school students' motivation to learn a new language with their motivation to learn their own language.

2. Literature Review

2.1. Language learning in Japan

Perhaps the most fundamental skill in formal education is the acquisition of literacy in one's own language. It is one of the primary benchmarks used by the Program for International School Assessment (PISA; OECD, 2015) to compare school achievement around the world. On this test, Japan is often rated in the top ten, scoring alongside high ranking

countries like Singapore and Finland (OECD, 2010, 2015). This achievement has been attributed to the strength of the education and curriculum beginning in primary schools and continuing into secondary school (Cave, 2007; 2016; Authors, 2019a), and many teachers and parents regard learning the complexities and nuances of the Japanese language to be the central goal of school.

At the same time, Japan lags behind many other countries on comparisons of English language ability (Education First, 2017), including similar monolingual East Asian countries. As such, English language achievement and motivation have a long history as topics of research (Berwick & Ross, 1989; Sakai & Kikuchi, 2009; Oga-Baldwin & Fryer, 2018). Numerous studies have indicated major issues with the motivational environment in Japanese schools, especially secondary schools, both for language learning and for other subjects (Kikuchi, 2009; Nishimura & Sakura, 2017). The discrepancy in achievement within the same motivational environment leads to a question of individual differences between learning Japanese as one's own language versus English as a foreign language.

2.2. Motivation for learning a language and other school subjects

Given the potential differences in own language and foreign language motivation, a clear and consistent framework is necessary for explaining the potential variability. One of the most robust and internally consistent theories of human motivation is self-determination theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2017). According to SDT's organismic integration mini-theory, motivation is regulated by a continuum of reasons for action. This continuum spans from controlled, where motivation originates outside of the person, to autonomous, where motivation originates from within. These regulations are further separated into a more fine-grained series of reasons. Proceeding from most controlled to most autonomous, these are external regulation, introjected regulation,

identified regulation, integrated regulation, and intrinsic regulation. Applied to learning contexts, external regulation describes when students act to avoid punishment or receive praise and rewards. Introjected regulation is when students act due to feelings of guilt, shame, social stress, or non-volitional internal pressure. Identified regulation represents when students act to achieve personally valuable outcomes. Integrated regulation comes once external reasons have been internalized and made a part of the students' worldview. Finally, intrinsic regulation is when students act out of enjoyment, curiosity, or a desire to succeed for the sake of the task itself.

Prior studies have explored motivation to learn a new language using the SDT continuum. Noels, Clément, and Pelletier (1999) found that more intrinsic motives correlate with a decreased anxiety, stronger motivational intensity, and intention to continue learning beyond the end of the course. A later study validated a language learning oriented instrument to measure the SDT continuum in a Canadian sample, indicating more autonomously motivated students to be more likely to continue learning the foreign language (Noels, Clément, Pelletier, & Vallerand, 2000). Later studies showed how more autonomously motivated students had more positive results in classroom learning environments (Noels, Clément, & Pelletier, 2001; Vansteenkiste, Zhou, Lens, & Soenens, 2005). McEown, Noels, and Saumure (2014) found that Canadian students learning Japanese as a foreign language were likely to want to continue studying if their motivation was more autonomously regulated. Utilizing the same extrinsic-intrinsic continuum, Kozaki and Ross (2011) found that Japanese university students' achievement on standardized tests is influenced by a combination of the quality of their own motivation, prior achievement, and the quality of motivation in their peer group, with more autonomous motivation of both the individual and the cohort positively influencing learning outcomes.

Recent work has shown that autonomous motivation is related to a supportive learning environment (Oga-Baldwin & Fryer, 2018). Japanese elementary school students learning English in a low-stakes, highly stimulating environment showed a positive pattern of changes toward becoming more autonomously motivated. A high degree of engagement in class also predicts autonomous motivation (Oga-Baldwin & Nakata, 2017). Finally, both autonomous motivation and engagement, mediated by a satisfying learning environment, predict achievement in a foreign language, even when controlling for prior knowledge (Oga-Baldwin, Nakata, Parker, & Ryan, 2017).

Studies in general education and first language contexts have predicted and paralleled these findings (Corpus & Wormington, 2014; Ryan & Connell, 1989; Taylor et al., 2014; Wormington, Corpus, & Anderson, 2012). One significant recent development is the foundation of a hypothesis regarding students' subject specific motivation (Chanal & Guay, 2015). According to the specificity hypothesis, students' autonomous motives are more strongly tied to individual differences regarding specific school subjects, while more controlled motivation resembles a general motivation for school. The results indicate that there is constant interplay between global, contextual, and situational motivations in school (Vallerand, 1997), and thus motivation for one subject potentially influences motivation for another based on individual differences in experiences. One important covariate of these differences is students' belief in their ability to succeed in each subject.

2.3. Ability beliefs, motivation, and foreign language

Students' belief in their ability to succeed is a significant explanatory factor for both achievement (Bandura, 1997) and motivation (Ryan & Deci, 2017). While a variety of terminology defines the construct of competence beliefs (see Elliot, Dweck, & Yeager, 2017, for a comprehensive guide), in terms that students recognize, these beliefs all relate to how

well students perceive themselves as having performed in the past and how well they think they will do in the future. Importantly, all major motivational theories include a competence belief component in their model. Despite their importance for learning, competence beliefs such as self-efficacy and self-concept have received only limited exploration in language education (Boo, Dörnyei, & Ryan, 2015).

In one study, Mills and colleagues (2007) found that self-efficacy can predict university students' language course grade independent of self-concept and value for the foreign culture. Their work with American university students learning French indicates that self-efficacy as a competence belief is an important covariate of motivation and helps to explain some aspects of students' achievement. In a UK study of French learners, Graham and Macaro (2008) demonstrated that self-efficacy and language performance could be improved with situated strategy-use instruction.

Other competence beliefs have shown similarities between school subjects. Self-concept for language both foreign and native language studies were found to be strongly linked. Xu and colleagues (2013) found strong connections between Chinese learners' self-concept for language (both Chinese and English), demonstrating a high correlation between achievement in both subjects and subsequent self-concept.

More recent research has demonstrated that when self-concept is the sole ability-belief predictor of interest, it is substantive (Fryer, 2015). However, when self-concept is paired with self-efficacy, longitudinal modelling has indicated that self-efficacy is the principal ability-belief driving interest in a domain of study, but that self-concept might be an important moderator (Fryer, Ainley, Thompson, 2016). A recent longitudinal test of this relationship has established strong reciprocal linkages over time between students' interest

in a domain of study and their self-efficacy for studying in a specific course (Fryer & Ainley, 2018). Furthermore, this research demonstrated that after accounting for prior competence, that interest and self-efficacy beliefs presented consistent predictive relationships with achievement. Other research has shown the importance of self-efficacy as a predictor of adolescents' academic motivation (McGeown et al., 2014).

Building on these theories, Fryer and Oga-Baldwin (2017) looked at two cohorts of Japanese junior high school students, measuring self-efficacy for mathematics, English, and Japanese language. Using a longitudinal cross-lagged auto-lagged model, they found no relationship between mathematics and the language subjects, but found that self-efficacy for English at the beginning of the school year predicted future self-efficacy for Japanese. More recent work indicated that, mediated by instructional experiences, self-efficacy reciprocally predicts achievement and self-determined motivation in school subjects such as Japanese, English, and mathematics (Authors, 2019b). These findings indicate that competence beliefs, especially self-efficacy beliefs, may be important covariates for how students are motivated in secondary school and vice versa.

