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## **Psychological Attributes in Foreign Language Reading: An Explorative Study of Japanese College Students**

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### **ABSTRACT**

*This study explores the internal structure of psychological attributes (i.e., motivation, belief and emotion) related to foreign language reading (FLR) (hereafter FLR attributes) and checks the utility of existing FLR attribute measurements for the specific learner group (i.e., Japanese university students studying English as their foreign language). 63 students who fall into the above learner group responded to the questionnaire survey. The results of descriptive statistics and correlation analysis uncover the following: (a) five out of nine indexes are in need of measurement reconstruction and revalidation; (b) the taxonomy of learning motivation proposed by the self-determination theory is partially confirmed in that lack of motivation is a different motivational facet from more internalized ones; (c) FLR motivation can develop along with the self-efficacy belief in FLR (RSE); and (d) anxiety toward FLR shows its sensitivity toward the changes in learners' motivational states and the degree of RSE.*

### **INTRODUCTION**

Owing to findings in foreign language (FL) reading (FLR) studies, it has become clear that psychological attributes (e.g., motivation, belief and emotion) affect our reading and learning behaviour, and our behaviour in turn engenders changes in our psychological state (Güvendir, 2014; Takase, 2007; Yamashita, 2013). These attributes are also connected to the development of reading skills through learning behaviour (Fujita & Noro, 2009; Kondo-Brown, 2006). Due to this association, mapping out the general relationship between FLR-related psychological attributes (hereafter FLR attributes) has an underlying meaning as it will be the foundation for building future models. Yet, although some useful models connecting FLR attributes with learners' behaviour or learning outcomes have been introduced, we still have little understanding of the internal structure of FLR attributes. Also, when testing our models, we often borrow the measurements originally invented for different populations from ours and use the sum or an average of question items as an

index score. Where this is the case, reconfirming the utility of given measurements is of importance because it gives useful information not only to a given study but to future measurement refinement and localization. In response to these issues, this study targeted Japanese university students studying English as their FL (JEFL college students) and explored the internal structure of FLR attributes borrowing from existing scales and models.

## **BACKGROUND**

Studies in FLR have captured FLR attributes as a multi-dimensional entity and the best accepted model argues that three dimensions are particularly relevant to the FLR attitude (McKenna, 1994; Yamashita, 2013). That is, motivation/conation (i.e., what drives us to actions), belief (i.e., what we think and believe about ourselves and FLR) and emotion (i.e., our affective state). These are different facets of human mind yet are interrelated and are (directly and indirectly) connected to our behaviours, such as the amount of learning effort we make (Takase, 2007) and our reading behaviours in a given task (Brantmeier, 2005; Güvendir, 2014). Also, the influence between attributes and behaviours is bidirectional as learning experience (gained thorough actions) entails psychological reactions to what individuals have encountered in given events and these reactions shape our mental state (Schunk & Zimmerman, 2007). Moreover, due to the above association, FLR attributes are connected to the development (or lack thereof) of FLR skills through learning behaviour (Kondo-Brown, 2006; Matsui & Noro, 2010). In this chapter, we will briefly review how FLR attributes are connected to the reading behaviours and the development of FLR skills, focusing particularly on the three psychological dimensions — motivation, belief and emotion.

### **Motivation**

To our knowledge, the most frequently employed motivational theory in FLR studies is the self-determination theory (SDT) (Grabe, 2009, pp. 175-193). According to SDT, there are three dimensions to learning motivation. The first dimension is referred to as amotivation and is synonymous with no motivation (i.e., one has no self-value or self-perceived importance in FLR). The next dimension is called extrinsic motivation and theoretically it can be divided into four sub-dimensions: that is, external, introjected, identified and integrated regulations. The foremost regulation encompasses the least self-value or self-perceived importance in studying FLR and, as we move through the regulations, the value and the importance increase. External regulation represents pure extrinsic reward targeted motivation (e.g., one attends a reading class only because he/she needs to earn some credits for graduation). Introjected regulation involves ones' ego and the core of this concept is the desire for approval. Regulation will be identified when learners spontaneously endorse the value of studying FLR. Integration will be realized 'when identified regulations have been fully assimilated to the self (Ryan & Deci, 2000, p. 62)' (e.g., one studies FLR because it is considered to be consequential for his/her social well-being). The last dimension, intrinsic motivation, represents personal interest, enjoyment and the satisfaction entailed in FLR. Integrated regulation and intrinsic motivation share many qualities (e.g., strong self-value attached to FLR) (Ryan & Deci, 2000, p. 62); however, at least in theory, they differ in concept as the targets of the former are mainly the outcomes of learning whereas that of the latter is the feeling of joy and satisfaction brought by FLR itself.

