



Motivating young language learners: A longitudinal model of self-determined motivation in elementary school foreign language classes



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ARTICLE INFO

Article history:

Available online 2 February 2017

Keywords:

SDT
Longitudinal model
Engagement
Motivational development
Elementary school
Japan

ABSTRACT

Promoting intrinsic motivation is often a central concern in teaching foreign languages to elementary school children. Self-determination theory posits that intrinsic motivation develops through the interaction of the person and the environment. The present study investigated how elementary school students' motivation develops over the course of a school year in Japanese public schools. Five-hundred and fifteen Japanese elementary school children were surveyed over the course of one school year. Self-reported motivation, perceptions of teacher support, need satisfaction, and engagement were measured at different times. External raters observed students' engagement, while classroom teachers assessed the quality of students' motivation and learning. Structural equation modeling results indicated a positive, dynamic relationship between motivation, perceptions of the learning environment, and engagement. External raters' assessments showed significant positive correlations with students' self-reported engagement. Findings indicate how the instruction offered in these Japanese elementary schools supported students' foreign language learning motivation.

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1. Introduction

For elementary school children, learning a language can often be a process of growth and discovery. When learners develop positive affect for the foreign language, it can lead to a lifelong interest. Making the process of foreign language learning attractive to children is a goal of many instructional programs (Garton, Copland, & Burns, 2011). In these contexts, motivation, and more specifically intrinsic motivation, becomes a key focus in the classroom process.

Following this trend, the Japanese Ministry of Education, Culture, Sports, Science, and Technology (MEXT), has emphasized intrinsic motivation (“zest for life”) in its institution of compulsory (English) foreign language studies for all 5th and 6th grade pupils (MEXT, 2008). Under this Course of Study, students experience foreign language communication through interaction and games, but are not given summative assessments due to the potentially damaging motivational consequences (Berwick & Ross, 1989). Instead, teachers nurture motivation through a low-pressure, low-stakes learning environment (Ryan & Niemiec, 2009), based on experiential learning, with no summative assessments and a strong

emphasis on enjoyment (MEXT, 2008). The ultimate goal is to promote motivation through supporting students' behavior, interest, and positive attitude toward the foreign language; in other words, their engagement and intrinsic motivation. This leads to the question of how teachers can effectively support and maintain this type of activity and motive. As noted by Butler (2015, p. 319), situated research on the learning context is now needed to find how best to support and maintain young language learners' motivation. In this study, we address this call for further research.

Previous longitudinal models of motivational development in first and second language educational settings have primarily focused on secondary school children (e.g., Csizér & Dörnyei, 2005; Jang, Kim, & Reeve, 2012). While there have been cross-sectional studies looking at Japanese elementary students' language learning motivation (Carreira, 2011, 2012; etc.), previous studies have not approached this from a latent-variable, structural equation modeling perspective. Due to numerous constraints on the use of testing in elementary foreign language classes, previous models have also not included external assessments. We propose an empirical model of how motivation to learn a foreign language begins to develop in a public elementary school setting, including external assessment of learning outcomes.

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1.1. Foreign language motivation in elementary schools

In recent years, researchers have given considerable attention to motivation in elementary schools across East Asia (Butler, 2015). In Japan, the Ministry of Education currently promotes the ideas of interest and motivation in foreign language learning through an emphasis on communication and games in elementary classrooms; the Course of Study specifically refers to promoting interest, behavior, and motivation (MEXT, 2008). Students learn words and phrases through interest-building, activity-based classes, without relying on external rewards such as praise and high-stakes assessment. This paradigm of instruction is consistent with the motivational ideas put forth in *self-determination theory* (SDT; Deci & Ryan, 1985), in that both seek to promote a positive motivational climate for language learning (Oga-Baldwin & Nakata, 2014).

According to SDT, intrinsic motivation is defined as the desire to engage with a task for its own sake, and is often indexed by personal enjoyment, interest, and feelings of positive affect. Applied to language education generally, SDT has shown positive explanatory power for students' desire to continue learning the new language (Noels, Pelletier, Clément, & Vallerand, 2000) and interact with foreign cultures (Noels, Clément, & Pelletier, 2001; Vansteenkiste, Zhou, Lens, & Soenens, 2005).

Applying ideas from SDT in a series of cross-sectional studies in Japanese elementary schools, Carreira (2006, 2011, 2012) found a clear pattern of decreasing motivation to learn English as a foreign language across school years, subjects, and genders. Students' motivation to learn in schools decreased in higher grades, both in terms of the desire to learn English (Carreira, 2006) and the desire to learn other subjects (Carreira, 2011). Male students also showed lower levels of adaptive motivation compared to females. These results are echoed in studies of young learners in Korea (Kim, 2011).

In a recent study, Carreira, Ozaki, and Maeda (2013) found evidence that teachers' support correlated with higher student motivation. Using path analyses, the results of this study suggested that teachers' support predicted a sense of more autonomous motivation for learning a foreign language. While previous work indicated that the quantity of motivation diminishes as students age (Carreira, 2011), this study offered the hope that perhaps through effective pedagogy, teachers could influence the quality of students' motivation.

Similar findings come from studies in China. Parents from higher socio-economic backgrounds supported their children's sense of autonomy and self-determined motivation (Butler, 2014). These higher income parents were also more likely to provide a less-controlling and more nurturing environment for children learning a foreign language. Similarly, teachers in Korea attributed decreases in student motivation to teaching practices (Kim & Seo, 2012). Taken together, these studies indicate that the decreasing trend in motivation noted in previous studies may be a partial product of their environment, potentially remedied by providing better support for students' motivational needs. If this is so, students with positive perceptions of their teachers' support should show a lower decrease in motivation over time.

According to MEXT (2008), classroom teaching should support positive interest in and behavior toward language learning. Continuing in the traditions defined by previous language learning studies (Butler, 2014; Carreira et al., 2013; Nishida, 2013), we integrate self-determination theory and its minitheories with the concept of engagement to describe how elementary school learners develop a sense of positive autonomous motivation.

1.2. Self-determination theory and its minitheories

As a broad theory of human motivation across domains, SDT attempts to organize the numerous aspects of motivation,

including how and why people do what they do, the effects of the environment, and personal needs and goals (Deci & Ryan, 1985). According to Reeve (2012), SDT is "a macrotheory of motivation comprised of five interrelated minitheories" (p. 150). The three minitheories relevant to the current study are *organismic integration theory* (OIT), *basic psychological need theory* (BPNT), and *cognitive evaluation theory* (CET) (Ryan, Deci, & Vansteenkiste, 2016). Researchers have tested different combinations of these theories (cf. Carreira et al., 2013; Jang et al., 2012; Noels et al., 2000), but none have used all of them together in an empirical longitudinal model. In this study, we test all three theories alongside the concept of engagement to build a motivational model for foreign language learning.