2.4. Studies on motivational profiles

Past person-centered work using self-determination theory has found between three and six motivational profiles depending on several factors, including age and domain of study (Corpus & Wormington, 2014; Gillet, Morin, & Reeve, 2017; Oga-Baldwin & Fryer, 2018; Vansteenkiste et al., 2009). Most of these studies have shown some version of four theoretically consistent profiles of motivation based on Vansteenkiste and colleagues' (2009) 2 x 2 framework of quality and quantity. Moving across the illustration in Figure 1, the first profile is "low quantity motivation," where students report low scores on both

autonomous and controlled motives. The next profile is "poor quality motivation," with comparatively higher controlled and comparatively lower autonomous motives. The third profile is "good quality motivation," comprised of higher autonomous and lower controlled motivation. Finally, "high quantity motivation" is represented by simultaneously high ratings on both autonomous and controlled motivation. While other studies have found a variety of other, more nuanced profiles (Gillet et al., 2017; Wang et al., 2016) or used different terminology to represent the same constructs (e.g., Corpus & Wormington, 2014), these four profiles have been the most consistent. According to SDT, profiles with high autonomous motivation are more likely to show more adaptive results, while a lack of autonomous motivation is more often associated with maladaptive outcomes (Ryan & Deci, 2017). Thus even in the presence of controlled motivation, autonomous motivation might mitigate the negative effects of external control (Gillet et al., 2017).

	Low Controlled Motives	High Controlled Motives
Low Autonomous Motives	Low Quantity Motivation	Poor Quality Motivation
High Autonomous Motives	Good Quality Motivation	High Quantity Motivation

Figure 1. Theoretical profile compositions.

In one series of studies sampling from Belgian high school and university students, Vansteenkiste and colleagues (2009) hypothesized and consistently found previously described theorized four-profiles: low quantity, poor quality, high quantity, good quality. Using cluster analysis, the authors found links between good quality motivation and adaptive behaviors such as time use, meta-cognitive strategies, effort regulation, and higher GPA. Likewise, students with poor quality motivation were more likely to cheat, feel that cheating is acceptable, procrastinate, and achieve less than students in the other profiles.

North American secondary school students also showed the same four-profile pattern (Hayenga & Corpus, 2010; Wormington, Corpus, & Anderson, 2012). Cluster analysis indicated the same four student profiles. In lower secondary school (Hayenga & Corpus, 2010), good quality motivation was associated with high GPA, while students with poor quality motivation showed lower grades. Results further showed general within-subject stability across the year; as with other research on secondary schools (Eccles et al., 1993), most students who changed profiles went toward lower motivation. In high school (Wormington, Corpus, & Anderson, 2012), students' achievement was similarly associated with both high quantity and good quality motivation.

Work on specific school subjects in Asia has indicated some more nuanced findings through Latent Profile Analysis. Singaporean students indicated different patterns of motivation for physical education (Wang et al., 2016). Primary and secondary school students exhibited poor quality, high quantity, and good quality for physical education, but also two more moderate subgroups, one moderate group with similar levels of both autonomous and controlled motivation near the midpoint, and another similar to the poor

quality subgroup, but with slightly lower controlled and slightly higher autonomous motivation.

Gillet and colleagues (2017) demonstrated the most fine-grained differences in motivational profiles in a sample of French-Canadian university students, using Latent Profile Transition Analysis to measure change across a single semester. Students in this study showed six motivational profiles: a good quality motivation profile, one with moderately good quality, one corresponding to high quantity motivation, one with low quantity motivation, one showing moderately low quantity motivation, and a poor quality motivation profile. The three more autonomously motivated profiles showed more adaptive outcomes, including positive affect for school, interest, effort, and achievement, lower levels of boredom, disorganization, and fewer intentions to dropout of university. Likewise, more externally controlled (i.e., low quantity and poor quality) profiles were associated with boredom, disorganization, intention to dropout, and lower grades.

In a sample of elementary school students, Corpus and Wormington (2014) found poor quality, high quantity, and good quality motivation profiles, but no low quantity motivation subgroup. Using cross-sectional cluster analysis at two time points, the study followed changes in motivation over the course of a single school year. The good quality motivational subgroup changed the least, and showed higher grades and test scores, indicating something of a Matthew effect. Students in the high quantity motivation subgroup showed the least stability, with many students starting in this profile changing profiles during the year. The students in the poor quality motivation subgroup from the start of the year were also relatively stable, and showed lower achievement.

Confirming these findings with a sample of Japanese elementary students learning English, Oga-Baldwin and Fryer (2018) found the same three-subgroup pattern as noted in Corpus and Wormington (2014). Across two years and three time points, a cohort of Japanese elementary school students again showed good quality, high quantity, and poor quality motivations. In this low-stakes environment, students' motivation to learn English as a foreign language improved in quality, with the largest number of students moving toward high quantity and good quality motivation. The most adaptive patterns of movement also covaried with students' in-class engagement with English language learning.

Research to this point suggests that the number and nature of a sample's subgroups may be related to some combination of context and age. Japanese elementary school does not have the same life-defining stakes as secondary school (Cave, 2007), and thus might not produce low quantity motivation (Corpus & Wormington, 2014; Oga-Baldwin & Fryer, 2018). In secondary school and beyond, students may also have more mature understandings for why they are in school (Alexander, 2003), resulting in the greater range of profiles found in those settings (Hayenga & Corpus, 2010; Vansteenkiste et al., 2009; Wang et al., 2016; Wang et al., 2017). Previous studies have shown decreasing quality of motivation in secondary school (Authors, 2018; Nishimura & Sakurai, 2017), indicating potential developmental and social factors at work. In secondary and tertiary education, students might display more nuanced patterns of highs and lows in quality and quantity of motivation for their studies related to increased understanding of the complexity of social and academic demands, leading to more varied profiles.

Based on these prior results, several questions regarding students' motivational profiles are salient. The number of profiles for school-based learning, their composition and

covariates, and the differences and similarities that individual students show for different school subjects are key issues for understanding the motivation to learn languages.

3. The Current Study

3.1. Research questions and hypotheses

The current study is one of the first to use latent profile analysis to compare autonomous and controlled motivations for foreign and own language learning. As noted in previous studies comparing multiple school subjects, the processes of foreign language learning may relate to students' own language (Xu et al., 2013). Based on the reviewed theoretical and empirical work, the current study worked from the following research questions and corresponding hypotheses:

Research question 1: What types of profiles do students display in Japanese secondary school foreign and own language classes?

Hypothesis 1: Based on the self-determination motivational quality and quantity framework, students will display a greater variety than the three profiles found in elementary schools (Oga-Baldwin & Fryer, 2018), similar to prior findings (Gillet et al., 2017; Vansteenkiste et al., 2009; Wang et al., 2016), and indicating a developmental trend previously hypothesized by Oga-Baldwin & Fryer (2018). Specifically, we expect to see the four profiles indicated by Vansteenkiste and colleagues (2009): low quantity, poor quality, high quantity, and good quality.

Research question 2: What similarities exist in the composition of the profiles?

Hypothesis 2: Profiles for both own language and foreign language learning will show similar patterns of motivation, evidenced by similar levels of each component motivation and group population in each profile.

Research question 3: How will subgroup profiles relate to measures of self-efficacy and actual language learning?

Hypothesis 3: More adaptive (higher quantity and better quality) motivational subgroup profiles will show statistically significantly higher self-efficacy and course grade.

Research question 4: What kind of overlap will the subgroups display across both subjects?