In prior FLR studies, mostly in response to the results of factor analysis, researchers have often given a slightly different taxonomy to learning motivation. For instance, in Kondo-Brown (2006), an amalgam of identified and integrated regulations were called extrinsic orientation for FLR (see also S. Mori, 2002); and because extrinsic regulation includes minimum self-perceived importance in studying FLR, it was combined with amotivation and referred to as lack of motivation. Likewise, several studies integrated extrinsic and introjected regulations into a single attribute and treated it as class- and exam-related factors (Fujita & Noro, 2009; Matsui & Noro, 2010; Takase, 2007). What we should be cautious about here is that, particularly when it comes to amotivation and extrinsic motivation, there are several differences (not discrepancies, see Takase, 2007, p. 2) between the original taxonomy and these in FLR studies. As for intrinsic motivation, although FLR studies have sometimes used different names for this attribute (e.g., intellectual value of reading) (Yamashita, 2013), these factors basically represent the same concept as intrinsic motivation in SDT.

Of these dimensions, lack of motivation showed negative correlation ( $r = -.32$ ) with the development of reading proficiency (Kondo-Brown, 2006). The interpretation of this result is straightforward: lack of motivation does not induce learning effort and, without learning behaviour, there will be no room for skill development (Ryan & Deci, 2000). Regarding intrinsic motivation, it was shown that this type of motivation can be fostered by an educational intervention (Fujita & Noro, 2009; Matsui & Noro, 2010; Yamashita, 2013). In these studies, students who experienced the extensive reading (ER) treatment did increase their intrinsic motivation in FLR. Also, Takase (2007) in particular showed that intrinsic motivation was, among other attributes, the best predictor of the amount of reading engagements ( $\beta = .19$ ). Although the relationship between extrinsic orientation (or integrated regulation) and the amount of learning effort has yet to be well investigated or made very clear, in Fujita and Noro (2009), extrinsic orientation was also enhanced after the implementation of the ER treatment.

In Matsui and Noro (2010), the implementation of the weekly 10-minutes ER was connected to the development of accuracy and speed of FLR. The fact that the students in the experimental group in this study showed significantly greater development in their reading skills and intrinsic motivation than their counterparts can be certain evidence of the link between motivation and FLR skill development. Nevertheless, it is also true that we definitely need further empirical evidence to accept this particular link. For instance, despite the fact that the researchers allocated the same amount of time (10 minutes) for their weekly ER treatment, the participants in Fujita and Noro (2009) did not show a significant improvement in their reading accuracy (they improved their reading speed, however). Kondo-Brown (2006) also failed to find a meaningful correlation between the development of FL learners' reading proficiency, intrinsic motivation and extrinsic orientation (p. 64).

## **Belief**

In Kondo-Brown (2006), only one FLR attribute showed a significant positive correlation with reading proficiency development ( $r = .38$ ). The attribute was called the self-perception of FL reading and is synonymous with self-efficacy (SE) in FLR. As stated in Zimmerman (2006), SE is a positive belief in one's own problem-solving and learning skills. This finding is worth attention because although the importance of SE in reading performance and reading skill development is well recognized in first language studies (Grabe, 2009, pp. 181-189), few studies have dealt with the role of SE in FLR (Matsui & Noro, 2010; S. Mori, 2002). Likewise, the general function of

belief in FL reading behaviour and learning behaviour has largely been uncovered after Kondo-Brown introduced some belief indexes consulting the findings of Y. Mori (1999)