1.2.1. Reasons why: Regulation of motivation

Self-determination theory posits that learners have a range of motives that can underpin their efforts at learning. This minitheory, called *organismic integration theory* (OIT), describes a set of behavioral regulation patterns, moving from external, controlled reasons to internalized, autonomous reasons. In broad terms, OIT describes why learners choose to engage in their schoolwork on a continuum from controlled to autonomous motivation.

Controlled motivation is comprised of motives whose locus of causality is outside of the person. It is represented by *external* and *introjected regulations*. Under external regulation, students complete tasks in order to get praise, rewards, or avoid negative consequences. Extrinsically regulated behavior disappears quickly after the rewards disappear (Deci, Koestner, & Ryan, 2001). Introjected regulation comes from a sense of "ought-to," shame or other social pressure associated with a task. This form of regulation is brought about by a desire not to seem incapable in the eyes of classmates, or to receive positive regard from parents or teachers. These two categories of maladaptive motivation can be used together (Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009), but also may appear as separate and distinct sets of motives (Carreira, 2012; Noels et al., 2000). Students with more controlled motives generally show less effective time management and greater anxiety (Senécal, Julien, & Guay, 2003), and ultimately lower achievement (Soenens & Vansteenkiste, 2005).

The opposite of controlled motivation, autonomous motivation, is defined by two types of regulation: *identified* and *intrinsic regulation*. Prior studies have measured these two regulations together as autonomous motivation (e.g., Vansteenkiste et al., 2009). Identified regulation refers to how individuals perceive personal value in learning. This presents as a desire to learn for tangible or intangible future gains, such as attaining the skills necessary for a dream job, becoming part of a desired target community, or other instrumental outcome (Noels, 2013). Intrinsic regulation is characterized as a belief that the learning task is stimulating, that accomplishment in and of itself is worthwhile, and that studying and knowing new things is pleasurable (Noels et al., 2000). Autonomously motivated students use more deep-level learning strategies (Vansteenkiste et al., 2005) and achieve better grades (Soenens & Vansteenkiste, 2005).

Studies have replicated the internal to external continuum from autonomous to controlled motivation presented by organismic integration theory to describe motivation for learning a foreign language (Noels et al., 2000). Other research using this aspect of SDT has been conducted in Japanese elementary schools, (Ando, Fuse, & Kodaira, 2008; Carreira, 2012; Oga-Baldwin & Nakata, 2017; Yamauchi & Tanaka, 1998), showing support for the theory. In some of these studies, students' responses indicated a three-factor solution, with identified and introjected regulations factoring together (Ando et al., 2008; Carreira, 2012), while others indicated a four-factor solution (Oga-Baldwin & Nakata, 2017; Yamauchi & Tanaka, 1998). Ando et al. (2008) sample came from

a large group of third through sixth grade students, while the others focused only on students in fifth and sixth grades. In all of these studies, the patterns of correlation were largely consistent with OIT, though the slight differences in results and cross-sectional nature of these studies make it difficult to conclude any specific developmental trends.

More recently, researchers have used aspects of the continuum to show how the learning environment positively correlates with Japanese elementary schools students' autonomous motivation to study English (Carreira et al., 2013). Other cross-sectional studies have shown a positive relationship between engagement and motivational regulation (Oga-Baldwin & Nakata, 2017).

1.2.2. Autonomy, relatedness, and competence needs: motivational nutrients

Basic psychological needs theory is conceptualized under the assumption that human beings thrive under situations where their basic psychological needs are met. Just as people require clean air and water, nutritious food, and sufficient exercise for optimal physical functioning (Ryan & Deci, 2002), these needs are theorized to nourish and sustain high quality motivation and psychological wellness. For the sake of parsimony, SDT recognizes three basic needs: the need to feel a connection to others (Baumeister & Leary, 1995), referred to as the need for *relatedness*; the need to feel capable of influencing the surrounding environment in a meaningful way (White, 1959), titled the need for *competence*; and the need to feel a sense of personal causality and volition in one's actions (deCharms, 1968), referred to as the need for *autonomy*. As people are social animals, these needs are necessarily interrelated (and in most contexts they are highly correlated; Deci & Ryan, 2000) and reciprocally influence one another. A threat to any one need hinders optimal functioning.

Applied to the field of education, need satisfaction has been used to explain students' classroom engagement (Jang, Reeve, Ryan, & Kim, 2009). Longitudinally, autonomy need satisfaction has been shown to mediate the influence of the classroom on students' engagement and achievement (Jang et al., 2012). Researchers have connected need satisfaction to autonomous motivation in various language learning settings (Carreira et al., 2013; McEown, Noels, & Saumure, 2014; Noels, 2013).

1.2.3. Autonomy support, structure, and teaching

According to the final minitheory, *cognitive evaluation theory*, teachers create a motivationally supportive environment through the use of interesting activities, timely feedback, judicious rewards, acceptance of students' affect, and culturally appropriate expectations (Reeve, 2012). Teachers may control students toward a single desired behavioral outcome through rewards and punishments, or may focus on providing students with the resources to feel initiative and choice in learning by focusing on autonomy-support (Deci et al., 2001). As described by Reeve (2012), "autonomy-support is whatever a teacher says and does during instruction to facilitate students' perceptions of autonomy and experiences of psychological need satisfaction" (p. 167). This definition allows for broad interpretation across cultures while retaining the essential underlying concept that support for the person's basic psychological needs is essential to good teaching. Because autonomy refers to the support of student's willingness and volition rather than "independence" or separateness, teachers' support for learners' autonomy remains an important factor even in cultural settings high in collectivism (Jang et al., 2009). In foreign language educational settings, autonomy-supportive teaching helps to promote autonomous motivation (Carreira et al., 2013; Noels, Clément, & Pelletier, 1999).

In education, the quality of support for students' needs is often balanced against the idea of structure, the form that instruction

takes. Structured teaching is clear, well-organized, appropriately paced, provides feedback, and builds new knowledge (Jang, Reeve, & Deci, 2010). Studies have shown that this aspect of instruction is positively correlated with autonomy support (Sierens, Vansteenkiste, Goossens, Soenens, & Dochy, 2009), sometimes inextricably so (Oga-Baldwin & Nakata, 2015). Thus, both the form and the quality of instruction are an integral part of the motivational process in classrooms.