Hypothesis 4: Groups will show statistically significant overlap (agreement) between subgroup categorization in own language and foreign language studies.

4. Methods

4.1. Measures

Motivation. Motivation was measured using a Japanese translation of the academic self-regulation questionnaire (SRQ-A; Ryan & Connell, 1989). This survey is designed to measure the quality of students' motivation according to SDT's organismic integration theory continuum from intrinsic to external regulation of motivation using 12 items to represent the four factors. Scales were designed to measure intrinsic, identified, introjected, and external regulations. Scales were Likert-type, representing a range from "I don't think so at all" (1) to "I fully agree" (6). Students completed these surveys in March 2017. Internal reliability for all scales was acceptable at all three time points (all Cronbach's alpha > .70; Devellis, 2012). We used the intrinsic and external regulation scales to derive the profiles of students' motivation to learn English and Japanese in secondary schools, while identified and introjected were used as non-profiling covariates. While the identified and introjected scales can contribute meaningful and nuanced to understanding students' motivational orientations, the more polar intrinsic / external variables more strongly represent autonomous and controlled motives (Oga-Baldwin & Fryer, 2018).

Self-efficacy. Self-efficacy for learning Japanese and English as a foreign language in their current class was measured by five items from the patterns of adaptive learning inventory (Midgley et al., 2000). Students self-reported their agreement with items (e.g., I am certain I can master the skills taught in class this year; Even if the work is hard, I can learn it) across the Likert formatted scale, from "I don't think so at all" (1) to "I fully agree" (6). The scale for each subject had a different stem (e.g., In my English class this year...; In my Japanese class this year...). This variable was treated as an additional (non-profiling) covariate.

Achievement. Achievement was modeled using students' year-end course grades for English and Japanese. These grades are given by teachers and assess both objective (written test-based) and subjective (teacher assessments of in-class performance) aspects of students' abilities. Though performance in Japanese is primarily assessed through reading and writing, English assessment also could include speaking and listening. Municipal and national privacy policies forbid sharing of regional standardized test information; thus, only teacher grades were available for the current study. Achievement was used as a non-profiling covariate.

4.2. Sample

The current study was undertaken with first-year secondary school students in Japan (n = 830; female = 389, gender unknown = 9). Six schools located in two rural-suburban districts agreed to participate in the study. These municipalities were representative of Japan as a whole; mean monthly household income for both towns was ¥465,000 and ¥459,00 respectively, compared to ¥461,000 nationally (Japan Statistics Bureau, 2017). Students were all ethnically and culturally Japanese, speaking Japanese as a home language, and had completed six years of compulsory primary education. Japanese school enrollment policy is decided by age cohort; students who repeat a school year are extremely rare (Tsuneyoshi,

2004). Accordingly, all participants were born between April 2, 2003 and April 1, 2004 (age 12–13 at the time of the study). Student participation was voluntary, and parents were notified regarding student involvement in the study by the participating schools. All students and parents in the district consented to participate; at no point did individuals raise concerns or refuse participation. Non-participation due to absence on survey days was minimal (missing individuals < 1% of school enrollees).

Students had previously experienced English studies in elementary school focusing on listening and speaking prior to their first year of English in secondary school. As noted in previous work (Oga-Baldwin et al., 2017; Oga-Baldwin & Fryer, 2018), elementary English focuses specifically on enjoyment of learning English. Curriculum changes have now brought continuity to these studies, emphasizing more communicative approaches (MEXT, 2017a). Japanese teaching focused in similar ways on communication, but with more focus on reading and beginning to understand literary texts (MEXT, 2017b). Classrooms were not observed as part of this research.

Research participation was coordinated through meetings with the board of education, school principals, and teachers. Surveys were administered during the final term of the 2016-2017 school year. Achievement data was gathered after all surveys were collected after the end of the academic year. Ethical oversight was included in the review process for the JSPS Grant-in-aid for Scientific Research and permission was granted from the [University Details Removed for Peer Review] Ethics Review Board.

Previous variable-centered work using this sample has been published (Authors, 2019b). However, this data has not yet been used in person-centered work, nor did the previous study use the full sample. The current analyses place specific emphasis on learners' subject-based individual differences.

4.3. Analyses

Latent profile analysis (LPA) is a person-centered approach, deriving latent subgroups from the sample, developing a probabilistic approach to group membership based on observed continuous scores (Magidson & Vermunt, 2004). Further, for exploratory research as in this study, it has an advantage over *k*-means clustering in that it does not require *a priori* setting of hypothesized clusters, and can provide more accurate results (Magidson & Vermunt, 2002). All latent analyses used M*plus* 8.0 (Muthén & Muthén 1998–2017). Observed variable analyses was completed with Stata 14 (StataCorp, 2014). Convergent and divergent validity of the constructs had previously been assessed using Confirmatory Factor Analysis (CFA) and invariance testing, with a four-factor structure (intrinsic–identified–introjected–external) for the motivation scales found to be accurate (Authors, 2018; 2019b). Missing data due to non-response were less than 2% of the total volume. These missing data were handled using full-information maximum likelihood estimation in M*Plus*, generally held to be the most appropriate means (Schafer & Graham, 2002).

For all person-centered analysis, only the intrinsic and extrinsic scales were utilized as profiling variables, following previous work with similar samples (Oga-Baldwin & Fryer, 2018; Authors, 2019b). These scales were chosen so as to allow for the maximum contrast among the profiles; though some studies have found nuanced profiles based on multiple profiling variables (Gillet et al., 2017; Wang et al., 2016), as noted in the literature review, these profiles largely represent differing combinations of autonomous and controlled motives. Analyses and interpretation of fit indices relied on the examples from Nylund and colleagues' established practices (Nylund 2007; Nylund et al., 2007; Nylund-Gibson et al.,

2014).[1] For each subject, two through six latent sub-groups were tested and compared using LPA. Fit was estimated with Information Criterion, Log-Likelihood tests, relevant theory, past empirical findings and subgroup size. We employed two Likelihood Ratio tests and three Information Criterion indices. The Vuong–Lo–Mendell–Rubin Likelihood Ratio Test (Vuong, 1989) and Lo–Mendell–Rubin Likelihood Ratio Test (Lo et al., 2001) both test whether the identified set of latent subgroups was less statistically significant than a solution with one group less, that is, whether the solution with one group less was a better fit for the data. For the information criterion, Akaike's Information Criterion (Akaike, 1987), the Bayesian Information Criterion (BIC; Schwartz, 1978) and the sample size-adjusted BIC model are each selection criterion; all three information criteria provide asymptotic distributions as subgroup numbers increase, and therefore the lowest value of the plausible cluster solutions is considered the best (Nylund et al., 2007). Of the three information criteria, the BIC is generally seen as being the most useful guide for person-centered latent analyses (Nylund-Gibson et al., 2014).

Finally, as a follow-up secondary analysis to the LPAs we tested differences in the profiles using multivariate analysis of variance (MANOVA) and univariate analysis of variance (ANOVA) using the profiles generated for each subject as categorical predictors to confirm effect sizes for each of the profiling variables and additional covariates; these difference tests were used as confirmation of the profiling results. MANOVA/ANOVA have

[1] We are aware of methods for latent profile transfer analysis (LPTA) outlined by Morin and Litalien (2017), and agree that they offer a significant step forward for this method. We have elected not to use these methods based on the goals of the paper and the differences demonstrated by a profile transfer analysis. We seek to illustrate key overlaps and differences found in two static profiles at a single time point, and thus have not used LPTA methods.

been suggested as a method for further investigations after LPAs in other fields (Stanley, Kellermanns, & Zellweger, 2017). In reporting results, we followed the guidelines and suggestions laid out by Larson-Hall and Plonsky (2015).

