Contributions of motivational components to L2 achievement through the mediation of learning strategies

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Abstract

This study investigated the relationships among intrinsic and extrinsic motivation, learning strategies, and second/foreign language (L2) achievement. A self-report questionnaire of the Motivated Strategies for Learning Questionnaire (MSLQ) was administered to 291 university students learning English in Korea to collect data about motivation and learning strategies, and L2 achievement was determined by the grade of an English reading course. The results of data analysis using the Pearson product moment correlation and structural equation modeling (SEM) were as follows: first, the correlations among intrinsic motivation, extrinsic motivation, self-efficacy, learning strategies, and achievement were all significant, with intrinsic motivation and self-efficacy the highest and intrinsic motivation and extrinsic motivation the lowest correlations. Second, the model (Model 4) explaining the contributions of extrinsic motivation and self-efficacy to achievement mediated by learning strategies fit the current data better than other competing models (Models 1, 2, and 3). Third, significant direct effects of extrinsic motivation and learning strategies on achievement were found, whereas a significant indirect effect of self-efficacy on achievement by way of learning strategies was detected. The implications of these findings were discussed in terms of the contributions of extrinsic motivation, self-efficacy, and learning strategy use to L2 achievement, followed by future study areas to shed further light on relations among motivational components, learning strategies, and L2 achievement.

1 Introduction

Numerous variables influence individual differences in success in second/foreign language (L2) acquisition (Dörnyei 2005; Skehan, 1991). Among these variables, motivation pertaining to inner drive to initiate and persist in learning tasks and learning strategies referring to behaviors and thought processes employed by learners to achieve a goal are crucial because these two variables contribute to L2 acquisition under the influence of teacher intervention (Dörnyei, 1998; Griffiths & Oxford, 2014).

Motivation is a multi-construct having different facets such as instrumental and integrative orientations, the L2 motivational self system, intrinsic and extrinsic motivation, and self-efficacy (Dörnyei, 1998; Gardner, 1985; Pintrich et al., 1991; Ryan & Deci, 2000; Ushioda, 2008). These facets of motivation appear to be independent and mutually exclusive, but they are conceptually related to and empirically found to overlap with each other (Csizér & Dörnyei, 2005; Noels et al., 2001; Pae,

2008; Pintrich & DeGroot, 1990; Taguchi et al., 2009). Learning strategies are commonly discussed in categories such as cognitive, metacognitive, social, and affective strategies, and the choice of learning strategies is determined by several variables including motivation and L2 learning contexts to which learners are exposed (O'Malley & Chamot, 1990; Oxford, 1990).

One of the motivational constructs popularly discussed in educational psychology is intrinsic and extrinsic motivation. Intrinsic motivation refers to a goal or reason that leads to an action because learners are interested in or curious about the action per se, whereas extrinsic motivation pertains to a goal or reason arising from extrinsic rewards or to avoid sanctions (Ryan & Deci, 2000). Another popularly discussed facet of motivational constructs is self-efficacy referring to perceived capabilities to carry out a task (Bandura, 1993; Pintrich et al., 1991). Regardless of the importance of intrinsic and extrinsic motivation and self-efficacy in learning in general and in L2 acquisition in particular, only limited studies on these motivational components have been conducted in the domain of L2 acquisition with inconsistent findings due to many variables including ethnicity and linguistic milieus, warranting more studies among diverse L2 learners (Cheng, 2018; Noels et al., 2001; Huang, 2008; Pae, 2008; Wen, 1997; Zhang et al., 2017).

The purpose of this study is to gather and add more data to previous findings by investigating the relations among motivation, learning strategies, and L2 achievement with a focus on how motivation and learning strategies contribute to achievement either uniquely or in tandem. To this end, a general model accounting for the contributions of intrinsic motivation, extrinsic motivation, and self-efficacy−the working definition of motivation in this study−to L2 achievement by way of learning strategies was developed. Then, four competing submodels (models hereafter) were constructed from the various combinations of motivation in the general model and tested to find the best fit model of the data, followed by the direct, indirect, and total effects of the predictive and mediating variables on L2 achievement.

The data about motivation and learning strategies were obtained using the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich et al. (1991) and analyzed by Pearson product moment correlation and structural equation modeling (SEM) among university students learning English in Korea. A self-report questionnaire of the MSLQ was chosen because this instrument has been used worldwide to investigate the role of motivation and learning strategies in learning with acceptable reliability and validity (Duncan & McKeachie, 2005; Huang, 2008; Pintrich et al., 1993). The criterion variable of achievement level was determined by the grade of an L2 reading course. These students were chosen because they were typical English as a Foreign Language (EFL) learners who showed individual differences in success in accordance with variables including the level of motivation and learning strategies used to overcome limited EFL learning contexts in terms of input, interaction, and output (Kong et al., 2018; Park, 1997). Therefore, the following three research questions were addressed by this study:

RQ 1: What are the correlations among intrinsic motivation, extrinsic motivation, self-efficacy, learning strategies, and L2 achievement?

RQ 2: What is the best fit model of the data accounting for the contributions of intrinsic motivation, extrinsic motivation, and self-efficacy to L2 achievement through the mediation of learning strategies?

RQ 3: What are the direct, indirect, and total effects of the variables on academic achievement in the best fit model obtained in RQ 2?