Taken together, the organismic integration, basic psychological needs, and cognitive evaluation theories explain why people act, what sustains their action, and how they perceive their environment. However, these theories by themselves do not account for the action itself. This leads to the question of what students actually do, feel, and think during their studies; in short, their engagement. Given that behavior and enjoyment are explicitly mentioned as part of the Course of Study (MEXT, 2008), engagement should be considered an integral aspect of a dynamic process leading toward the goal of motivational development.

1.3. Engagement: energy in action

Recently, researchers have integrated SDT concepts such as need satisfaction, structure, and support with the idea of *engagement* (Jang et al., 2009, 2010, 2012; Skinner, Furrer, Marchand, & Kindermann, 2008, etc.) Different from motivation, engagement represents the temporary state where students are acting, studying, and doing. Where motivation is the potential and direction of students' energy, engagement is that energy being used to learn actively. Research into supportive teaching has used engagement as a dynamic pivot point in the process of classroom motivational growth (cf. Jang et al., 2012; Skinner et al., 2008). In these models, the classroom environment both influences and is influenced by the degree to which students enjoy their studies, pay attention, and think actively in a virtuous circle. Likewise, when students feel the classroom exerts a negative impact on them, they are likely to "turn off" and enter a vicious cycle of maladaptive beliefs and behaviors with regard to the school environment (Jang, Kim, & Reeve, 2016; Skinner et al., 2008).

Engagement is a multifaceted concept (Fredricks, Blumenfeld, & Paris, 2004). Students may work hard, pay attention in class, and complete their assignments as a form of *behavioral* engagement. They may find the class enjoyable, fun, and interesting, which represents *emotional* engagement. They may find their assignments and activities to be challenging, causing them to think deeply and use their abilities to the fullest, which represents *cognitive* engagement.

Together, these forms of engagement have shown meaningful effects on achievement (Jang et al., 2012, 2016), and further positive reciprocal effects on teachers' attitudes and behaviors toward students (Skinner & Belmont, 1993; Skinner et al., 2008). Engagement predicts students' self-efficacy and goals over time (Reeve & Lee, 2014). Positive engagement has shown direct effects on students' learning and achievement (Jang et al., 2012). Teachers may also be more able to recognize engagement than motivation (W. Lee & Reeve, 2012). This concept thus represents a crucial element in the process of describing both how students learn in the classroom and how these selfsame students are perceived by their teachers.

According to recent theory (Reeve, 2012), engagement should positively support and maintain students' motivation over time. Oga-Baldwin and Nakata (2015) demonstrated a predictive relationship of a well-structured and supportive environment on students' in-class engagement in Japanese elementary classes. More recent work has shown that engagement may positively predict more autonomous motivation, while negatively predicting more controlled motives (Oga-Baldwin & Nakata, 2017). As a direct

result of engaging with learning material, students developed more high-quality autonomous motives. Thus, engagement may act as a central pivot for the development of motivation (Heckhausen, 1991; Reeve & Lee, 2014), mediating the influence of the classroom and prior motivation on future motivation.

1.4. Why an amalgamated model is needed

The major concepts of SDT and engagement have been studied within the realm of general education. At the same time, few empirical studies to date have demonstrated how elementary students develop motivation to learn a foreign language longitudinally; prior research in Japan (Carreira et al., 2013; Nishida, 2013) has only employed cross-sectional models. Oga-Baldwin and Nakata (2017) found a positive relationship between engagement and different motivational regulations, but did not measure the classroom environment or need satisfaction. Carreira et al. (2013) showed the most complete cross-sectional model using CEP, BNPS, and intrinsic motives, but did not include the full continuum of motivational regulation, nor did they show any connection with engagement. These findings, along with others from recent longitudinal models (Jang et al., 2012, 2016; Wang & Eccles, 2013) offer the foundations for an amalgamated model of motivational development across a single school year.

As noted, the Course of Study (MEXT, 2008) makes the development of interest, desire to learn, and positive behavior through positive learning experiences a central policy goal; these concepts match with engagement and autonomous motivation. Organismic integration theory defines the desired quality of motivation as emphasized in this policy (Ryan & Deci, 2002). Basic psychological needs theory predicts that autonomy, relatedness, and competence support autonomous motivation and engagement (Jang et al., 2009). Cognitive evaluation theory provides a mechanism for how students' needs may be met by the environment (Skinner et al., 2008). Engagement represents what students do, think, and feel in a real classroom setting, and may help explain the development of motivation (Reeve, 2012; Reeve & Lee, 2014). By amalgamating these theoretical elements, we seek to illustrate how classrooms may help to sustain elementary school students' language learning motivation (Reeve & Assor, 2011).

2. Research questions and overview

In order to answer the broader question of how teachers can build and maintain young language learners' motivation (Butler, 2015), we constructed a longitudinal model of how motivation develops through the process of learning a foreign language in a Japanese elementary school classroom. This study represents the first fully latent longitudinal test of these theories together in a foreign language classroom setting. While previous tests of theory have used mean-based path analyses (Carreira et al., 2013), use of fully latent methods allow for inclusion of measurement error from multiple indicators in the model and therefore to correct estimates for it (Kline, 2011). All of the constructs investigated are multifaceted (Fredricks et al., 2004; Ryan & Deci, 2002), and thus should be represented by a latent modeling framework using multiple indicators rather than reducing the data to mean scores.

Based on the classroom motivation and engagement literature, we constructed a hypothetical model. We sought to measure both self and environment (Ushioda, 2013). In this model, the term "prior motivation" refers to the three different motivational regulations (autonomous, introjected, external) as measured at the beginning of the school year, while "outcome motivation" refers to the motivational regulation variables at the end of the school year. We expected students to be high in intrinsic motivation from

the outset, based in the MEXT policies focused on facilitating zest for learning. We constructed the model to answer the following research questions:

1. To what extent does students' prior knowledge of English predict motivation and classroom processes?

Hypothesis 1. Prior vocabulary proficiency was expected to predict all variables in the model, reflecting the relationship between previous ability on subsequent on academic and motivational outcomes (Hattie, 2009).

2. To what extent do prior motivations predict perceptions of teacher support, need satisfaction, and engagement?

Hypothesis 2. Prior motivation was expected to predict students' perceptions of teachers' support, need satisfaction, and engagement. Autonomous motives were expected to show a positive effect, and extrinsic motives expected to have a negative relationship (Cohen & Katz, 2015; Reeve, 2012).

3. To what extent do teacher support and need satisfaction predict engagement?

Hypothesis 3. Consistent with robust findings across paradigms and environments (Jang et al., 2012; Skinner et al., 2008; Wang & Eccles, 2013; etc.), teacher support and need satisfaction were expected to positively predict student engagement.