We used Cohen's Kappa to test for overlap between the subgroups. This test assesses agreement for nominal categories, and thus demonstrates how subgroup placement in one subject agrees with subgroup placement in the other. It accounts for random chance in group assignment, and is one of the most commonly used tests of agreement for categorical variables (Graham, Milanowski, & Miller, 2012). Although guidelines for interpretation exist (e.g., Landis & Koch, 1977), kappa is also sometimes overly stringent when looking at multiple categories (Strijbos, Martens, Prins, & Jochems, 2006). We thus further considered the population size and percentage of students sorted into the same category when interpreting the agreement in subgroup placement.

5. Results

5.1. Descriptive and correlational statistics

Mean scores and pairwise correlations for each variable are presented in Table 1. Full population mean scores for all variables were close to the midpoint of the scale for all variables except introjected regulation in each subject. A Shapiro-Wilk test for normality for the profiling variables (intrinsic and external regulations) indicated that only external regulation for English was normally distributed; the other scales had violations of normality. Further investigations of skewness and kurtosis indicated that skewness was minimal for all variables (< .3), and kurtosis was under 3, which is within acceptable limits for latent variable modeling (Hancock & Mueller, 2010).

Highlighting only the most relevant correlations presented in Table 1, pairwise correlations were consistent with theory, demonstrating a pattern of correlations similar to previous studies (Ryan & Connell, 1989). Across Japanese and English (i.e., intrinsic regulation for Japanese and intrinsic regulation for English; self-efficacy for Japanese and self-efficacy for English; etc.), constructs showed statistically significant strong correlations (.55~.81). The cross-subject correlation for autonomous motivation in one domain and controlled motivation in another was also negative but not consistently statistically significant, $Intrinsic_{Japanese}$–$External_{English}$ r = -.07, *ns*, $Intrinsic_{English}$–$External_{Japanese}$ r = -.11, $p < .001$. The correlation for achievement in Japanese and achievement in English was .76, indicating that the two were strongly related. Self-efficacy for both Japanese and English showed small, but significant, correlations with achievement.

Table 1. Correlation table with descriptive statistics. Cronbach's alpha scores displayed in bold on the diagonal.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Japanese Intrinsic	**(0.91)**												
2. Japanese Identified	0.68***	**(0.85)**											
3. Japanese Introjected	0.44***	0.37***	**(0.82)**										
4. Japanese External	-0.07*	-0.01	0.34***	**(0.82)**									
5. Japanese Self-Efficacy	0.64***	0.61***	0.37***	-0.01	**(0.94)**								
6. English Intrinsic	0.55***	0.49***	0.26***	-0.11***	0.47***	**(0.92)**							
7. English Identified	0.45***	0.61***	0.26***	-0.08*	0.46***	0.74***	**(0.88)**						
8. English Introjected	0.36***	0.35***	0.81***	0.31***	0.31***	0.41***	0.38***	**(0.74)**					
9. English External	-0.06	-0.04	0.29***	0.81***	-0.03	-0.21***	-0.15***	0.29***	**(0.75)**				
10. English Self-Efficacy	0.42***	0.47***	0.29***	0.01	0.70***	0.64***	0.60***	0.38***	-0.07*	**(0.91)**			
11. Japanese Achievement	0.16***	0.13***	0.13***	-0.02	0.20***	0.12***	0.12***	0.11***	0.00	0.16***	-		
12. English Achievement	0.11***	0.08*	0.13***	-0.01	0.15***	0.17***	0.13***	0.12***	0.00	0.18***	0.76***	-	
13. Gender	0.01	0.02	0.05	0.04	0.04	0.05	0.06	0.02	0.06	-0.10**	-0.09**	-0.06	-
Mean	3.39	4.23	2.43	3.18	3.61	3.34	4.11	2.46	3.06	3.66	3.23	3.30	-
SD	1.40	1.36	1.04	1.28	1.19	1.38	1.33	1.19	1.36	1.23	0.92	0.95	-
95% CI	[3.29, 3.48]	[4.14, 4.33]	[2.36, 2.50]	[3.10, 3.27]	[3.52, 3.69]	[3.24, 3.43]	[4.02, 4.20]	[2.38, 2.55]	[2.97, 3.15]	[3.57, 3.74]	[3.17, 3.29]	[3.23, 3.36]	- -
Range	1-6	1-6	1-6	1-6	1-6	1-6	1-6	1-6	1-6	1-6	1-5	1-5	0-1

*Note: Gender 0 = female, 1 = male, * p < .05, ** p < .01, ***p < .001*

5.2. Person-centered results

LPA was conducted with intrinsic and extrinsic motivation. For each of the LPAs two through six subgroup solutions were tested. For each LPA, the Information Criterion, Likelihood Ratio Tests, subgroup size (presented in Table 2), and relevant theory were reviewed to establish the best solution. For both subjects, the BIC (generally the most informative; Nylund, 2007; Nylund-Gibson et al. 2014) indicated a clear lowest value at five subgroups. The five-subgroup solution was supported by the Likelihood Ratio Tests for English, but was ambiguous for Japanese—while a two-subgroup solution was also potentially indicated by a non-significant Likelihood Ratio Test, no prior motivational model or theory has used two subgroups, and selection of profiles is simultaneously model-based and theory-driven (Samuelsen & Dayton, 2010). Prior theory (Vansteenkiste et al., 2009) has suggested four interpretable subgroups, the current BIC indicated five as the superior result for both subjects. Profile assignment probabilities for the five profiles are presented in Table 3.

To confirm the superiority of the five profiles, we conducted MANOVA results based on profile classifications for both subjects, indicating that the 5-subgroup categorization in both subjects accounted for over 92% of the variance in students' motivation scores, Wilk's $\text{Lambda}_{\text{Japanese}} = 0.0667$, $F(8, 1648) = 507.29$, $p < 0.001$, $R^2 = .93$, Wilk's $\text{Lambda}_{\text{English}} = 0.0727$, $F(8, 1648) = 557.92$, $p < 0.001$, $R^2 = .92$. As further evidence, a MANOVA test with the four cluster solution demonstrated weaker results, Wilk's $\text{Lambda}_{\text{Japanese}} = 0.0973$, $F(8, 1650) = 606.80$, $p < 0.001$, $R^2 = .90$, Wilk's $\text{Lambda}_{\text{English}} = 0.1028$, $F(8, 1950) = 582.63$, $p < 0.001$, $R^2 = .89$. The five-cluster solution accounted for a greater proportion of the variance in both subjects. Subgroup size cutoff (> 5%) was found in the Japanese sample, but English had one group with only 23 individuals (3%). Profile composition (presented in Figures 2 and 3) for

each subgroup indicated high similarity across subjects. Recent findings (Gillet et al., 2017; Wang et al., 2016) have also found five or more theoretically consistent subgroups, and thus the five-subgroup solution was determined to be the most meaningful for this sample. Tables 4 and 5 presents the mean scores for each of the profiled variables and covariates, along with ANOVA scores for each variable.

Table 2. Fit comparisons and subgroup populations for each profile solution by subject.