2   Review of literature

2.1   *Research on motivation*

The trailblazers in L2 motivation research are Gardner and Lambert (1972). Gardner (1985) referred to motivation as "the extent to which the individual works or strives to learn the language" in a specific learning context (p. 10). According to Masgoret and Gardner (2003), the components of

motivation consist of integrativeness, attitudes toward the learning situation, motivation, integrative motivation, and orientations to language study. Among these motivational components, motivation as measured by motivational intensity, desire to learn the target language, and attitudes toward learning the target language was highly correlated with achievement more than the other components. Instrumental and integrative orientations and integrativeness were closely related to language outcomes and to other facets of motivation such as the L2 motivational self system and intrinsic and extrinsic motivation (Csizér, & Dörnyei, 2005; Dörnyei & Csizér, 2002; Gardner & MacIntyre, 1991; Liu, 2007; Noels et al., 2000; Noels et al., 2001; Wen, 1997). It is worth noting that even though Gardner and Tremblay (1994) differentiated orientation referring to "reasons for doing" from motivation referring to "desiring to do," Ryan (1995) postulated that motivation includes motivational orientation. Thus, the meanings of orientation and motivation have often been used interchangeably in the literature of motivation across academia.

Extending the work conducted by Gardner and his associates, Dörnyei (2009) developed the L2 motivational self system which consists of the ideal L2 self referring to the ideal image with regard to L2 acquisition, the ought-to L2 self referring to the attributes one ought to possess to meet expectations or to avoid negative outcomes, and L2 learning experience concerning L2 learning experience and environment. Much research has been undertaken to validate the L2 motivational self-system and to relate this motivational system to language behaviors or efforts (Csizér, & Dörnyei, 2005; Dörnyei & Csizér, 2002; Kim & Kim, 2014; Kong et al., 2018; Kormos & Csizér, 2014; Taguchi et al., 2009). Confirming their earlier work, Csizér and Dörnyei (2005) found a seven-factor structure of the L2 motivational self-system among foreign language learners in Hungary: integrativeness referring to integrating with L2 speakers, instrumentality referring to the pragmatic benefits of L2 proficiency, attitudes toward L2 speakers, vitality of L2 community, cultural interest, milieu, and self-confidence. They reported that integrativeness immediately influenced by instrumentality and attitudes toward L2 speakers was the most important factor affecting efforts and language choice, and suggested that integrativeness be relabeled as the ideal L2 self (Taguchi et al., 2009).

One of the most well-known motivational studies in educational psychology is about intrinsic and extrinsic motivation under the theory of expectancy and value or self-determination (Eccles, 1983; Ryan & Deci, 2000). Intrinsic motivation concerns any type of behavior performed for its own sake, such as to experience satisfaction, interest, or satisfy curiosity, whereas extrinsic motivation concerns behavior performed as a means to an end, whether to get rewards, such as getting a good job or grade, to avoid punishment, or to succumb to pressures (Pintrich et al., 1991). Developing self-determination theory, Ryan and Deci (2000) speculated that extrinsic motivation consists of external, introjected, identified, and integrated regulation in ascending order of self-determination, while intrinsic motivation is connected with, and even leads to, extrinsic motivation, and vice versa, particularly when learners are self-determined. Regardless of the importance of intrinsic and extrinsic motivation in L2 acquisition, empirical research on motivation in these areas to date is sparse and inconsistent. In studies with bilingual students in Canada, Noels et al. (2000) and Noels et al. (2001) found significant relations between instrumental orientation and external regulation, and between integrative orientation and intrinsic motivation. Pae (2008) reported that among EFL learners in Korea, intrinsic motivation played a basic role affecting achievement by way of self-confidence and motivation determined by motivational intensity, desire to learning English, and attitudes toward learning English, and that other types of orientations such as instrumental and integrative orientations did not affect achievement. However, considering that Korean students are in general instrumentally oriented in learning English, like other Asian students in China and Taiwan, this finding needs to be further supported before making any conclusions (Liu, 2007; Yu & Downing, 2012; Warden & Lin, 2000; Wen, 1997).

Another motivational construct often discussed in the literature is self-efficacy referring to learners' perceived capabilities to carry out certain tasks. According to Bandura (1993), self-efficacy contributes to learning through complex learning processes including cognitive, motivational, and affective processes. Pintrich et al. (1991) categorized self-efficacy under the component of expectancy compared with intrinsic and extrinsic motivation under the component of value. Dörnyei

(1998) postulated that self-efficacy contributes to learners' expectancy for success by determining the amount of aspiration, efforts exerted, and persistence displayed. In general, previous studies on self-efficacy in educational psychology reported that intrinsic value and self-efficacy were significantly related to each other and predicted strategy use and performance in the classroom (Chen et al., 2004; Pintrich & DeGroot, 1990; Rao & Sachs, 1999; Zusho et al., 2003). However, Walker et al. (2006) reported no linkages between intrinsic value and self-efficacy. They also found that intrinsic motivation and self-efficacy uniquely contributed to deep learning strategies such as planning and elaboration and that extrinsic motivation contributed to shallow learning strategies such as rote memorization. Roshandel et al. (2018) investigated the relationship between motivation and self-efficacy by EFL students in Iran and found that motivational factors were significantly related to self-efficacy, with some variables such as intended efforts, attitudes to learn English, and the ideal L2 self predictive of self-efficacy more than other variables such as ought-to L2 self and integrativeness. Considering the lack and inconsistent findings of studies on self-efficacy in L2 acquisition, more studies need to be conducted to better understand the relations among self-efficacy, intrinsic and extrinsic motivation, and learning strategies, and how these variables work together to affect L2 acquisition.