4. To what extent does prior motivation predict outcome motivation?

Hypothesis 4. Prior motives were expected to predict outcome motives at the end of the year. Each motive was expected to predict itself, but also show cross-lagged effects. More autonomous prior motives will negatively predict more external outcome motives, and more external prior motives will negatively predict more autonomous outcome motives.

5. To what extent does in-class engagement predict outcome motivation?

Hypothesis 5. We expected that self-reported engagement would positively predict outcome autonomous motivation, and negatively predict more external regulations (Carreira et al., 2013; Oga-Baldwin & Nakata, 2017; Reeve, 2012).

6. To what extent do motivation and classroom engagement predict teacher assessments?

Hypothesis 6. Engagement, prior motivation, and outcome motivation were expected to predict teachers' assessments of each individual student, while external regulation at both times will negatively predict teacher assessment (Jang et al., 2012).

7. To what extent is self-reported engagement visible to outside observers?

Hypothesis 7. Independent of the structural equation model, external raters' assessments of engagement were expected to positively correlate at greater than 0.3 with students' self-reported engagement (Butler & Lee, 2006; Nave, Sherman, & Funder, 2008).

3. Methods

3.1. Participants

The current sample came from seven schools in a suburban school district in western Japan. Five-hundred and fifteen 5th-year students (female $n = 253$; age 10–11) in 16 classes at seven

schools completed surveys during the 2013–2014 school year. Several students had absences due to illness at one point during the course of the year. Surveys were administered at five times during the 2013 school year: once in April 2013, once in May, once in October, once in January 2014, and finally in March. The sixteen homeroom teachers attached to each class were given student assessment surveys at the end of the school year in March.

This research was approved by the [University] Ethics Review Board. Permission to conduct the research was also provided by the local board of education. Participating principals volunteered to have their schools join the study, and individual teachers were approached to obtain agreement. Participants were informed of the scope and aims of the study before agreeing to participate with signed permission forms. Fifth-year classes were chosen for the target population as it is the first year targeted for foreign language study in Japanese elementary schools (MEXT, 2008).

3.2. Instruments

Survey instruments were designed to represent the specific theories describing the interaction between the person, their actions, and the environment. The survey instruments used, the theories they represent, and sample items are presented in Table 1.

Prior to taking surveys, students completed a 20-item vocabulary pre-test at the beginning of April 2013. Students were asked to identify English vocabulary words from pictures selected from the curriculum. As a small but not insignificant number of foreign loanwords have been imported into the Japanese language, test items were selected from English words not commonly used in daily life in Japan. Students were asked to demonstrate word knowledge productively, and allowed to write either the Japanese phonetic reading (*katakana*) or English spelling of the items. Usage of Japanese phonetic writing and incorrect spelling were not penalized when they indicated the correct word. Scores ranged from 0 to 20. The overall mean score was roughly 31%, or 6 correct items. This test was administered during the first weeks of the semester, roughly a week before students completed their first surveys.

Survey instruments were based on previous research and instrument validations conducted in the SDT paradigm (Carreira, 2012; Yamauchi & Tanaka, 1998). As Weeks, Swerissen, and Belfrage (2007) recommend, items were tested through translation and back translation, then focus group participants re-wrote items together in groups to provide the most comprehensible wordings. Wordings were validated through focus groups with elementary students and teachers at each of the seven participating schools. These focus groups were designed to elicit the natural wordings

that students and teachers use when discussing the concepts relevant to this study (Devellis, 2012). We conducted these groups in order to achieve the best emic representations of the motivational constructs in question (King & McInerney, 2014) and achieve wordings that were most likely to be comprehensible to the larger population of students. Groups then listened to explanations of the different theoretical factors (e.g., autonomy, intrinsic regulation, engagement, etc.), then sorted items into discrete categories. Wordings and categorizations were deemed acceptable only when more than half of the participants agreed. This a priori cutoff was used in order to achieve the greatest consensus and maintain the minimum number of indicators necessary to create an appropriate latent factor (i.e., 3 indicators; Kline, 2011, pp. 114–115).

The quality of students' motivation was measured at two time points with a twelve-item Japanese version of the self-regulation questionnaire (SRQ-A; Carreira, 2012; Ryan & Connell, 1989; Yamauchi & Tanaka, 1998). Scales showed acceptable internal reliabilities (>0.70; Devellis, 2012; see Table 2). While studies have found evidence for discriminant validity between intrinsic and identified regulations (Oga-Baldwin & Nakata, 2017), in order to avoid difficulties occurring when predictors are highly correlated (>0.8; Tabachnick & Fidell, 2007), these two variables were treated as a single latent factor representing autonomous motivation. Prior studies using the SDT framework have also employed this conceptualization of autonomous motivation (e.g., Vansteenkiste et al., 2009). Introjected and extrinsic regulations were treated as separate factors. Scales ranged from 1 (“<50% true for me”) to 5 (“>90% true for me”). A comparative EFA from the pilot study is presented in Appendix 1.

Students' perceptions of their teacher were measured using a measure of supportive teaching (five items, Cronbach's $\alpha = 0.70$; Oga-Baldwin & Nakata, 2015). Students' autonomy, relatedness, and competence (ARC) needs were measured using the nine-item Activity Feeling Scales (AFS; Jang et al., 2009; Reeve & Sickenius, 1994; Cronbach's $\alpha = 0.87$). As noted in theoretical work (Ryan & Deci, 2002), all three needs are necessary to appropriate psychological functioning. Where previous models have used means-based path analyses to show differential effects of each factor, fully latent longitudinal models using the same scales have treated these as a single latent variable (Jang et al., 2012, 2016). Scales for both supportive teaching scales and the AFS ranged from 1 (“<50% true for class today”) to 5 (“>90% true for class today”). Alternative constructions and the justification for the use of a single latent variable are presented in Appendix 2.

Consistent with prior longitudinal models (Jang et al., 2012; Reeve & Lee, 2014), engagement was measured as a single

Table 1
Theoretical elements and their instrumentations in the model.

Theoretical element	Instrument	Example items
Organismic integration theory	Self-Regulation Questionnaire–Academic (3 factors) Autonomous regulation (6 items)	I'm interested in English I want to be able to use English in the future I want my friends to think I'm good at English
	Introjected regulation(3 items) External regulation (3 items)	If I don't participate my teacher will get angry My teacher gives clear explanations
Cognitive evaluation theory	Teacher support scale (1 factor, 5 items)	I felt I wanted to learn more English
	Basic needs theory	Activity Feeling Scales (1 factor, 9 items)
Engagement	Engagement scales (1 factor, 11 items)	I paid attention in today's class I was interested in today's class I tried to comprehend my teacher's English
Prior proficiency	Vocabulary Pre-test (20 items; mean score)	Concrete words from the curriculum: ruler, twelve, globe
	Learning outcomes	Teacher assessment (1 factor, 4 items)

Table 2
Latent factor correlations, intraclass correlations, descriptive statistics, and internal reliabilities.