### **Emotion (Anxiety)**

Of a number of affective factors, anxiety has been the target of many researchers' attention in second language acquisition research<sup>1</sup>. The biggest reason for this trend lies in the strikingly strong negative impact of anxiety on FL performance (MacIntyre, Noels, & Clément, 1997). In Macintyre et al. (1997), however, while anxiety had strong negative impacts on the performance of productive skills (speaking and writing), that of reading (i.e., the reading comprehension score) showed the best durability to anxiety. Although not many studies have investigated the role of anxiety in FLR since then (Güvendir, 2014, p. 110), the findings of two particular studies are directly related to our research interest.

First, in Sellers (2000), it was discovered that highly anxious FL learners were prone to use more inference in their reading task engagements than those with low anxiety. This result suggests that, even if FLR is generally not a high anxiety-provoking activity, once individuals become anxious, it certainly affects their reading behaviour. Second, Brantmeier (2005) showed that the degree of anxiety that learners feel depends on in what they will engage in the post-reading situation. In this study, advanced FL learners did not feel much anxiety toward reading activity itself; however, where they needed to show their comprehension of what they have read after the reading, the degree of self-perceived anxiety was boosted. It would not be a huge jump from this data to say that, if the structure of a reading activity makes changes to the intensity of learners' anxiety, then their motivation and belief can also play a part in the inflation and deflation of anxiety (Saito, Garza, & Horwitz, 1999). For instance, learners with high intrinsic motivation may show greater tolerance to anxiety than those who lack motivation due to the difference in the amounts of their past reading experience (Kuru Gönen, 2009 in Güvendir, 2014) or their willingness to engage in FLR. High SE in FLR (or in a given task form) may also inhibit the feeling of anxiety toward a reading task from rising and changing learners' reading processes (e.g., a strategy that each individual employs) (Sellers, 2000). If what we hypothesized above is true, it gives us enough reason to revisit the impact of anxiety on FLR performance because the existence or lack of other FLR attributes can change the results of anxiety studies just as the task structure did in Brantmeier (2005).

### **Internal Structure of FLR Attributes**

As we have seen in the last section in particular, the importance of knowing the general relationship between FLR attributes (i.e., the internal structure of FLR attributes) lies in the fact that controlling confounding (i.e., up- and downward bias) is always better for model buildings. As an example, if two attributes, x and y, show a significant and/or meaningful correlation and we are interested in the impact of x on a particular criterion (e.g., learning effort) and y is also related to the target criterion, then we should adjust the impact of y from our analysis because otherwise the results of our analysis will be distorted (Rosenbaum & Rubin, 1983). Yet, although some useful models connecting FLR attributes with learners' reading and learning behaviour and learning outcomes have been introduced, we still have little understanding of how the three different dimensions of FLR attributes are interrelated. Given this, the value of shedding the light on the internal structure of FLR attributes is indisputable.

## Utility of Measurements

One more reason that leads us to the present study is the fact that the target populations of existing measurements for FLR attributes vary from study to study. As particularly stated in Grabe (2009, p.190), because we so far have few validated measurements for FLR attributes, it is good practice to keep using these (or the brushed up version of) measurements for our surveys. Nevertheless, we also know that if one scale is invented for a population different from ours, we need to confirm whether or not that measurement also functions well in our target context. If the ratio of participants to factors is more than 20:1 in our study (viz.,  $n \geq 100$  if the number of expected factors is five)<sup>2</sup>, then this issue will be less problematic because we can reconfirm the stability of given factors and compute our own factor scores for successive analyses (Arrindell & van der Ende, 1985). As stated in Plonsky, Egbert and Laflair (2014), however, it is not always possible for us to undertake surveys with an ample number of participants, especially when conducting a long-term piece of research or collecting language performance data. If our sample size does not satisfy the above 20:1 ratio, we often borrow measurements from prior studies and use the sum or an average of question items as an index score. Where this is the case, a reliability coefficient ( $r_{xx}$ ) of each index has a critical importance for two reasons.