2.2   Research on learning strategies

Research on language learning strategies referring to behaviors or thought processes used by language learners to facilitate learning more effectively has blossomed since the good language learner (GLL) studies with the recognition that some learners are more successful than others regardless of other variables such as age and learning contexts (Griffiths & Oxford, 2014; Rubin, 1975). O'Malley and Chamot (1990) classified learning strategies into three categories: cognitive strategies used to deal with learning materials; metacognitive strategies to plan, monitor, and evaluate; and socio-affective strategies to learn with other people and to regulate one's emotions. In consideration of the importance of memory and compensation in a language-specific domain, Oxford (1990) added memory strategies for storing new information and compensation strategies for overcoming lack of knowledge to the above classifications, and developed the strategy inventory for language learning (SILL) which has been widely used to measure learning strategies (Griffiths & Oxford, 2014; Hong-Nam & Leavell, 2006). In educational psychology, Pintrich et al (1991) classified learning strategies into two categories: cognitive and metacognitive strategies as defined by O'Malley and Chamot (1990) and resource management strategies which are concerned with students' management and control of various resources and tasks. These classifications of learning strategies indicate that language learning strategies can be explained by the social cognitive theory where individual learner characteristics, ethnicity, and language learning milieu play crucial roles in L2 acquisition (O'Malley & Chamot, 1990).

Research on learning strategies has been centered around attempts to put theory into practice by relating learning strategy use to classroom achievement. Under the umbrella of assumptions regarding "the more, the better," Green and Oxford (1995) and Park (1997) found that strategy use is positively related to L2 proficiency. Similarly, Pintrich and DeGroot (1990) showed that self-regulatory learning components played a more important role in classroom performance than motivational components in regression analysis. However, Vann and Abraham (1990) reported that unsuccessful language learners were also active learners and that what these unsuccessful learners lacked was appropriateness rather than a lack of storage of learning strategies. Furthermore, they displayed passiveness in applying learning strategies to various learning tasks. In terms of strategy instruction to help learners become strategic learners, Gunning and Oxford (2014) reported that those who received strategy instruction in general appeared more interactive from pretests to posttests and outperformed the control group. Understanding various factors such as motivation, ethnicity, and language learning contexts will help maximize instruction effects because these factors influence learning strategy use (Kormos & Csizér, 2014; Pintrich & DeGroot, 1990; Walker et al., 2005; Zhang et

al., 2017). Nevertheless, no studies to date have investigated how motivational factors such as intrinsic motivation, extrinsic motivation, and self-efficacy affect L2 acquisition mediated by learning strategies among EFL learners in Korea.

2.3 Triadic relations among Motivation, Learning Strategies, and L2 achievement: The models

Researchers in different learning contexts investigated the triadic relations among motivation, learning strategies, and L2 achievement with a focus on how motivation and learning strategies contribute either uniquely or in tandem to the criterion variable of achievement/performance or efforts/behaviors, using SEM which allows for structural paths between latent variables. Pae (2008) found that intrinsic motivation influenced L2 achievement mediated by motivation and self-confidence by EFL learners in Korea. Kormos and Csizér (2014) found that instrumentality and international posture affected the ideal L2 self, which in turn affected independent use of resources and technology through the pathways of self-regulatory strategies among language learners in Hungary. Zhang et al. (2017) found that learning strategies significantly mediated in the role of intrinsic and extrinsic motivation in vocabulary learning by EFL learners in China. The importance of instrumentality in L2 acquisition was also found in other studies where instrumentality contributed to the criterion measure mediated by integrativeness in Hungary (Csizér & Dörnyei, 2005) and by the ideal L2 self in China, Japan, and Iran (Taguchi et al., 2009).

Overall, motivation is a multiconstruct having different facets that are intricately interrelated with each other. For instance, instrumental orientation is related to extrinsic motivation/regulation, integrativeness can be relabeled as the ideal L2 self, and integrative orientation is associated with intrinsic motivation, which is in turn linked to self-efficacy (Csizér & Dörnyei, 2005; Dörnyei & Csizér, 2002; Noels et al., 2000; Noels et al., 2001; Pae, 2008; Taguchi et al., 2009). Compared with a wealth of work examining instrumental and integrative orientations and the motivational L2 self system influenced by the great works of Gardner (1985), Dörnyei (2005), and their associates, only limited research on intrinsic and extrinsic motivation and self-efficacy has been undertaken to date in L2 acquisition with inconsistent findings (Cheng, 2018; Noels et al., 2001; Huang, 2008; Pae, 2008; Wen, 1997; Zhang et al., 2017). Thus, more research on these motivational facets should be conducted in L2 acquisition in diverse learning contexts to shed further light on L2 motivation and learning strategies. In this study, the general model accounting for the contributions of intrinsic motivation, extrinsic motivation, and self-efficacy to achievement mediated by learning strategies was developed as shown in Figure 1. Then, four competing submodels/models on the basis of the combinations of predictive variables in the general model with the mediating variable being constant were developed and tested with EFL university students in Korea:
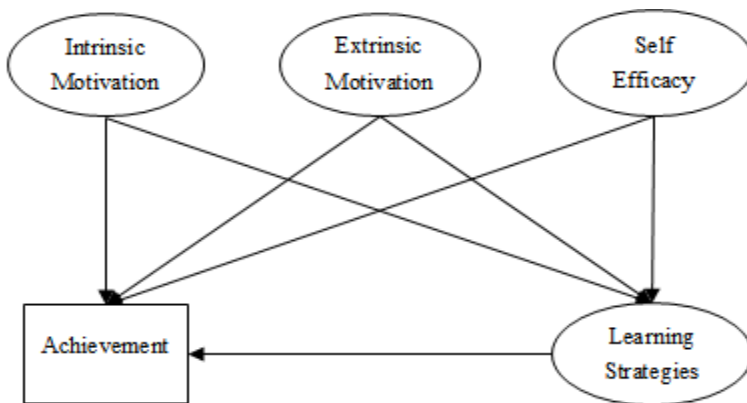

Fig 1. The General Model

Model 1 accounts for the contributions of intrinsic motivation, extrinsic motivation, and self-efficacy through learning strategies to achievement.