Latent	ICC	1	2	3	4	5	6	7	8	9	10
1. Autonomous Reg. April	0.04	–	0.30 ^{***}	–0.56 ^{***}	0.27 ^{***}	0.41 ^{***}	0.32 ^{***}	0.57 ^{***}	0.02	–0.48 ^{***}	0.29 ^{***}
2. Introjected Reg. April	0.03		–	0.16 ^{**}	0.14 ^{**}	0.18 ^{**}	0.17 ^{**}	0.21 ^{***}	0.57 ^{***}	0.01	0.07 [*]
3. External Reg. April	0.05			–	–0.19 ^{***}	–0.16 ^{**}	–0.18 ^{***}	–0.32 ^{***}	0.08	0.51 ^{***}	–0.16 ^{***}
4. Supportive Teaching June	.14				–	0.46 ^{***}	0.59 ^{***}	0.39 ^{***}	0.17 ^{***}	–0.27 ^{***}	0.17 ^{***}
5. Need Satisfaction October	0.08					–	0.51 ^{***}	0.41 ^{***}	0.13	–0.27 ^{***}	0.19 ^{***}
6. Engagement January	0.16						–	0.60 ^{***}	0.26 ^{***}	–0.38 ^{***}	0.25 ^{***}
7. Autonomous Reg. March	0.08							–	0.27 ^{***}	–0.56 ^{***}	0.28 ^{***}
8. Introjected Reg. March	0.04								–	0.28 ^{***}	0.05
9. External Reg. March	0.07									–	–0.20 ^{***}
10. Teacher Assessment March											–
Mean		3.73	1.94	2.48	4.04	3.64	3.89	3.81	2.06	2.46	3.31
SD		0.90	0.88	1.06	0.71	0.78	0.75	0.88	0.87	0.96	1.02
95% CI		3.65	1.86	2.39	3.91	3.57	3.83	3.72	1.98	2.38	3.21
		3.81	2.02	2.57	4.10	3.70	3.96	3.89	2.13	2.55	3.40
Cronbach's Alpha		0.87	0.72	0.73	0.70	0.87	0.91	0.89	0.78	0.73	0.94

* $p \leq 0.05$.

** $p \leq 0.01$.

*** $p \leq 0.001$.

construct, using items representing cognitive, emotional, and behavioral engagement (eleven items, Cronbach's $\alpha = 0.91$). All scales were tested previously with independent samples (Oga-Baldwin & Nakata, 2015; Oga-Baldwin & Nakata, 2017). As with other measures, this scale ranged from 1 (“<50% true for class today”) to 5 (“>90% true for class today”).

Homeroom teachers assessed individual students' in-class interest, behavior, motivation, and English ability according to the goals outlined by the Ministry of Education (MEXT, 2008). According to the national curriculum policy, summative assessment, especially testing, is to be avoided, in part due to the potential negative impact it may have on motivation. Due to these policy constraints, summative post-tests were not permitted by schools or boards of education. Outcome measures instead used teachers' assessment of students' language abilities and quality of motivation (Moore, Lippman, & Ryberg, 2015). This assessment measure should be noted, as no prior studies of elementary school motivation in Japan have used outcome measures. Maintaining consistency with other measures, a 5-point scale was used, ranging from 1 (“50% true or less for this student”) to 5 (“90% true or greater for this student”). This scale was chosen as an attempt to reflect a rating of degree of accuracy rather than a frequency rating (i.e., “Students often do this”; “Students are rarely like this”), the latter of which has shown weaker psychometric fit (Mizumoto & Takeuchi, 2009). Further, ratings reflecting a more precise level of applicability may overcome previously noted cultural tendencies toward non-committal answers (i.e., marking toward the center of the scale; Reid, 1990). Internal reliability for this measure was good (Cronbach's $\alpha = 0.94$).

In order to measure engagement externally, videos were taken of students' in-class performance and behavior. Two trained raters were instructed to watch the whole class and rate activity levels for each minute of the class, leading to roughly 40 observations per class. Using a 5-point rating system, raters documented full class engagement on a scale ranging from 1 (“all students off-topic, bored, or mindless”) to 5 (“all students working, interested, or thinking”). Raters were selected from a group of 4th-year university teacher trainees who had completed their teaching practicum and were preparing to enter the teaching practice in Spring of 2014. The observations were conducted in the fall and winter of 2013–2014. Rater training was minimal to allow for naïve assessment as might be made by non-scholarly observers, such as parents, teachers, and administrators. Inter-rater reliability was calculated using Pearson's correlation coefficient, showing acceptable agreement ($r = 0.93$, $p < 0.001$).

3.3. Analyses

Latent analysis was undertaken using MPlus 7 (Muthén & Muthén, 2012) using the weighted least squares mean and variance corrected (WLS-MV) estimator for all structural equation models. As Likert data may be considered ordered categorizations rather than truly continuous (Carifio & Perla, 2007), we used weighted least squares estimation for its ability to model non-normal ordered categorical data (Muthén & Muthén, 2012). Fit cutoffs were set at RMSEA < 0.08, CFI > 0.9, TLI > 0.9 for an acceptable model, with RMSEA < 0.06, CFI > 0.95, TLI > 0.95 deemed to demonstrate good fit (Kline, 2011). No item error correlations were used.

Missing data due to student absences or non-response was 3.3% of the total volume of data. Missing data from individuals absent at one time point or from non-answered questions was handled in MPlus using Full-Information-Maximum-Likelihood estimation in order to handle the 66 cases with missing data (Schafer & Graham, 2002).

The nested nature of the data (i.e., participants nested within classes) was accounted for using cluster-robust standard errors. For this analysis, each individual class was treated as a cluster. Intraclass correlations ranged from 0.05 to 0.16. The ICCs for each of the variables considered are presented in Table 2. While the intraclass correlations for the variables were large enough to justify a multilevel approach, the number of level 2 clusters was potentially small enough to lead to bias (< 50; Maas & Hox, 2005) and other computational issues (Steenbergen & Jones, 2002); thus we chose to account for potential nesting issues with cluster-robust standard errors. Engagement had the strongest ICC, indicating the largest between cluster differences. We treated this separately through the use of external validation of engagement in each individual class.