The first reason comes from a statistical aspect. When we investigate a link between an attribute and a criteria, the magnitude of our target relationship will be attenuated along with the decrease in the reliability coefficient (i.e., the results will have more downward bias with lower  $r_{xx}$ ) (Haertel, 2006; Muchinsky, 1996).

The second issue is more related to the measurement validity. In a questionnaire survey, reliability is best described as the consistency of participants' responses in a given index (Brown, 2001). Also, reliability is considered to be a subset of validity due to the fact that a high reliability coefficient tells us that an index succeeds in measuring something consistent; and to clarify what was consistent, we need to think of the quality of the given index (Murayama, 2012). If  $r_{xx} = .70$ , this means that the variance on the index is 70% systematic (or consistent) with 30% measurement error (or random variance), and thus using the sum or an average of question items as an index score is generally justifiable (yielding higher  $r_{xx}$  is almost always better, however). On the contrary, if  $r_{xx} = .40$ , measurement error associated with our data reaches 60% and this impedes clear data interpretation as this amount of error is basically the red flag hoisted on the validity of given measurement (Brown, 2001, pp. 171-192).

For these reasons, it is a golden rule for small sample studies to use the indexes that are most likely to function well in their target context. That being stated, if we borrow the indexes invented for a different population from ours, whether these indexes properly serve their purpose or not is unclear until we examine the behaviour of chosen attributes using observed data. Exploring the utility of existing measurements in our interested context will, therefore, also provide useful information for future FLR studies.

## Research Questions

Our primary research interest is in mapping out the general relationship between FLR attributes. On top of this, we are also motivated to examine the utility of existing FLR attribute measurements to our target population. In this study, we targeted JEFL college students. Guided by these research interests, we set the following research questions.

1. Do the existing measurements function well for JEFLL college students? If not, what types of adjustments or improvements are possible in the future?
2. What trends can we see from the relationship between FLR attributes?

## METHODOLOGY

### Participants

Participants of this study were students of a Japanese national university. English is their FL in that they have learnt it as a school subject throughout their learning experience. 69 participants were recruited for this study and 63 (91.30%) of them completed the questionnaire survey. Thus, the final sample ( $n$ ) of this study was 63 (male = 25, female = 38). Their age ranged from 18 to 26 ( $Med = 20.00$ ,  $SD = 1.95$ ). Their English proficiency in TOEIC® is 651.94 on average ( $Med = 640.00$ ,  $SD = 148.36$ ). Four participants had a short term study-abroad experience in a country where people speak English as their first language (from one to eight weeks). They were from 10 different departments and none of them was an English major student. The latter point is of importance as English major students can have considerably different learning objectives from other students (i.e., they experience many more hours of English classes as a part of their curriculum).

### Indexes

We borrowed nine indexes from four different studies: three motivational indexes (Kondo-Brown, 2006); the anxiety index (Brantmeier, 2005); the self-efficacy index (S. Mori, 2002); and the rest of the belief indexes (Y. Mori, 1999). These indexes have been invented to document FLR attributes and their target language was changed to English where necessary (only S. Mori's study targeted the same population as ours). All items were translated into Japanese by the authors and piloted to five cooperators who are studying at the same university as our participants. The descriptions of question items were refined through this piloting. The order of question items was randomized in the actual survey. Each item was answered on a 6-point Likert scale and an average of three (if  $k = 3$ ) to five (if  $k = 5$ ) items became each individual's score on each index. In what follows, we briefly describe the target attributes of each index.

#### *Lack of motivation for reading English (LMR)*

LMR represents the absence of self-value and self-recognized importance in studying FLR ( $k = 5$ ). This index is the amalgam of amotivation and extrinsic regulation. The former is the situation where one does not have any motivation toward FLR whatsoever, and the latter stands for pure extrinsic reward targeted motivation. The only value of engaging with FLR included in LMR comes from outside the learner (e.g., obligation).