Model 2 accounts for the contributions of intrinsic motivation and extrinsic motivation through learning strategies to achievement.

Model 3 accounts for the contributions of intrinsic motivation and self-efficacy through learning strategies to achievement.

Model 4 accounts for the contributions of extrinsic motivation and self-efficacy through learning strategies to achievement.

3   Procedure

3.1   Participants

A total of 291 students taking English reading as a required course in six different colleges—humanities (117), social sciences (37), natural sciences (21), engineering (34), medical sciences (40), and medicine (42)—at a university in Korea voluntarily participated in this study. Most of the participants were freshmen (234) with sophomores (40), juniors (9), and seniors (8), with an average age of 19.5 (*SD*=1.4). More females (174) than males (117) participated because many participants were studying in the Humanities with a higher ratio of female to male students at the university.

The participants had studied English for four years in elementary school with a focus on listening and speaking skills, and for three years each in middle school and in high school with a focus on reading and listening skills. Regardless of the goal of communicative competence in teaching English across academia in public schools in Korea, speaking skills are ignored in teaching English in high school because of the Korean Scholastic Aptitude Test (KSAT) (Pae & Park, 2006). The English part of the KSAT consisting of 45 multiple-choice items with 17 items of listening skills and 28 items of reading skills plays a crucial role in English teaching in high school because universities select students in large part based on the scores of the high-stakes test. Considering a total of 10 years in public schools and interest in learning English as a lingua franca, the participants' English proficiency was assumed to be diverse showing individual differences in success from beginning to advanced levels depending on many factors including their perceived self-efficacy, level of motivation, and learning strategy use.

3.2   Measures

Three motivational components—intrinsic motivation, extrinsic motivation, and self-efficacy—and learning strategies were excerpted from a self-report questionnaire of the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich et al. (1991), which consists of motivation and learning strategy scales. The motivation scales are comprised of three subscales: value, expectancy, and affect. Intrinsic goal orientation (intrinsic motivation hereafter) and extrinsic goal orientation (extrinsic motivation hereafter) belong to the value scales including four items, respectively. Intrinsic motivation refers to students' engaging in the task for its own sake including items related to challenge and curiosity (e.g., "In a class like this, I prefer course material that really challenges me so I can learn new things."). Extrinsic motivation refers to students' participation in the task as a means to an end, including items related to getting a good grade and reward (e.g., "Getting a good grade in this class is the most satisfying thing for me right now."). As per the recommendation of Hair et al. (2010), items lower than the factor loading of 0.5 in the subsequent analysis of SEM were excluded. Thus, two items—the item (M24) "When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade." in the intrinsic motivation with the standardized estimate (factor loading) of 0.46, and the item (M30) "I want to do well in this class because it is important to show my ability to my family, friends, employer, or others." in

the extrinsic motivation with the standardized estimate of 0.12－were excluded from the data analysis. Self-efficacy for Learning and Performance (self-efficacy hereafter) belongs to the expectancy subscales including eight items. It pertains to performance expectation and self-appraisal of one's ability to master a task (e.g. "I expect to do well in this class." "I'm confident I can understand the basic concepts taught in this class.").

The learning strategy scales are comprised of two subscales: cognitive and metacognitive strategies and resource management strategies. Rehearsal and metacognitive self-regulation belong to cognitive and metacognitive strategies, including four and 12 items, respectively. Rehearsal strategies are used to recite or name items from a list in order to influence the attention and encoding processes in working memory (e.g., "I memorize key words to remind me of important concepts in this class."). Metacognitive self-regulation strategies are used to be aware of knowledge and to control cognition through planning, monitoring, and regulating (e.g., "I try to change the way I study in order to fit the course requirements and instructor's teaching style."). Effort regulation belongs to resource management scales, including four items. Effort regulation strategies are employed to make efforts despite potential distractions and uninteresting tasks (e.g., "Even when course materials are dull and uninteresting, I manage to keep working until I finish."). The composite scores of rehearsal, metacognitive self-regulation, and effort regulation constituted learning strategies throughout this study.

The MSLQ utilizes a 7-point Likert scale ranging from 1 (not at all true of me) to 7 (very true of me). When a student responds to 7 with a motivation item (e.g., "In a class like this, I prefer course material that really challenges me so I can learn new things.") or a learning strategy item (e.g., "I memorize key words to remind me of important concepts in this class."), it should be positively interpreted to mean that the student was highly motivated or that the student frequently used a learning strategy. However, some items are reversely coded, meaning that a student's response to 1 should be more positively interpreted than the student's response to 7 (e.g., "When course work is difficult, I give up or only study the easy parts."). The reverse-coded items should be coded reversely so that they can be used to compute composite scores with other positively coded items. The reliability and validity of the MSLQ as determined by Cronbach's alpha and factor analysis have been reported to be acceptable, and thus used in numerous studies to measure students' motivation and learning strategies (Duncan & McKeachie, 2005; Pintrich et al., 1993). In addition to the MSLQ, the participants' demographic information concerning college, academic year, gender, and age was gathered in order to contextualize the findings of this study.