To validate the engagement measures, class self-report means were correlated with the mean score of both raters' assessments of collective engagement. Previous work has indicated that independent ratings of individuals exceeding 0.3 (as a moderate effect size; Cohen, 1992) may be useful for explaining behaviors and attitudes (Nave et al., 2008).

4. Results

An initial confirmatory factor analysis indicated that all factors were adequately represented by the indicators. Factor analysis results demonstrated good fit, $\chi^2(1280) = 1492.254$, $p < 0.001$,

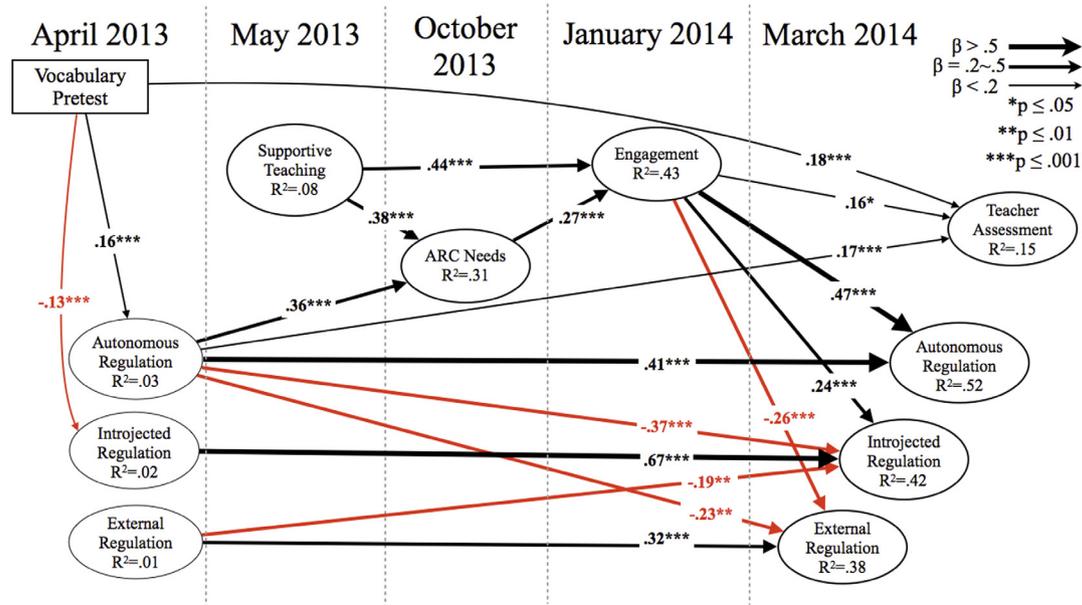


Fig. 1. Final model results. Latent covariances for external, introjected, and autonomous regulations are not displayed. Non-significant paths have been removed.

RMSEA = 0.018 [CI = 0.014, 0.022], CFI = 0.97, TLI = 0.97. Standardized factor coefficients ranged from 0.38 to 0.98, indicating sufficient internal factorial validity. Items and their wordings are presented in Appendix 3. Latent variables had low to moderate correlations (from 0.00 to 0.62). Table 2 displays the factor correlations and descriptive statistics.

The full model with standardized structural regression coefficients is presented in Fig. 1. The structural model fit the data well, $\chi^2(1329) = 1527.003$, $p < 0.001$, RMSEA = 0.017 [CI = 0.012, 0.021], CFI = 0.97, TLI = 0.97. The model and its components will be explained referring to each of the original hypotheses.

Vocabulary proficiency weakly predicted autonomous motivation ($\beta = 0.16$, $p < 0.001$) and teacher assessment ($\beta = 0.18$, $p < 0.001$). The pre-test scores negatively predicted prior introjected regulation ($\beta = -0.13$, $p < 0.001$). No other significant correlations from Hypothesis 1 were found in the model.

No prior motives significantly predicted supportive teaching or engagement, but autonomous regulation significantly predicted need satisfaction ($\beta = 0.36$, $p < 0.001$). This confirms the theoretical relationship between autonomous motivation and need satisfaction, but no other relationships from Hypothesis 2.

The model successfully confirmed Hypothesis 3. Supportive teaching predicted engagement ($\beta = 0.44$, $p < 0.001$), partially mediated by need satisfaction ($\beta = 0.27$, $p < 0.001$). The structural model explained 44% of the variance for engagement.

Using Cohen's (1992) criteria, one large and two medium auto-regressive relationships was found on motivational regulations over time ($\beta_{\text{autonomous-autonomous}} = 0.41$, $p < 0.001$, $\beta_{\text{introjected-introjected}} = 0.67$, $p < 0.001$, $\beta_{\text{external-external}} = 0.32$, $p < 0.001$). Autonomous motivation had a medium-sized negative predictive relationship on introjected regulation ($\beta_{\text{autonomous-introjected}} = -0.37$, $p < 0.01$), while external regulation had a small relationship ($\beta_{\text{external-introjected}} = -0.25$, $p < 0.05$). Autonomous regulation negatively predicted external regulation ($\beta_{\text{autonomous-External}} = -0.23$, $p < 0.01$). No other relationship from Hypothesis 4 was found. Differing from previous findings of statistically significant decrease across years in Japanese elementary schools (Carreira, 2006, 2011), autonomous motivation showed a slight, non-significant increase over time (April $M = 3.73$, March $M = 3.80$, $t = -1.87$, $p = 0.06$).

Support was also found for Hypothesis 5. Engagement showed a medium-sized predictive effect on autonomous motives ($\beta = 0.47$, $p < 0.001$). Engagement further showed a small positive relationship with introjection ($\beta = 0.24$, $p < 0.01$) and a small negative relationship with external regulation ($\beta = -0.26$, $p < 0.001$). The model predicted roughly 52% of the variance on autonomous motivation, 42% of the variance for introjection and 38% of the variance for external regulation.

Both engagement and prior autonomous regulation weakly predicted teachers' final assessment of students' in-class performance ($\beta_{\text{engagement-assessment}} = 0.16$, $p < 0.01$; $\beta_{\text{autonomous-assessment}} = 0.17$, $p < 0.001$). No other direct effects from students' self-report data showed a significant effect on teacher assessment. The total model accounted for roughly 15% of teachers' assessment, including non-significant effects.

Outside of the structural equation model, observed collective engagement showed a significant correlation with class mean self-reported engagement ($r = 0.57$, $p = 0.02$, 95% CI = 0.10–0.83). Table 3 shows the mean collective engagement score for each class as rated by observers and students. This correlation is consistent with other results using external triangulation of self-reports (Butler & Lee, 2006; Nave et al., 2008), and confirmed Hypothesis 7. Students' self-report ratings were generally higher than the external ratings, Raters' $M = 3.36$, Self-reported $M = 3.95$, $t = -6.58$, $p < 0.001$.