#### *Extrinsic orientation for reading English (EOR)*

EOR reflects the recognized value of studying FLR for achieving one's social well-being ( $k = 5$ ). It encompasses conscious desire to increase accessibility to international markets and pieces

of information provided in English. The items in this index not only represent the practical values of enhancing FLR skill but these values match with one's self-concept. Hence, the quality of this index is close to a mixture of identified and integrated regulations (Ryan & Deci, 2000, pp. 61-62).

#### *Intrinsic orientation for reading English (IOR)*

This index stands for the personal interest and enjoyment included in FLR *per se* which coincides with a feeling of satisfaction ( $k = 5$ ) (see also Takase, 2007; Yamashita, 2013).

#### *Reading anxiety (RA)*

RA represents the degree of self-perceived anxiety in FLR ( $k = 4$ ). It comprises anxious feeling toward FLR itself and text comprehension (see also Saito et al., 1999).

#### *Self-efficacy in English reading (RSE)*

RSE is the efficacy belief in one's FLR skills and problem-solving skills in studying FLR ( $k = 4$ ).

#### *Avoid ambiguity (AA)*

AA represents tolerance toward ambiguity in language use and the learning process ( $k = 4$ ).

#### *Quick learning (QL)*

QL reflects the self-recognized importance of the efficiency of task completion and learning ( $k = 3$ ).

#### *Risk taking (RT)*

RT represents to what degree one can take risks for more effective language learning ( $k = 4$ ).

#### *Single answer (SA)*

This index measures whether or not a respondent thinks there should be correspondence between his/her mother tongue and the target language ( $k = 4$ ).

### **Data Analysis**

This study employed correlation analysis to answer the research questions. To this end, the normality of each index was firstly tested by the Kolmogorov-Smirnov test. Based on the following formula, the critical value was set at 0.17 in this study ( $= 1.36 / \sqrt{63}$ ). Normality was confirmed for IMR, EOR, IOR and RA. Neither the ceiling nor floor effect was observed in this study. Table 1 shows the descriptive statistics on each index. As we can see in this table, AA, IOR, QL, RT and SA showed unsatisfactory Cronbach's alpha. However, we did not eliminate these indexes from

further analysis for the following reasons. Statistically speaking, significant and/or notable correlation found in a situation where one or both reliability coefficients are inadequate indicates the durability of our target relationship as it survives attenuation (Haertel, 2006; Muchinsky, 1996). This is to say, although we must reconsider the question items of low-reliability indexes in order to state something conclusive (Murayama, 2012), correlations found between these indexes can still give us certain directions and reference values for future model building. Thus, Pearson's  $r$  was used for the normally distributed variables and Spearman's rho was applied to the rest. All reported significances in Table 2 were corrected for False Discovery Rate ( $p \leq .05$ ) (Benjamini & Hochberg, 2000). With the exception of the row of AA, the statistical powers of the double asterisk correlations in Table 2 were over .80.

95% confidence intervals (CIs) of each correlation (Table 3) were used for data interpretation so as to present more robust arguments (Wilkinson & Task Force on Statistical Inference, 1999). Because it is inappropriate to apply the orthodox CI calculation method to non-normal data, bootstrapped CIs were computed. Bootstrapping is an innovative (at least in second language acquisition research) (Plonsky et al., 2014) yet widely accepted way of overcoming problems in parameter estimations (Chernick, 2008, pp. 16-25) and, if  $n \geq 50$  for non-normal data, the computation of bootstrapped statistics is justifiable (Chernick, 2008, pp. 173-174). SPSS® version 17.0 and the statistical program R version 3.1.1 were used for the data analyses.

## RESULTS

Table 1 shows the descriptive statistics on each index. As already stated, the reliability coefficients of AA, IOR, QL, RT and SA were unsatisfactory and the opposite was true for EOR, LMR, RA and RSE. It was also confirmed that item trimming could not be used to solve our low-reliability issue. We can see the correlations of observed variables in Table 2. Here, despite their low reliability, AA, IOR and QL indicated several notable correlations with other indexes.