The criterion variable of achievement was determined by the grade in an English reading course. The course, which was required at the university, was designed to help students read various topics on the world to improve their world knowledge as well as English reading ability. It was taught once a week for 100 minutes with a focus on skimming for main ideas, scanning for specific details, and guessing for the lack of linguistic knowledge, with the common text-book－New College English－chosen by the professors in charge. Even though grading was based on various activities including attendance, in-class participation, homework assignments, mid-term and final tests, the data were ultimately analyzed using the scores of the mid-term and final tests. Considering the importance of the mid-term and final tests for obtaining scholarships and a good job, the teachers made every effort to measure students' reading ability consistently and accurately. The items of the tests covered various types to determine students' reading abilities from different angles, including skimming, scanning, guessing, summarizing, and vocabulary and translation ability. The main test formats were multiple choice and short answer for the sake of consistency of the scores, with a few open-ended items for the sake of accuracy of reading ability. In accordance with the university's policy, grading had to be norm-referenced in the sense that each student's score was interpreted in comparison to the scores of others. The

students sincerely prepared for the achievement tests because they should take good care of their grade for benefits such as scholarships and future job opportunities, thus ensuing the quality of reading test scores.

3.3   Data collection and analysis

The author contacted the professors who were in charge of the English reading course, explained the purpose of this study, and asked for their assistance in the data collection process. After confirming their assistance, the following data collection tips were provided to the professors who helped collect the data. First, explain the nature of this study to the students briefly enough to awaken their interest but not excessively to prevent a possible Hawthone effect. Second, explain the benefits of participation by thinking in depth about their motivation for English reading and their use of learning strategies. All the participants were given a mechanical pencil and a three-colored pen as small presents for their participation. Third, ask the students to read each item of the questionnaire with care and respond to the item in honest. They were told that any questions with regard to responding to the items would be welcomed. Finally, ask the students to read the consent form and to respond the questionnaire when they want to participate in this study. In administering the data, every effort was made to get as accurate data as possible by helping provoke students' interest in this study and by creating a favorable data collection environment. It took about 40 minutes to explain the nature of this study and administer the data. All the data were coded into the SPSS file and analyzed using SPSS and AMOS.

4   Results

In order to provide information about variables and answer Research Question (1), the means, standard deviations, reliabilities, and correlations of variables were investigated, as shown in Table 1. All the mean scores of the working definition of motivation in this study—intrinsic motivation, extrinsic motivation, and self-efficacy—were higher than the mean score (m=4.29) of learning strategies with extrinsic motivation (m=5.6) the highest mean score. The reliability of all the variables was higher than the appropriate level of 0.6, with the highest reliability (Cronbach's alpha=.90) for self-efficacy and the lowest reliability (Cronbach's alpha=.62) for intrinsic motivation (Pallant, 2001). Since the reliability coefficient is sensitive to the number of items, the relatively low reliability of intrinsic motivation might be in part due to the limited number of items (three items). The correlations between all the variables were significant, with the highest correlation (r=.83) between intrinsic motivation and self-efficacy and the lowest correlation (r=.21) between intrinsic motivation and extrinsic motivation. The high correlation between intrinsic motivation and self-efficacy implies that these two variables may be tapping into the same construct.

Table 1. Understanding variables: Mean scores, reliabilities, and correlations

|	Mean(*SD*)	Reliability	Intrinsic Motivation	Extrinsic Motivation	Self-Efficacy	Strategies
Intrinsic Motivation	4.2 (1.1)	.62	1			
Extrinsic Motivation	5.6 (1.0)	.74	.21**	1		
Self-Efficacy	4.5 (1.1)	.90	.83**	.36**	1	
Strategies	4.3 (0.7)	.88	.56**	.26**	.56**	1
Achievement	83.5 (9.5)		.35**	.33**	.40**	.39**

In order to answer Research Questions (2) and (3), a total of four competing models originated from the general model explaining the roles of intrinsic motivation, extrinsic motivation, and self-efficacy in L2 achievement mediated by learning strategies were developed and tested using SEM with a bias-corrected percentile method of 95% confidence intervals using 2,000 bootstrapped samples. As per the recommendation of Browne and Cudeck (1992) and Hooper et al. (2008), several fit indices were used to find the best fit model that describes the current data. The best model as determined by various model fit indices was Model 4, where learning strategies mediated in the contributions of self-efficacy and extrinsic motivation to students' achievement in the classroom, as shown in Table 2. Even though the index of χ^2 (or *CMIN*) of Model 4 was statistically significant ($p<.01$), indicating that the current data did not fit the model, the index of χ^2 could have been inflated because of the large sample size. It should be noted that SEM requires a large sample size, which practically guarantees that χ^2 is inflated and statistically significant. Thus, other absolute indices such as χ^2/df, *GFI*, and *RMSEA* and incremental indices such as *TLI* and *CFI* were used to investigate whether the current data were appropriate for the model. In conclusion, the data estimated Model 4 appropriately, with the recommended level of χ^2/df (2.800) less than 3, and with acceptable fit indices of greater than 0.90 for *GFI* (0.901), *TLI* (0.906), and *CFI* (0.925), and less than 0.08 for *RMSEA* (0.079) (Browne & Cudeck, 1992; Hooper et al., 2008). As presented in Table 2, the goodness-of-fit indices of the other competing models—model 1 with three predictors (intrinsic motivation, extrinsic motivation, and self-efficacy), model 2 with two predictors (intrinsic motivation and extrinsic motivation), and model 3 with two predictors (intrinsic motivation and self-efficacy)—were in general inappropriate for the aforementioned recommended model fit indices.