Japanese	1 group	2 groups	3 groups	4 groups	5 groups	6 groups
AIC	5767.702	5747.187	5678.957	5619.259	5570.881	5559.024
BIC	5786.588	5780.237	5726.171	5680.638	5646.424	5648.731
SABIC	5773.885	5758.007	5694.415	5639.354	5595.613	5588.394
Entropy		0.573	0.797	0.835	0.8	0.798
VUONG-LO-MENDELL-RUBIN		0.0349	0	0	0.001	0.0034
LO-MENDELL-RUBIN		0.0397	0	0	0.002	0.0044
PARAMETRIC		0	0	0	0	0
Cluster Sizes						
1	830	523	97	57	107	58
2		307	544	177	84	315
3			189	86	425	141
4				510	81	60
5					133	226
6						30
English	1 group	2 groups	3 groups	4 groups	5 groups	6 groups
AIC	5694.742	5653.935	5643.806	5545.192	5533.304	5533.414
BIC	5713.633	5686.993	5691.033	5608.586	5606.866	5623.144
SABIC	5700.93	5664.764	5659.276	5565.302	5558.055	5562.807
Entropy		0.514	0.54	0.785	0.789	0.739
VUONG-LO-MENDELL-RUBIN		0	0.0609	0.0062	0	0.5671
LO-MENDELL-RUBIN		0	0.0698	0.0079	0	0.583
PARAMETRIC		0	0	0	0	0.2083
Cluster Sizes						
1	830	194	83	79	84	400
2		636	549	197	173	84
3			198	114	119	152
4				440	23	44
5					431	118
6						32

Table 3. Average latent profile probabilities for most likely latent profile membership.

	Japanese					English				
	Low	Good	Poor	High	Moderate	Low	Good	Poor	High	Moderate
Low	0.853	0.080	0.000	0.000	0.066	0.808	0.000	0.101	0.000	0.092
Good	0.053	0.851	0.000	0.000	0.095	0.000	0.855	0.000	0.064	0.080
Poor	0.000	0.000	0.876	0.079	0.046	0.074	0.000	0.849	0.000	0.077
High	0.000	0.000	0.054	0.826	0.120	0.000	0.169	0.000	0.702	0.130
Moderate	0.023	0.028	0.008	0.046	0.895	0.026	0.039	0.020	0.011	0.905

Probabilities sum across rows.

The profiles for the five subgroups best represented Low Quantity (low ratings on both autonomous and controlled motivation), Poor Quality (comparatively low rating of autonomous motivation compared to high controlled motivation), Moderate motivation (similar levels of autonomous and controlled motivation, centered around the sample mean), High Quantity (ratings for both autonomous and controlled motivation both well above the midpoint) and Good Quality (comparatively more autonomous motivation than controlled motivation). These findings answer research question one, and support hypothesis one regarding a greater diversity of profiles with the expected composition for secondary school than in elementary school studies (Corpus & Wormington, 2014; Oga-Baldwin & Fryer, 2018).

Table 4. Japanese profile compositions and covariates, with individual ANOVA results.

Japanese																		
	Low Quantity N (Female) = 84 (32)			Poor Quality N (Female) = 81 (26)			Moderate N (Female) = 427 (201)			High Quantity N (Female) = 84(47)			Good Quality N (Female) = 133 (72)			ANOVA results		
Variable	Mean z95% CI	SD	Z	Mean 95% CI	SD	Z	Mean 95% CI	SD	Z	Mean 95% CI	SD	Z	Mean 95% CI	SD	Z	*F*	*p*	R^2
Intrinsic	1.88 [1.72, 2.03]	0.81	-1.06	1.86 [1.67, 2.05]	0.86	-1.07	3.24 [3.15, 3.34]	1.00	-0.07	4.70 [4.51, 4.89]	0.86	0.99	4.86 [4.72, 5.01]	0.84	1.11	255.28	<.001	0.55
Identified	3.16 [2.87, 3.44]	1.49	-0.71	3.15 [2.82, 3.48]	1.48	-0.72	4.04 [3.93, 4.14]	1.11	-0.05	5.16 [4.99, 5.34]	0.82	0.79	5.03 [4.87, 5.18]	0.92	0.69	71.21	<.001	0.26
Introjected	1.40 [1.28, 1.52]	0.64	-0.89	2.07 [1.82, 2.31]	1.09	-0.33	2.63 [2.54, 2.72	0.97	0.14	3.73 [3.42, 4.03]	1.40	1.06	2.23 [2.03, 2.44]	1.21	-0.19	65.99	<.001	0.24
External	1.35 [1.25, 1.45]	0.54	-1.25	5.38 [5.22, 5.53]	0.70	1.70	3.18 [3.13, 3.23]	0.53	0.09	4.76 [4.64, 4.88]	0.55	1.24	1.56 [1.47, 1.65]	0.53	-1.10	1063.84	<.001	0.84
Self-Efficacy	2.82 [2.57, 3.07]	1.33	-0.68	2.95 [2.67, 3.24]	1.28	-0.57	3.57 [3.48, 3.67]	1.00	-0.07	4.49 [4.28, 4.71]	0.99	0.68	4.50 [4.31, 4.69]	1.12	0.69	56.66	<.001	0.22
Achievement	3.10 [2.93, 3.27]	0.87	-0.15	2.96 [2.75, 3.16]	0.92	-0.30	3.34 [3.26, 3.42]	0.85	0.11	3.36 [3.18, 3.54]	0.82	0.14	3.35 [3.17, 3.52]	1.02	0.12	4.60	<.001	0.02

Table 5. English profile compositions and covariates, with individual ANOVA results.

English	Low Quantity N (Female) = 84 (32)			Poor Quality N (Female) = 119 (44)			Moderate N (Female) = 433 (203)			High Quantity N (Female) = 23 (15)			Good Quality N (Female) = 173 (97)			ANOVA results		
Variable	Mean 95% CI	SD	Z	Mean 95% CI	SD	Z	Mean 95% CI	SD	Z	Mean 95% CI	SD	Z	Mean 95% CI	SD	Z	*F*	*p*	R^2
Intrinsic	1.53 [1.42, 1.64]	0.51	-1.33	1.53 [1.44 1.62]	0.51	-1.33	3.41 [3.36, 3.46]	0.56	0.02	5.25 [5.00, 5.49]	0.57	1.32	5.26 [5.18, 5.34]	0.53	1.34	1189.48	<.001	.85
Identified	2.77 [2.44, 3.09]	1.49	-1.08	2.88 [2.64, 3.12]	1.32	-0.99	4.33 [4.24, 4.42]	0.93	0.07	5.58 [5.27, 5.89]	0.73	0.99	5.45 [5.36, 5.55]	0.63	0.89	172.29	<.001	.45
Introjected	1.47 [1.33, 1.60]	0.61	-0.92	1.91 [1.75, 2.08]	0.91	-0.50	2.60 [2.51, 2.68]	0.88	0.16	4.20 [3.69, 4.71]	1.18	1.70	2.60 [2.44, 2.76]	1.10	0.16	58.59	<.001	.22
External	1.92 [1.76, 2.08]	0.73	-0.99	4.70 [4.55, 4.84]	0.81	1.19	3.25 [3.16, 3.35]	1.02	0.06	5.10 [4.83, 5.37]	0.63	1.50	2.32 [2.18, 2.46]	0.96	-0.67	174.97	<.001	.45
Self-Efficacy	2.48 [2.21, 2.75]	1.23	-0.94	2.64 [2.44, 2.85]	1.13	-0.81	3.63 [3.55, 3.71]	0.84	0.02	4.80 [4.36, 5.24]	1.01	1.00	4.58 [4.44, 4.73]	0.96	0.82	112.53	<.001	.35
Achievement	3.08 [2.89, 3.26]	0.85	-0.23	3.15 [2.98, 3.31]	0.90	-0.16	3.35 [3.27, 3.44]	0.89	0.06	3.78 [3.41, 4.15]	0.86	0.51	3.49 [3.34, 3.64]	1.00	0.20	5.62	<.001	.03