5. Discussion

In this study, we sought to demonstrate a model of how motivation to learn a foreign language develops over the course of a school year in a low-stakes, activity oriented learning environment (MEXT, 2008). Consistent with our hypotheses and self-determination theory (Ryan & Deci, 2002), our results show that motivation develops in this context at the intersection of the classroom and individual. Specifically, the quality of students' motivation at the end of the school year develops in relation to both their prior motives and their learning experiences. Further, by engaging students in learning tasks through appropriate support for their needs, teachers can help to build a sense of autonomous

Table 3
Mean external ratings and self-report ratings for engagement by class.

Class	Rater 1		Rater 2		Rater Mean	Self-reported Engagement	
	Mean (95% CI)	SD	Mean (95% CI)	SD		Mean (95% CI)	SD
A (n = 40)	3.77 (3.52, 4.02)	0.81	3.64 (3.42, 3.86)	0.70	3.71	3.48 (3.25, 3.72)	0.72
B (n = 39)	2.77 (2.59, 2.95)	0.57	2.95 (2.84, 3.06)	0.37	2.86	3.63 (3.39, 3.87)	0.67
C (n = 39)	3.58 (3.4, 3.76)	0.58	3.63 (3.45, 3.81)	0.58	3.61	3.53 (3.27, 3.78)	0.79
D (n = 39)	3.04 (2.8, 3.28)	0.77	3.04 (2.80, 3.28)	0.77	3.04	3.65 (3.32, 3.98)	0.97
E (n = 29)	3.42 (3.27, 3.57)	0.50	3.64 (3.39, 3.89)	0.81	3.53	4.15 (3.92, 4.37)	0.52
F (n = 29)	3.42 (3.27, 3.57)	0.50	3.40 (3.22, 3.58)	0.58	3.41	3.92 (3.71, 4.12)	0.48
G (n = 29)	3.25 (3.08, 3.42)	0.55	3.42 (3.25, 3.59)	0.55	3.34	3.88 (3.72, 4.04)	0.41
H (n = 29)	3.00 (2.87, 3.13)	0.41	3.00 (2.88, 3.12)	0.38	3.00	3.57 (3.24, 3.90)	0.83
I (n = 33)	2.64 (2.49, 2.79)	0.49	2.86 (2.75, 2.97)	0.35	2.75	3.74 (3.53, 3.94)	0.52
J (n = 36)	2.67 (2.45, 2.89)	0.70	3.08 (2.99, 3.17)	0.28	2.88	3.66 (3.39, 3.92)	0.76
K (n = 21)	3.53 (3.35, 3.71)	0.57	3.39 (3.22, 3.56)	0.56	3.46	4.45 (4.19, 4.71)	0.57
L (n = 34)	4.00 (3.77, 4.23)	0.73	3.59 (3.37, 3.81)	0.72	3.80	4.22 (4.00, 4.43)	0.57
M (n = 34)	4.30 (4.01, 4.59)	0.95	4.20 (3.91, 4.49)	0.92	4.25	4.51 (4.27, 4.74)	0.65
N (n = 33)	3.26 (3.01, 3.51)	0.80	3.17 (2.92, 3.42)	0.80	3.22	4.20 (3.91, 4.46)	0.78
O (n = 25)	3.37 (3.13, 3.61)	0.79	3.37 (3.17, 3.57)	0.66	3.37	4.25 (4.03, 4.48)	0.49
P (n = 25)	3.77 (3.52, 4.02)	0.81	3.64 (3.42, 3.86)	0.70	3.71	4.43 (3.96, 4.30)	0.53

motivation at the end of the school year. These findings support previous models of motivational development (Carreira et al., 2013; Jang et al., 2012; Skinner et al., 2008), and help to draw connections between them. The model provides empirical evidence for Reeve's (2012) hypothesis that engagement, developed through a need-supportive environment, may help to support and maintain autonomous motivation.

5.1. Research questions

RQ 1: To what extent does students' prior knowledge of English predict motivation and classroom processes?

Students' prior vocabulary knowledge showed limited effects on the overall model. Vocabulary test scores weakly predicted autonomous regulation, and negatively predicted introjected regulation. This is consistent with SDT, as students with greater knowledge would likely feel a greater sense of competence (one of the basic needs) and would be less likely to feel the need to demonstrate their knowledge to avoid threats to their ego (Ryan & Deci, 2002); they know they have the knowledge, and want to use it. Teachers showed some recognition of their vocabulary knowledge as well in their assessments. This may reflect the curriculum in elementary schools, which is primarily focused on teaching new words and phrases through games (MEXT, 2008).

RQ 2: To what extent do prior motivations predict perceptions of teacher support, need satisfaction, and engagement?

Students' prior autonomous motivation predicted their sense of need satisfaction. Consistent with research showing that more internally regulated students may have a more positive picture of teachers' support (Cohen & Katz, 2015; McEown et al., 2014), more

autonomously motivated students were more likely to feel their needs were being met in class, while lower quality motives (i.e., introjected and external regulations) showed no significant effects. Students' existing motivations when they come into a classroom setting thus may predict their perceptions of what they experience in the form of their need satisfaction. At the same time, no significant direct effects from motivation were found on teacher support or engagement. More autonomously motivated students did not perceive their teachers as more supportive, indicating that the quality of the instruction itself was independent of students' perceptions. We interpret the lack of a direct effect between motivation and engagement to mean that engagement here is situational, and thus more strongly connected with the classroom environment than students' existing motivation. Zero-order correlations corroborate this interpretation. Engagement correlated with the prior motivation variables, but betas became non-significant after controlling for the classroom variables.

RQ 3: To what extent do teacher support and need satisfaction predict engagement?

Both supportive teaching and need satisfaction predicted positive engagement, supporting Hypothesis 3. Teaching showed a slightly stronger relationship, indicating the importance of a supportive classroom environment. By providing a need satisfying environment, teachers simultaneously helped students to engage in positive ways. Results are consistent with other SDT research (Jang et al., 2009; Skinner et al., 2008), further showing that school environments do not always damage students' motivation, but can also be need supportive (Reeve & Assor, 2011), even in hierarchically oriented societies like Japan.

While prior autonomous regulation predicted need satisfaction, no prior motivational factors showed any direct relationship with

engagement, indicating that engagement is tied more strongly to the quality of the classroom environment than students' existing motivation. The relatively large effect sizes and coefficients of determination (R^2) values for both need satisfaction and engagement further indicate the predictive value of a supportive classroom.