Table 2. Model fit indices of the competing models

Model (Predictors)	χ^2	χ^2/df	GFI	RMSEA	TLI	CFI
Model 1 (IM, EM, SE)	367.0**	2.936	.867	.082	.876	.898
Model 2 (IM, EM)	110.6**	3.685	.929	.096	.849	.899
Model 3 (IM, SE)	255.7**	3.044	.884	.084	.896	.917
Model 4 (EM, SE)	235.2**	2.800	.901	.079	.906	.925

Note. IM (Intrinsic Motivation), EM (Extrinsic Motivation), SE (Self-efficacy).

Model 4 was investigated in depth using SEM by the bootstrap method, as described above. SEM consists of the measurement model which is concerned with the relations of latent structures to observed variables and the structural model which is concerned with the pathways between endogenous variables and exogenous variables. Figure 2, Table 3, and Table 4 show the results of both the measurement model and the structural model. As can be seen in Table 3 and Figure 2, all the observed variables measured by the standardized estimates (factor loadings) were significantly related to the relevant latent factor structures. The standardized estimates of the observed variables onto the related latent factors such as extrinsic motivation, self-efficacy, and learning strategies were all above the cut-off value of 0.50 (Hair et al., 2010). In Table 4 and Figure 2, the direct effects of extrinsic motivation and learning strategies on students' achievement were statistically significant at $p<.01$. Interestingly, even though the direct effect of self-efficacy on achievement did not reach the significant level ($p>.05$), the indirect effect mediated by learning strategies was significant ($p<.01$). Considering that the total effects are the added results of the direct and indirect effects, it is natural that the total effects of both extrinsic motivation and self-efficacy on students' achievement reached a significant level ($p<.01$). In short, Model 4, which accounts for the contributions of extrinsic motivation and self-efficacy to achievement through the mediation of learning strategies as determined by goodness-of-fit indices, standardized estimates, and the direct, indirect, and total effects, provided an adequate representation of the current data.
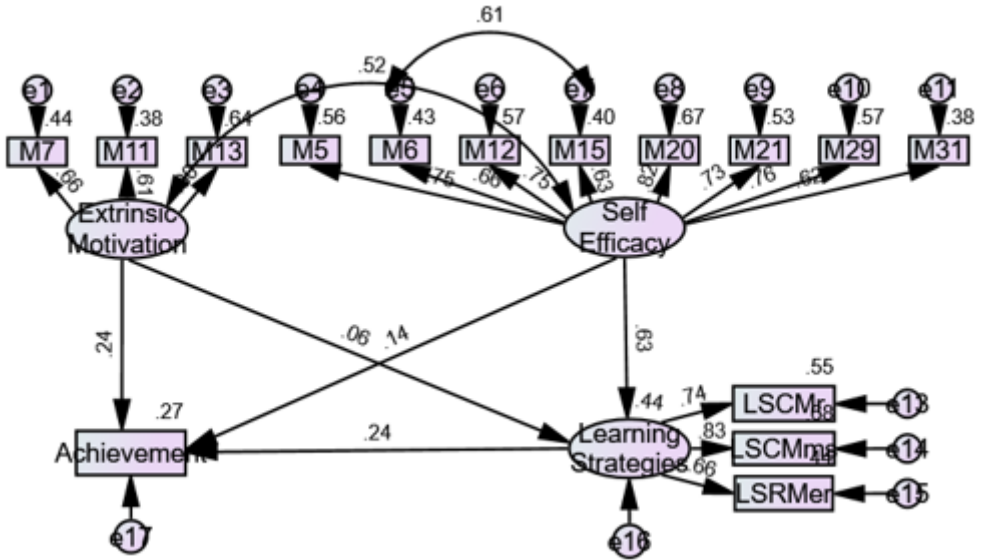
Note. LSCMr (rehearsal), LSCMms (metacognitive self-regulation), LSRMer (effort regulation).

Fig, 2. Model 4: Results of SEM

Table 3. Latent structures and observed variables

Latent Structures	Pathway	Observed Variables	Unstandardized Estimate (Standardized Estimate)	S.E.	C.R.(t)	p
Extrinsic Motivation	→	M7	1.00(.66)			
	→	M11	.99(.61)	.12	8.21	***
	→	M13	1.02(.80)	.11	8.98	***
Self-Efficacy	→	M5	1.00(.75)			
	→	M6	.89(.66)	.08	11.07	***
	→	M12	.80(.75)	.06	12.78	***
	→	M15	.82(.63)	.08	10.54	***
	→	M20	.91(.82)	.07	14.03	***
	→	M21	.80(.73)	.07	12.31	***
	→	M29	.95(.76)	.07	12.87	***
	→	M31	.67(.62)	.06	10.33	***
Learning Strategies	→	LSCMr	1.00(.74)			
	→	LSCMms	.78(.83)	.07	11.70	***
	→	LSRMer	.80(.66)	.08	10.09	***

Table 4. Structural coefficients: Direct, indirect, and total effects

		EM → Strategies/Achievement	SE→ Strategies/Achievement	Strategies → Achievement
	Direct effects	.06	.63[**]	
Strategies	Indirect effects	-	-	
	Total effects	.06	.63[**]	
	Direct effects	.24[**]	.14	.24[**]
Achievement	Indirect effects	.01	.09[**]	-
	Total effects	.25[**]	.23[**]	.24[**]