To answer research question 2, we looked at the individual scores for the profiling variables and subgroup covariates. In both subjects, students in each subgroup displayed similar profiles with similar patterns of motivation, confirming hypothesis two. The scores for each of the profiling variables and covariates are presented in Tables 4 and 5. ANOVA tests for both identified and introjected regulation for both subjects indicated that these profiles explained between 22% and 45% of the variance in students' scores on the non-profiling variables as well, $ANOVA_{Japanese\ Identified} = F(4, 827) = 71.21$, $p<0.001$, $R^2 = 0.26$, $ANOVA_{Japanese\ Introjected} = F(4, 827) = 65.99$, $p<0.001$, $R^2 = 0.24$, $ANOVA_{English\ Identified} = F(4, 828) = 172.29$, $p<0.001$, $R^2 = 0.45$, $ANOVA_{English\ Introjected} = F(4, 828) = 58.59$, $p<0.001$, $R^2 = 0.22$, indicating moderate to large effect sizes for each test (Moderate $r > .4$ ($R^2 > .16$), Large $r > .60$ ($R^2 > .36$); Plonsky & Oswald, 2014). The composition of each subgroup profile was similar across the two subjects, as is illustrated in Figures 2 and 3. These results further indicated the validity of the five-profile solution, and confirmed hypothesis 2 regarding profile similarity across subjects.

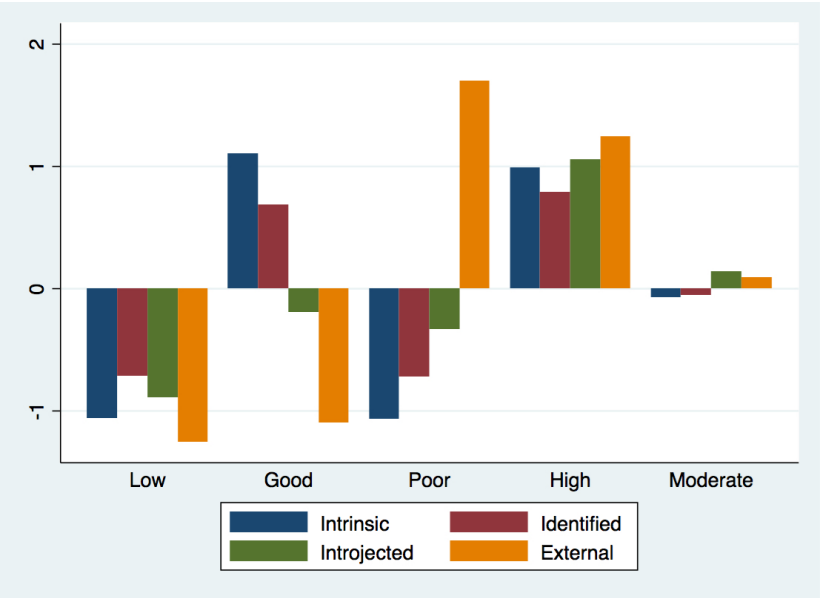

Figure 2. Japanese profile compositions.

Figure 3. English profile compositions.

Looking at research question three, we then investigated the differences in self-efficacy and achievement for each subject. ANOVA tests indicated that profiles differed significantly in their self-efficacy and course grade, $ANOVA_{\text{Japanese Self-Efficacy}} = F(4, 827) = 56.66$, $p < 0.001$, $R^2 = 0.22$, $ANOVA_{\text{Japanese Achievement}} = F(4, 827) = 4.60$, $p = 0.001$, $R^2 = 0.02$, $ANOVA_{\text{English Self-Efficacy}} = F(4, 828) = 112.53$, $p<0.001$, $R^2 = 0.35$, $ANOVA_{\text{English Achievement}} = F(4, 828) = 5.62$, $p<0.001$, $R^2 = 0.03$. Results indicate that the model explains roughly 22% of the variance for

Japanese self-efficacy, 35% of the variance for English self-efficacy, 2% of the variance for Japanese achievement, and 3% of the variance for English achievement indicating moderate effects for self-efficacy but very small effects on achievement (Small r > . 25 (R^2 > .06), (Moderate r > .4 (R^2 > .16), Large r > .60 (R^2 > .36); Plonsky & Oswald, 2014). Visualization of these covariates can be found in Figures 4 and 5. More adaptive profiles showed higher self-efficacy and achievement, confirming hypothesis 3.

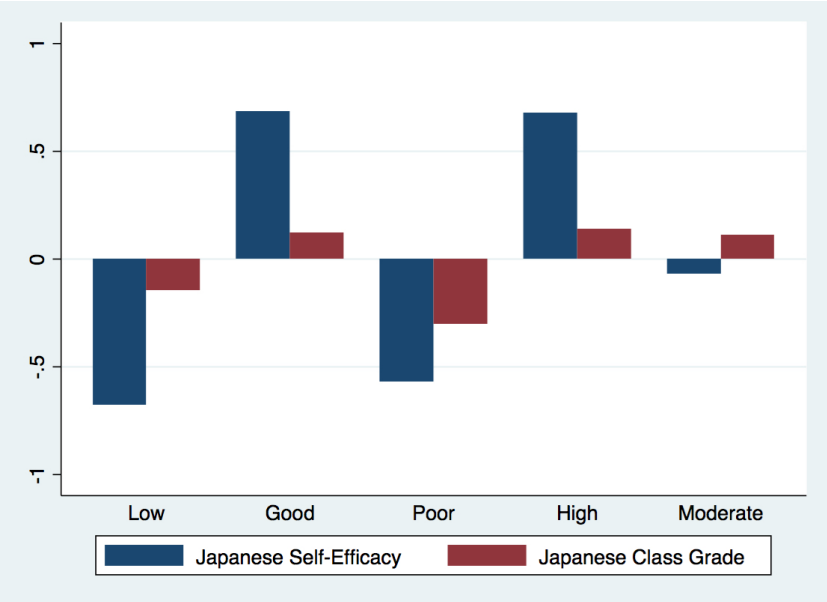

Figure 4. Japanese self-efficacy and class grade by profile.

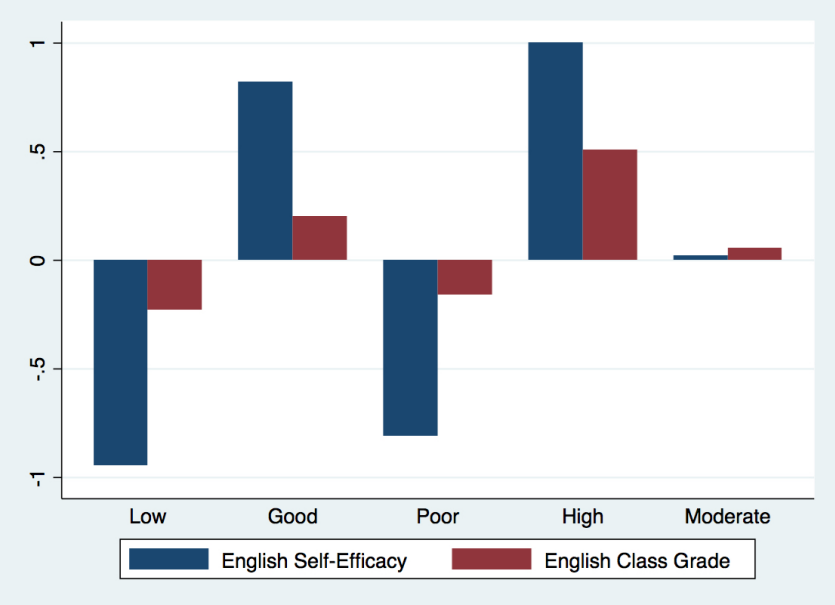

Figure 5. English self-efficacy and course grade by profile.