**Table 1.** Descriptive Statistics on the Nine Indexes

Index	$k$	$a$	$Min$	$Max$	$M$	$Med$	$SD$
AA	4	.36	2.00	5.50	3.50	3.50	0.68
EOR	5	.77	1.60	6.00	3.98	4.00	0.88
IOR	5	.45	2.40	5.20	3.90	4.00	0.65
LMR	5	.76	1.20	5.80	3.18	3.20	0.93
QL	3	.31	1.67	5.33	3.74	3.67	0.66
RA	4	.81	1.25	6.00	3.80	4.00	0.92
RT	4	.48	3.00	6.00	4.25	4.25	0.68
SA	4	.28	2.25	4.75	3.69	3.75	0.63
RSE	4	.75	1.25	4.75	3.59	3.75	0.95

*Note:* Possible Minimum = 1.00, Possible Maximum = 6.00.

**Table 2.** Correlation Matrix (Observed Variables)

Index	AA	EOR	IOR	LMR	QL	RA	RT	SA
AA	-							
EOR	-.13	-						
IOR	-.24	.54 **	-					
LMR	.31 *	-.55 **	-.49 **	-				
QL	.13	.27 *	.24	-.02	-			
RA	.33 **	-.31 *	-.28 *	.54 **	-.04	-		
RT	-.33 **	.07	.11	-.05	.17	-.05	-	
SA	-.01	.13	.18	.19	.28 *	.27 *	.03	-
RSE	.04	.38 **	.40 **	-.45 **	.21	-.41 **	.01	.02

*Note:* Pearson's  $r$  is used for correlations between EOR, IOR, LMR and RA; Spearman's  $\rho$  is used for the rest; \* =  $p \leq .05$ , \*\* =  $p \leq .01$ .

**Table 3.** Correlation Matrix (Bootstrapped 95% CI)

Index	AA	EOR	IOR	LMR	QL	RA	RT	SA
AA	-							
EOR	[-.43, .16]	-						
IOR	[-.48, .07]	[.36, .70]	-					
LMR	[.11, .55]	[-.73, -.30]	[-.69, -.27]	-				
QL	[-.16, .34]	[.04, .48]	[-.03, .36]	[-.21, .25]	-			
RA	[.14, .63]	[-.59, .03]	[-.51, -.04]	[.34, .71]	[-.20, .26]	-		
RT	[-.56, .01]	[-.19, .41]	[-.15, .33]	[-.32, .19]	[-.08, .34]	[-.37, .29]	-	
SA	[-.20, .28]	[-.14, .33]	[-.10, .42]	[-.08, .44]	[.09, .49]	[.05, .43]	[-.21, .24]	-
RSE	[-.35, .22]	[.13, .55]	[.14, .55]	[-.60, -.10]	[.01, .49]	[-.58, -.12]	[-.21, .30]	[-.19, .34]

*Note.* Reported CIs were calculated using the percentile method (non-parametric bootstrap);  $B = 2,000$  for each computation.

Except some marginal cases, correlations that can take either a positive or negative value at the 95% CI level (e.g., AA and SA) do not help us to make clear interpretations. Thus, regarding the data in Table 3, we will focus only on the correlations that show us clear directions or trends.

First, the correlation pattern of IOR and EOR with seven other indexes was very similar. Also, at most, correlation between these two indexes was notably high (95% CI = .36, .70) and,  $r$  becomes .92 when we correct the attenuation<sup>3</sup>. Both motivational indexes are negatively correlated with LMR ( $r$  falls between -.27 and -.73); and at their best they had a striking inverse relationship with RA ( $r$  falls between -.59 and .03). In addition, these indexes and RSE were positively correlated ( $r$  falls between .13 and .55).

Next, LMR was positively associated with RA (95% CI = .34, .71), and negatively related to RSE (95% CI = - .60, - .10) and other motivational indexes (see above). A similar correlation pattern can be seen for the RA index: RA showed a negative relationship with RSE (95% CI = - .58, - .12) and at its best also with IOR and EOR (see above).