5   Discussion

One of the findings of this study was that all the variables－intrinsic motivation, extrinsic motivation, self-efficacy, learning strategies, and achievement－were significantly related to each other, with intrinsic motivation and self-efficacy having the highest relationship as theorized by Bandura (1993) and as evidenced by several researchers (Pae, 2008; Pintrich & DeGroot, 1990; Rao & Sachs, 1999). The high correlation between intrinsic motivation and self-efficacy implies that these two variables are tapping into the same construct and that combining these variables into one variable should be discussed in subsequent studies. It was also interesting to find that the relationship between intrinsic motivation and extrinsic motivation was relatively low, but significant. This finding parallels in part a study where the two variables were significantly related in the American sample, but not in the Taiwanese sample, which implies that this relationship is dependent on ethnicity and language learning milieu (Cheng, 2018; Yu & Downing, 2012). The low correlations between these two variables proved the distinctiveness and validity of these variables, that is, each of which measured a different facet of motivation as it intended to measure. In addition, the significant finding means that intrinsic and extrinsic motivation can be partially transformed, and this transformation can be explained by social cognitive theory where personal, environmental, and behavioral processes reciprocally affect motivation (Schunk & DiBenedetto, 2020). That is, those who studied to improve their achievement score, or English reading score in this study, for inner pleasure, curiosity, and mastery could also pursue utilitarian goals such as getting a good grade through their own will or influenced by significant others such as the teacher, parents, or peer group members. From a different perspective, those who studied English reading for practical purposes might continue studying for pleasure and mastery after repeating the study behavior time and again while anticipating rewards. This might be so especially when the learners are self-determined (Ryan & Deci, 2000).

A second finding of this study was that among the four competing models originated from the general model which explained the contributions of intrinsic motivation, extrinsic motivation, and self-efficacy to achievement mediated by learning strategies, the best model fitting the current data was Model 4 with two predictor variables, extrinsic motivation and self-efficacy, accounting for achievement through learning strategies. The good fit of Model 4 implies the importance of these predictive and mediating variables for those who study English in the EFL Korean context, as will be discussed later. It deserves attention that the high correlation between the two predictors, intrinsic motivation and self-efficacy, in the other competing models (Model 1 & Model 3) might lead to inflation of standard errors related to some degree of multicollinearity which, in turn, led to relatively poor fit. The structural pathways of Model 4 appear to be unidirectional from the motivational components to achievement through learning strategies, as discussed by Berger and Karabenick (2010). This means that those who were motivated and efficacious opted to use learning strategies to achieve a goal such as a high grade. However, this interpretation deserves caution because in the big picture

this relation can be reciprocal as students' motivation can be affected by past achievement, as theorized by Schunk and Dibenedetto (2020), discussed by Dörnyei (1998), and evidenced by Hebbecker, Förster, and Souvignier (2019).

A third finding of this study was that Korean students were more extrinsically motivated than intrinsically motivated, and that the contribution of extrinsic motivation to achievement was significant, lending support to some studies (Liu, 2007; Roshandel et al., 2018; Wen, 1997; Yu & Downing, 2012) but conflicting with other studies (Huang, 2008; Noels et al., 2001; Pae, 2008). That is, those who studied English for practical purposes such as getting jobs and good grades had better academic achievement than those who did not. This finding was expected especially in the EFL Korean context, where learning English as a lingua franca is personally important and socially desired. Thus, students tend to invest time and effort to meet their practical needs rather than to pursue personal interests and pleasures. The tendency of EFL students to pursue practical purposes for learning English in Korea, China, and Japan is in part due to the learning contexts where integrating with native speakers of English and English language culture for pleasure and fun inside and outside the classroom is limited, compared with learners in an ESL situation (Cheng, 2018; Liu, 2007; Noels et al., 2001).

Another interesting finding was that a difference between the two predictors, extrinsic motivation and self-efficacy, was found in direct and indirect effects on achievement. The contribution of extrinsic motivation to achievement was significant in the direct effect, whereas the significant role of self-efficacy in achievement was detected in the indirect effect through learning strategies. The underlying reason for the indirect effect of self-efficacy on achievement might be that those who believed in their ability in learning English approached the task of English reading comprehension confidently and systematically by using various learning strategies to facilitate reading comprehension. This finding was expected and generally in line with previous studies in educational psychology where learners' self-perceived confidence facilitated learning strategy use, which in turn contributed to learning (Huang, 2008; Pintrich & DeGroot, 1990; Walker et al., 2006). However, extrinsic motivation was not related to learning strategy use. Considering that motivation, in general, was related to learning strategy use, the minimal effect of extrinsic motivation on learning strategies requires special attention (Kormos & Csizér, 2014; Pintrich & DeGroot, 1990; Zhang et al., 2017). This result might be attributable to the fact that extrinsically motivated learners compared with learners with self-efficacy did not study English reading systematically and therefore did not implement deep learning strategies. They might end up using rote memorization for a short period of time as a type of cramming to accomplish their goal of getting a good grade. The potential problem of these extrinsically motivated learners is that they do not continue to study to improve English proficiency when the achievement goal of getting a good grade is attained, so these learners end up having a lack of overall English proficiency in the long term (Gardner & MacIntyre, 1991; Noels et al., 2001).