In response to research question 4 regarding the overlap between the 5-Clusters for Japanese and English, a reliability analysis indicated roughly 55% agreement between the two groups, Cohen's Kappa = 0.33, $p < .001$, with a total of 454 students emerging in the same profile for both Japanese and English. Results confirm hypothesis 4, indicating statistically significant overlap between students' motivational profiles for both subjects. A cross-tabulation of these results can be found in Table 6, with a visualization of the data overlap presented in Figure 6. The strongest overlap between the profiles for the two subjects was generally found in the moderate motivation profile, with 64% of moderate English and 65% of moderate Japanese profile in the same subgroup. Notably, about 5% of the students in the Japanese good quality motivation subgroup showed a low quantity motivation for English; roughly 17% of those with good quality motivation for English had poor quality motivation for Japanese.

Table 6. Cross-tabulation of English and Japanese profiles with overlap percentages for each profile

English	Low	% Japanese[a]	Poor	% Japanese[a]	Moderate	% Japanese[a]	High	% Japanese[a]	Good	% Japanese[a]	
Japanese	$N_{ENGLISH} = 84$		$N_{ENGLISH} = 119$		$N_{ENGLISH} = 431$		$N_{ENGLISH} = 23$		$N_{ENGLISH} = 173$		
Low	45	42%	3	3%	41	38%	0	0	18	17%	$N_{JAPANESE} = 107$
% English[a]	53%		3%		10%		0		10%		
Poor	0	0	50	62%	27	33%	4	5%	0	0	$N_{JAPANESE} = 81$
% English[a]	0		42%		6%		17%		0		
Moderate	32	8%	51	12%	270	64%	4	1%	68	16%	$N_{JAPANESE} = 425$
% English[a]	38%		43%		63%		17%		39%		
High	1	1%	11	13%	44	52%	15	18%	13	15%	$N_{JAPANESE} = 84$
% English[a]	1%		9%		10%		65%		8%		
Good	6	4%	4	3%	49	37%	0	0	74	56%	$N_{JAPANESE} = 133$
% English[a]	7%		3%		11%		0%		43%		

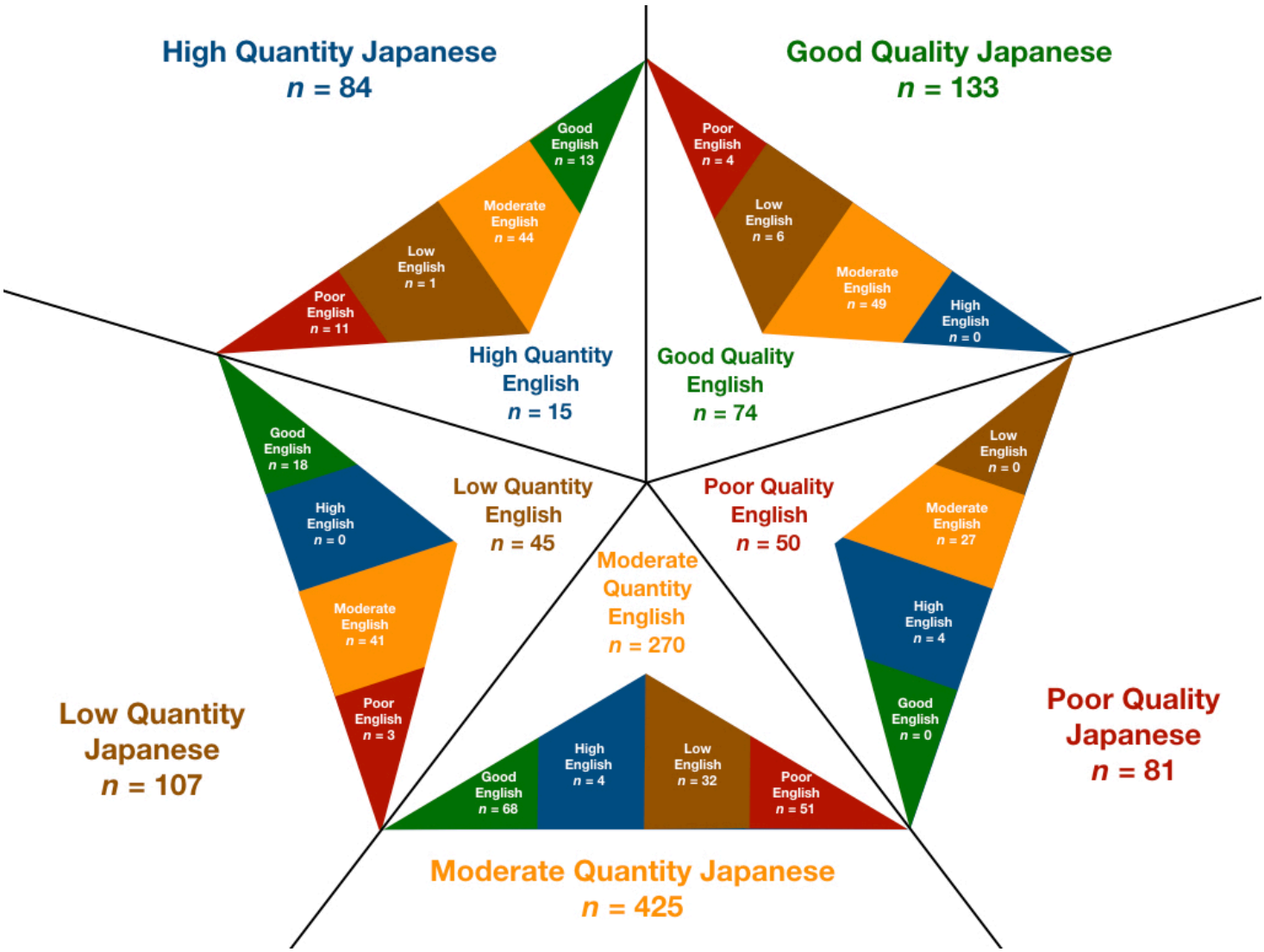

Figure 6. Visualization of subgroup overlap

6. Discussion

6.1. Research questions

For both language learning subjects, a five-subgroup structure showed the most consistent and interpretable fit to the data. This decision was made based on the Bayesian information criteria for both school subjects, which showed the lowest value for both (Nylund et al., 2007). For each subject, the composition of these profiles was similar and theoretically consistent with previous profiles. The five profiles were poor quality motivation, low quantity motivation, moderate motivation, good quality motivation, and

high quantity motivation. Additional corroboration was provided by comparison of variance explained by the five-subgroup solution to the also plausible four-subgroup solution, indicating that more variance was explained for both subjects by five profiles.