Lastly, despite their low reliability coefficients, AA and QL showed some interesting correlations with other variables. Propensity for avoiding ambiguity (AA) is connected to LMR (95% CI = .11, .55) and RA (95% CI = .14, .63), and might be negatively correlated with risk-taking tendency (RT) (95% CI = - .56, .01). As for QL, it may have positive relationships with EOR and IOR ( $r$  falls between - .03 to .48), the inclination for finding SA (95% CI = .09, .49), and RSE (95% CI = .01, .49).

## DISCUSSION

First of all, the clear negative relationships observed between LMR and the two other motivational indexes (i.e., EOR and IOR) generally upheld SDT's taxonomy of motivation (Ryan & Deci, 2000): LMR, the amalgam of amotivation and extrinsic regulation, is clearly a different motivational facet from more internalized ones (see also Kondo-Brown, 2006). On the contrary, the difference lying between EOR and IOR was by no means clear. On top of their notable correlation (95% CI = .36, .70; attenuation corrected  $r = .92$ ), the correlation patterns of EOR and IOR with the seven other indexes were remarkably similar. There are basically two ways of interpreting these results. The first possibility is that, in the case of JEFL college students, large parts of EOR and IOR are assimilated and this assimilation was the root of the above-stated phenomena. This explanation does not conflict with SDT as the quality of extrinsic motivation gets close to intrinsic motivation as learners internalize their learning motivation (Ryan & Deci, 2000; Wang & Guthrie, 2004). Also, because it is totally possible that learners enjoy their engagement in FLR and at the same time expect a high instrumental return for their investment (Grade, 2009, p. 184), assimilation of EOR and IOR is a possibility. Another explanation comes from the low reliability of IOR. As we can see in Table 1, measurement error included in IOR reaches 55% (= 1.00 - .45). Considering this together with the correlation patterns stated above, it is reasonable to think that EOR and IOR behaved similarly in Table 3 only because several items included in IOR had a similar quality to those of EOR. If this is the case, it basically means that the index known as IOR is not the appropriate index for JEFL college students. The data at hand does not allow us to conclude which explanation is more plausible. One option we can take in future is replacing IOR with the scale invented for Japanese junior high or high school students (Fujita & Noro, 2009; Matsui & Noro, 2010). Although Cronbach's alpha of this index was marginally adequate when it was applied to college students ( $\alpha = .71$  and  $.72$ ) (Yamashita, 2013), utilization of this index may result in illustrating clearer functional differences between EOR and intrinsic motivation in FLR. Due to these multiple possibilities for data interpretation, in what follows, we collectively refer to IOR and EOR as the more internalized motivation (MIM) and will not discuss the different functions of these attributes.

Next, a clear trend was confirmed in the correlations between RSE, RA and the motivational indexes. In a nutshell, these results showed that the more RSE people have, the more internalized motivation they have, and the less anxiety for FLR they feel. LMR behaved opposite to this: learners with LMR tend to become anxious when they need to engage with FLR and have negative SE in FLR. Also, as already mentioned, LMR does not coexist with MIM.

The above relationship can be clearly understood with the aid of relevant theories and empirical findings in FLR studies. As we explained above, learning behaviour provides individuals

with learning experience which include their psychological reactions (Schunk & Zimmerman, 2007). If the reaction is positive, then learners can strengthen their SE in a given domain (e.g., in FLR); and increased efficacy belief supports learners to make further self-investments (Zimmerman, 2006). This cycle in turn means that negative SE becomes a psychological barrier for future engagement in FLR activities. This explains why RSE correlates negatively with RA. Learning experience also drives people to form, increase or decrease (specific facets of) learning motivation (Yamashita, 2013). If one increases self-value toward their learning, this by and large fuels learners' (intended) learning behaviour (Grabe, 2009, p. 184). Because learning effort induced by MIM can enhance learners' RSE and *vice versa*, there is little reason to think that MIM cannot develop along with RSE. The results of this study gave empirical support to this: they indeed can coexist. Conversely, as one might expect, lack of or insufficient self-value in FLR and self-perceived importance in studying FLR is yet another psychological barrier for future FLR engagement (Kondo-Brown, 2006). Considering these rationales, it is easy to accept the idea that learning behaviour acts as the implicit function and ties together LMR with RA and negative RSE because, without learning behaviour, it is hard to grow RSE and easier to develop anxiety towards reading comprehension skill.