The last finding of this study was the significant direct effect of learning strategies such as rehearsal, self-regulation, and effort regulation strategies on achievement. The importance of deep learning strategies such as self-regulation and effort regulation has been detected, in general, in several studies because strategy use facilitates taking in, processing, and storing information (Griffiths & Oxford, 2014; Pintrich & DeGroot, 1990; Walker et al., 2006; Zhang et al., 2017). Indeed, planning such as goal setting and preliminary analysis, monitoring such as attention and self-questioning, and regulating such as controlling one's efforts and emotions are crucial for learning an L2 more effectively. This study added to previous findings on learning strategies on two points: First, the potential benefits of rehearsal strategies were found in attending to or activating information in working memory (Pintrich et al., 1991; Walker et al., 2006). The contention is that rehearsal strategies will help process information alone or function as a stepping stone for the operation of deep encoding processes. Second, students chose learning strategies based on their self-efficacy about language learning tasks, as was discussed earlier. Regarding the notion that students choose learning strategies on the basis of several factors including motivation and linguistic milieus, this study evidenced that students' self-efficacy was a crucial factor determining their choice of learning strategies

(Griffiths & Oxford, 2014; Pintrich & DeGroot, 1990; Walker et al., 2006). Considering that students use learning strategies to achieve a goal more effectively, students might first perceive their capabilities to carry out a task, set specific goals, and then use learning strategies to achieve the goal. In this sense, self-efficacy probably influenced by past achievement and significant others such as parents and teachers might play a crucial role in classroom achievement in the on-going tripartite relations among self-efficacy, goal setting, and learning strategy use.

6   Conclusion

This study found that the relationships among intrinsic motivation, extrinsic motivation, self-efficacy, and learning strategies were significant with the highest correlation between intrinsic motivation and self-efficacy, and that Model 4 explaining the contributions of extrinsic motivation and self-efficacy to classroom achievement mediated by learning strategies fit the current data better than other competing models developed from the various combinations of motivational constructs. The total effects of extrinsic motivation and self-efficacy on achievement were significant, with a significant direct effect of extrinsic motivation on achievement, and a significant indirect effect of self-efficacy on achievement through learning strategies.

These findings imply that the teacher can provide students with knowledge and skills about the criterion variable of achievement, or English reading comprehension ability while awakening students' motivation in general and extrinsic motivation in particular, self-efficacy, and learning strategies. The teacher's awakening of students' extrinsic motivation will help students set practical goals such as getting a good grade or a certain score on a certified reading test such as the Test of English for International Communication (TOEIC). This is important because EFL students in Asia tend to learn English as a means to an end involving extrinsic rewards or responsibilities (Chen et al., 2005; Cheng, 2018; Liu, 2007; Yu & Downing, 2012). Indeed, goal-setting is crucial in learning and improving reading comprehension ability because without goals students do not know which direction they should pursue. Nor do they use relevant learning strategies to accomplish the goals both inside and outside the classroom. However, regardless of the importance of extrinsic motivation, students should keep in mind that extrinsic motivation works better when it compliments intrinsic interest. When students feel interested in a reading task, their attention and persistence level to achieve the task will be raised and they will continue to improve their English proficiency, even after attaining extrinsic rewards. It is recommended that the teacher select interesting textbooks or reading materials by negotiating with students to improve their interest levels in the classroom, which will also lead to more self-regulated and autonomous L2 readers (Kormos & Csizér, 2014).

The teacher's awakening of students' self-efficacy will help them approach reading tasks more effectively because when students perceive themselves as competent or confident in a task, they will invest more time and effort to accomplish the task while taking charge of their own learning. By contrast, when students are not confident, they shy away from a learning task while complaining about their lack of reading comprehension ability from the beginning, and they will, therefore, easily fall prey to giving up without making sincere efforts to accomplish the task, particularly in a challenging or boring situation. Furthermore, when students lack confidence, learning will be hard because cognitive function will be interfered with or blocked by affective variables, such as confidence and anxiety when these variables do not function optimally (Krashen, 1985; Park, 2014). The teacher can stimulate students' self-efficacy by providing materials that are comprehensible and by helping them set short-term and long-term goals on the continuum from easy to difficult. The on-going processes of goal-setting and attainment will help students develop a higher level of self-efficacy, which will in turn help them be successful L2 learners.

The teacher's instruction of learning strategies will help students store a variety of strategies that facilitate learning by inviting, processing, and retrieving information more effectively. In order to maximize the effects of learning strategy instruction, the teacher should understand the variables underlying strategy choice. One of these variables turned out to be self-efficacy. More specifically, when the teacher provides reading strategies such as rehearsal to influence encoding processes in

working memory, metacognitive self-regulation to control cognition through planning, monitoring, and self-regulating, and effort regulation to control efforts in the face of distractions, students will store and use them in accordance with their self-efficacy (Pintrich et al., 1991). However, the teacher should be sensitive to what are known as better or effective learning strategies as well that can be applied to readers across levels of self-efficacy as discussed in the good language learner studies (Griffiths, 2008).

Regardless of the important findings in the relations among motivation, learning strategies, and achievement using SEM, this study has limitations. The sample of this study was chosen from a population of university students learning English in Korea and thus generalizations of the findings to other groups should be made with caution. Even though SEM makes it possible to allow pathways and causality between variables, the current cross-sectional data and analysis did not further reveal whether motivation and learning strategies affected achievement or vice versa, as discussed by Berger and Karabenick (2011) and Hebbecker et al. (2019). Nor did the current data reveal the in-depth relations of self-efficacy to different strategy categories such as deep regulation strategies and shallow rehearsal strategies. To clarify the muddy, data should be collected through various methods including self-report questionnaires and think-aloud protocols over time as well as at one point in time. The current study combined with subsequent studies across academic domains and socio-cultural contexts will shed more light on the unique and combined roles of motivation and learning strategies in learning, in general, and in L2 acquisition, in particular.

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