As presented in hypothesis one, these subgroups replicated those originally defined by Vansteenkiste and colleagues (2009), and also found in similar secondary school samples (Wormington et al., 2012). The moderate motivation profile was similarly indicated in previous samples with Asian secondary school learners with regard to domain specific motivation (Wang et al., 2016; Wang et al., 2017). This group showed no strong highs and lows of motivation, self-efficacy, or achievement. This was both the largest group and had largest percent-wise overlap between profiles, indicating a high likelihood (> 60%) for students exhibiting this profile for Japanese to also show this profile for English; the reverse is also true. Nearly one third of the total number of students evinced this profile for both subjects. For these students, neither Japanese nor English may induce a particularly strong desire to learn nor feeling of being forced to engage in their classwork. The moderate motivation subgroup appears to be comprised of students with neither a strong aversion or liking for either English or Japanese, perhaps considering both “just another” school subject that is presented to them in a normal day. The greater variety of profiles confirmed hypothesis one that secondary students would show more subgroups compared to elementary students, answering research question one (Corpus & Wormington, 2014; Oga-Baldwin & Fryer, 2018).

The similar composition of subgroup profiles across subjects answered research question two and confirmed hypothesis two, though profile subgroup size differed for each subject. It is important to note that slightly more students showed adaptive motivational profiles for Japanese than they did for their English. Most notably, three times as many

students exhibited the high quantity motivation pattern for Japanese as did for English. Other differences were small, but may widen as students progress through secondary school. If this pattern holds and increases, these results might mark the beginning of a trend and indicate reasons for the discrepancy in results between national level comparisons of achievement and ability in native language (OECD, 2015) and English proficiency (Education First, 2017).

Regarding research question three, results partially replicate those of Gillet and colleagues (2017), where students in the high quantity motivation profile in English showed the highest achievement and self-efficacy. Students in the English good quality profile showed slightly less achievement and self-efficacy. Self-efficacy and achievement were similar for the two most adaptive Japanese profiles, good quality and high quantity. Confirming hypothesis three, the students in the two adaptive profiles in both subjects felt more capable and received higher grades than those in the low quantity, poor quality, and moderate groups. The strongest achievement results were found for a high quantity of motivation in English; students in both the high quantity and good quality profile subgroups for Japanese showed similar levels of achievement. These results corroborate prior person centered research indicating the relationship of intrinsic motivation and self-efficacy for school achievement (Vansteenkiste et al., 2009; Fryer & Ainley, 2018), further indicating that more internalized motives may offset the negative effects of external regulation (Gillet et al., 2017).

Looking finally at research question four, the results showed significant overlap between the profiles, with over half of the students reporting the same type of motivation for both subjects. More broadly, students with adaptive profiles for one subject were likely to show an adaptive profile in the other subject, or to display moderate motivation. The same was so

with maladaptive profiles; students in low quantity or poor quality for one subject showed similar maladaptive or moderate motivation in the other. The overlap in these results indicates that a pattern of motivation for languages specifically (Xu et al., 2013) or school more generally (Chanal & Guay, 2015) may partially underlie students' reasons for engaging in their school work.

6.2. Theoretical and practical implications

From a theoretical standpoint, results show the best fit for a five-subgroup solution, indicating the developmental trend in students' motivational profiles implied by comparisons of previous studies: younger students show less diversity of profiles and older students show greater nuance (Corpus & Wormington, 2014; Gillet et al., 2017; Oga-Baldwin & Fryer, 2018; Wang et al. 2017; etc.), ostensibly due to greater maturity, sensitivity, and awareness of their reasons for studying (Alexander, 2003). The robustness of the four central theoretical profiles was also confirmed; students showed low quantity, poor quality, high quantity, and good quality motivations as hypothesized by Vansteenkiste and colleagues (2009). Findings further confirm that motivational profiles may be used to effectively categorize students according to their desires, and that profile differences may have small but noticeable real-world effects. Students with more adaptive, autonomous profiles (high quantity and good quality) had higher classroom achievement and competence beliefs in both languages. Findings confirm the relationship between autonomous motivation, competence beliefs, and learning (Chanal & Guay, 2015).

Results further display the complex nature of motivation for learning a language. While the majority of students certainly showed similar profiles across the two subjects, a clear plurality of students also fell into a different subgroup in the other subject. Following previous studies in profile transition (Gillet et al., 2017; Oga-Baldwin & Fryer, 2018) and

cross-subject self-efficacy transfer (Fryer & Oga-Baldwin, 2017), future studies should look at how the current profiles predict changes in motivation and achievement, with an eye towards explaining those whose subgroup profiles do not match (e.g., moderate for English, good quality for Japanese). An essential question for future investigations is then whether students will converge on greater overlap in their subgroup profiles, or whether they will diverge and demonstrate stronger subject-specific motivational profiles. Given the strong correlations between achievement, self-efficacy, and motivation in both subjects, we hypothesize a Matthew effect where those with high achievement in both subjects continue to do well, but those with weaker abilities in one area or the other showing increasing divergence.

On a practical level, the findings of this study measured a naturally occurring representative subset of the larger Japanese population. The presence and prevalence of the moderate motivation profile should indicate to both teachers and policy makers that more work is necessary to build the desired positive affect for English in Japanese schools (MEXT, 2017; Authors, 2014). These results should offer hope; moderately motivated students can be targeted for interventions designed to improve the quality of motivation. Recent research has indicated that structured and supportive teaching aimed at improving engagement (Oga-Baldwin et al., 2017) or self-efficacy (Authors, 2019b) may positively influence the quality of students' motivation, especially for moderately motivated students.

6.3. Limitations

Several limitations apply to this study. First, the sample comes from one area of one country, and thus replication in other regions and cultural settings is necessary to confirm the universality of the profile patterns found here. Longitudinal work is also necessary to confirm profile stability and changes as well—future work using Morin and Litalien's (2017)

methods for deriving longitudinal profiles and their dynamic changes and interplay offer guidance. There is also room for methodological comparisons for determining profiles and overlap, looking at the methods used here in relation to those proposed by other researchers. Finally, given the complicated nature of the data and analyses, insufficient treatment has been given to gender differences. Likewise, reasons for students' presenting a specific profile will need to be addressed both qualitatively and quantitatively. Future studies from the present research program will address these issues.

7. Conclusions

We have presented the results of two latent profile analyses of one group of Japanese students' motivation to learn English and Japanese. This is one of the first fully-latent person-centered profile analyses of motivation in the field of language learning, and the first we are aware of to compare motivation for two similar subjects in a formal educational situation. These results indicate that students' motivation across language subjects (native and foreign) are similar, and show similar achievement outcomes. Achievement in Japanese and English, as well as ability beliefs, were highly correlated.

These profiles ultimately show a strong overlap between the majority of students' motivations to learn both their own language and a foreign language in a formal educational context. At the same time, the differences between the proportions of students in each profile indicate to what extent this overlap extends, providing clear evidence for individual variance between the motives to learn a language, as originally theorized by Ushioda (2012). While previous discussion of this topic has been speculative and qualitative, this study provides concrete quantitative evidence for key similarities and differences between motivations to learn each subject.

This offers a frame of reference for both future qualitative and quantitative research on the topic of formal language education. For quantitative research, this means that those targeting the center of the distribution are well justified in considering own and foreign language motivation as similar in general school settings. For a majority of students, motivation to learn a new language resembles the motivation for other, similar school subjects. Simultaneously on the qualitative end, these results show that the differences in students' motivation for formal language education are real, meaningful, and apply to a plurality of language learners. A very specific minority of students were motivated to learn English or Japanese for domain specific reasons, necessitating further investigation to understand these students' individual differences. For future work, the question for researchers and teachers is whom they target in their investigations, interventions, and instructional strategies. For most of these students, learning a new language was still learning a language, but not all learners shared the same motives.

Compliance with ethical standards

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: Informed consent was obtained from all individual participants included in the study as well as their legal guardians.

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