RQ 4: To what extent does prior motivation predict outcome motivation?

In support of Hypothesis 4, learners' motivation showed a range of autocorrelations over time, showing one strong effect, and two medium sized effects (Cohen, 1992). Medium sized autolagged effects were found for autonomous and external regulations, and a strong effect was found for introjected. Results show that students' prior motivations predict themselves, indicating how students' reasons for studying at the beginning of their studies may affect motivation over the course of the school year. While the longitudinal correlations between the different regulations were comparatively weak, they were consistent with organismic integration theory, showing negative correlations between more and less autonomous motives. Unlike in previous cross-sectional studies (Carreira, 2006, 2011), students in this sample did not show decreases in the quality of their motivation; intrinsic motivation remained relatively stable. In light of the previously noted negative trend, this may offer some hope for foreign language education in the Japanese context.

RQ 5: To what extent does in-class engagement predict outcome motivation?

Engagement, influenced by the classroom environment, had a direct predictive effect on students' motivational orientations at the end of the year. This confirms Hypothesis 5. Based on these results, a crucial step in the process of supporting students' long-term motivation is providing an engaging learning environment, as hypothesized by Reeve (2012). While engagement alone did not predict motivation, the strong path from engagement to autonomous motivation corroborates previous findings of the relationship between engagement and motivation (Oga-Baldwin & Nakata, 2017; Reeve & Lee, 2014). Thus, while previous models have found evidence for a direct effect from supportive teaching and need satisfaction to autonomous motivation (Carreira et al., 2013), the current model suggests that engagement is an important mediating element in the teaching and learning process.

RQ 6: To what extent do motivation and classroom engagement predict teacher assessments?

Teachers were somewhat able to understand students' self-reported motivation and engagement in order to assess their ability, interest, and behavior. The effects for each were small, though this is consistent with other findings on the relationship between engagement, motivation, and assessment in other longitudinal studies of engagement (Jang et al., 2012; Reeve & Lee, 2014). This result confirms Hypothesis 6, but also differs from the results of Lee and Reeve (2012), who found self-reported engagement, but not motivation, to be salient and recognizable to teachers. We interpret the significant relationship between motivation and assessment to mean that prior motivation may be reflected indirectly throughout the school year, and teachers may come to recognize this in their subjective assessments.

RQ 7: To what extent is self-reported engagement visible to outside observers?

External raters' assessments of students' engagement broadly agreed with self-reports. The correlation found here between

students' self-report and raters' assessments ($r = 0.57$) is somewhat stronger than those in studies using independent rating of personality traits (e.g., Nave et al., 2008, etc.), and is consistent with other correlations found between self-reports and external assessments of on-task behavior in language learning (Butler & Lee, 2006). Engagement is thus visible to outsiders, providing further validation for the self-report model.

5.2. Implications

This model illustrates how learners may be influenced by their past motives, while also demonstrating the effects of teachers' support on students motivation. While existing motivation significantly, sometimes strongly, predicted itself within the model, need satisfaction and engagement also had dynamic effects over time. Motivation showed no direct effects on engagement; teachers' support did. Engagement thus functions as the central pivot point for much of the model, predicting both outcome motivation and teachers' evaluations. This indicates that what teachers do and say can have a positive influence on students' motivation over time.

Results showed a generally positive trend with regard to the motivational aspects of the classrooms surveyed. While students' motivation did not increase during the year, this may be taken as a positive sign for these school environs; prior findings have indicated a decrease as students grow older (cf. Carreira, 2011). This runs counter to the argument that decreases in intrinsic motivation are developmental (Carreira, 2006), and instead may indicate that these decreases have some relationship to the teaching and learning environment. This represents how engaging, supportive, and need-satisfying instruction in a low-pressure, low-stakes environment may positively influence students' motivation (Ryan & Niemiec, 2009).

The strong predictive value of prior motivation on outcome motivation is further evidence for the idea of a stable core of motivation found in previous research (Nakata, 2006), as well as the presence of a sense of autonomous motivation to learn beyond simply enjoying English. While motivation may ebb, flow, and change over time (Dörnyei, Ibrahim, & Muir, 2015), findings here indicate that these changes in motivation may also center around more stable beliefs that influence students' behavior indirectly over the course of an academic year.

5.3. Limitations and future directions

While results indicate the relative stability of motivation and the importance of teachers' support, how students change as individuals and the minutiae of how teachers may best provide that support is beyond the scope of the current investigation. The results display variable-centered but not person-centered statistics. Further, no qualitative observations of these classes have been discussed. Future studies on this topic will need to make use of qualitative observations and person-centered analyses. Qualitative observations will allow a finer discussion of the principles and practices of the most successful teachers in this cohort, while person-centered analyses may show the trajectories of the individual students. Testing motivational development from a person-centered perspective represents a critical direction for further research. Continuing the call from Butler (2015), providing more detailed context to the learning environment and the changes within the individuals may offer further insight into how young language learners develop autonomous motivation.

Additionally, this study focused on Japanese elementary classrooms that are embracing the MEXT (2008) approach that emphasizes variables known to support autonomy and intrinsic motivation. Thus there was a high level of autonomous motivation

and engagement in evidence. The findings should be generalized with caution in other L2 settings.

6. Conclusions

The current study details the first study detailing the development of Japanese elementary school students' motivation to learn a foreign language using external assessment under the current Course of Study. This research further represents one of the first truly longitudinal investigations of the cognitive evaluation, basic needs, and organismic integration minitheories from self-determination theory. The results demonstrate the coherence of the three theories, validated with external measures. Where previous measures of both elementary school language learning (Nishida, 2013) and motivational development (Jang et al., 2012) have modeled for time periods within a single school term, the current study measured the development of language learning motivation over the course of an entire school year.

These findings demonstrate how teachers may support students' motivation over the course of a school year by providing an engaging classroom experience. Teachers who provide appropriate need support and structure to their foreign language lessons help students to engage, which predicts student motivation at the end of the year. For teachers, this would imply that creating a clear, interesting, and well-paced learning environment is centrally important for foreign language learners. In this environment, students feel connected to their peers, capable of the tasks, and personally invested in their learning, and thus engage in the learning activities. Engagement in turn leads to more positive assessments from teachers. This rich and enjoyable language learning environment appears to alleviate the previously noted motivational declines that occur across school years, thus offering some hope for teachers wishing to develop motivation, positive affect, and a sense of growth and discovery for elementary school students learning a foreign language.

Compliance with ethical standards

Funding: This study was funded by a JSPS KAKENHI grant-in-aid for young scientists (B) [Funding ID number removed for peer review]

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.

Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.cedpsych.2017.01.010>.

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