The behaviour of RA in Table 3 is probably the most interesting result in this study. It is of our interest because reading has been considered to be the least anxiety-provoking activity among other types of language activities. The results of this study showed, however, that RA sensitively fluctuates with the changes in the motivational state and the degree of RSE (see also Kuru Gönen, 2009 in Güvendir, 2014). As we have seen in Table 3, learners tend to feel anxious toward FLR activities when they have no or little internalized value for studying FLR (95% CI = .34, .71) whereas this relationship, to say the least, virtually disappears where learners have MIM ( $r$  falls between -.59 and .03). Also, as touched on above, RA does not coexist with RSE. With the results of this study, we can now establish the following hypothesis: reading activity is probably the least anxiety-provoking activity in comparison; however, how anxious individuals are in FLR depends on their mental conditions as well as the type of reading (Brantmeier, 2005); and existence (or lack thereof) of LMR and RSE will be (possibly along with MIM) the keys with which we can conduct further investigation into this research topic. Our future challenges will be, therefore, to clarify to what extent RSE and the motivation types affect the degree of perceived RA, and actual FLR performance.

Some of the remaining indexes also showed interesting correlations despite their low reliability coefficients. As touched on above, statistically speaking, these results suggest the durability of the target relationship as it survives attenuation (Haertel, 2006; Muchinsky, 1996). When it comes to the validity of inference, however, we cannot regard the scales which do not have adequate internal consistency as valid, as a large amount of error associated with measurements prevent us from giving proper names to what is being measured (Murayama, 2012). Thus, the best we can say from the results of this study is that, if we overcome the reliability issue, it is quite possible that similar correlation patterns will emerge to where we had significant and/or notable correlations in Table 2 and 3. In this study, we confirmed that item trimming did not make any improvement to the Cronbach's alpha of low-reliability indexes (see also Kondo-Brown, 2006). Judging from these results, what should be done in future is to reconsider the question items of these indexes revisiting the concept of each target attribute and test the validity of refined measurements. Although these results are surely a limitation of this study, we believe that our data will be a stepping-stone for future measurement refinements and revalidations.

Another limitation of this study lies in its sampling. Although this study recruited its participants from as many departments as possible (i.e., 10 different departments), more data from a greater variety of college students are needed for more precise parameter estimations and generalization of results. Thus, after the above-stated measurement revalidations, we should revisit the internal structure of FLR attributes once more.

## CONCLUSION

The answer to the first research question is as follows. First, judging from their adequate reliability coefficients and the theory-consistent behaviours observed in Table 2 and 3, it is safe to say that the utility of EOR, LMR, RA and RSE is satisfactory for JEFL college students. As for IOR, it probably will be better for future studies to use the index introduced in Fujita and Noro (2009) in order to confirm the different function of intrinsic motivation from EOR (see also Matsui & Noro, 2010; Yamashita, 2013). The rest of the low-reliability items were in need of item reconsideration and revalidation.

Regarding the second research question, this study succeeded in illustrating some interesting trends in the relationship between FLR attributes (of JEFL college students). In particular, (a) partially upheld taxonomy of motivation; (b) the positive and negative link found between the motivational indexes and RSE; and (3) RA's behaviour toward the motivational states and the degree of RSE will provide useful insight for future model building.

## ENDNOTES

- <sup>1</sup>. This is partially because more positive emotions, such as the feelings of joy or pleasure, are regarded as components of motivation and not as single attributes.
- <sup>2</sup>. According to Arrindell and van der Ende (1985), the ratio of participants to factors has much more importance than that of participants to variables.
- <sup>3</sup>.  $P_{xy} = r_{xy} / \sqrt{r_{xx} \times r_{yy}}$ , where  $P_{xy}$  is the disattenuated coefficient,  $r_{xy}$  is the observed correlation, and  $r_{xx}$  and  $r_{yy}$  are the reliability of index x and y (Muchinsky, 1996).

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