

Profiling Individual Differences of Successful and Unsuccessful L2 Readers

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Understanding the ways in which L2 learners differ from one another is one of the primary concerns of those involved in second language acquisition (SLA) research. Although studies conducted so far offer various insights into effective L2 teaching, they also have several drawbacks, such as (1) they have focused on each learner variable individually, thus lacking a holistic perspective; (2) they have employed cross-sectional designs, thus lacking a developmental perspective; and (3) they have dealt with each learner variable on a general level, and have not related these variables to specific language skills or tasks. On the basis of the above, the objective of this study is to identify, in a holistic and developmental way, the relationships among L2 learners' reading motivation, reading strategy use, learner beliefs, and L2 reading achievement, and consequently reveal the profiles of successful and unsuccessful L2 readers. The results showed that: (1) participants could be divided into four groups with various learner characteristics; and (2) each group followed unique developmental paths for (un)successful learning. This suggested that more than one route exists to success or failure in

learning an L2, indicating that teachers should adjust their teaching strategies according to the profiles of L2 learners.

Key words: individual differences, reading motivation, strategy use, learner beliefs, reading achievement

BACKGROUND

Individual differences (henceforth abbreviated only to IDs) among learners have been the focus of numerous researchers and educational practitioners. Even within the research context of L2 education, the role fulfilled by IDs has repeatedly been indicated as important when considering the success or failure of L2 learning. For example, Oxford and Ehrman (1993) synthesized L2 research on IDs and identified nine important factors that can strongly influence L2 learning: aptitude, motivation, anxiety, self-esteem, tolerance of ambiguity, risk-taking, language learning styles, age, and gender. Robinson (2002) included intelligence, motivation, anxiety, language aptitude, working memory, and age in his list, and examined each factor in detail. More recently, Ellis (2004, 2008) summarized various L2 studies and classified ID factors into four categories (i.e., abilities, propensities, learner cognitions about L2 learning, and learner actions). Table 1 shows these four categories and corresponding example factors.

Thus far, a large number of studies have been conducted regarding ID factors (for example, see Dörnyei, 2005; Ellis, 2004; Gardner, 2008; Robinson, 2002). Among them, learner motivation appears to be a factor that attracts many researchers and practitioners, partly because it is considered to significantly affect the success of learning not only in L2 instruction, but throughout all aspects of educational activities.

L2 motivation research began with studies that defined and explained the structure of motive in L2 learning. These studies were often based on a social psychological approach (e.g., Gardner & Lambert's integrative/instrumental orientation, 1972) and an educational psychological approach (e.g., Noel's Self-

TABLE 1
Factors Responsible for IDs in L2 Learning
(Ellis, 2008: 645; Originally from Ellis, 2004: 530)

Category	Factors
A Abilities	1 Intelligence
	2 Working memory
	3 Language aptitude
B Propensities	1 Learning style
	2 Motivation
	3 Anxiety
	4 Personality
	5 Willingness to communicate
C Learner cognitions about L2 learning	Learner beliefs
D Learner actions	Learning strategies

Determination theory approach, 2001; Williams & Burden's attribution theory approach, 1997). Following these lines of research, later studies attempted to describe and explain the process of motivation in L2 learning. For example, Gardner, Masgoret, Tennant, and Mihic (2004) tracked intermediate-level French course students over a period of one year and found that some affective characteristics (such as attitudes toward the learning situation) were more amenable to change than others (such as integrative/instrumental orientation), and that patterns of change over time were moderated by achievement in the course. More recently, several researchers have engaged in studies that detailed and organized numerous motivational techniques (e.g., Dörnyei's (2001) 35 motivational strategies that teachers can use in the language classroom), and investigative research or educational intervention studies conducted on the basis of a motivation model (e.g., Guilleaume & Dörnyei, 2008; Hiromori, 2006).

On the other hand, learning strategy is another well-researched factor responsible for IDs in L2 learning (see Cohen & Macaro, 2007; Griffiths, 2008; Oxford, 2011). As with learner motivation, initial research on L2 learning strategies attempted to define and categorize various learning strategies. Two of the most influential classifications involve Oxford's (1990) taxonomy of direct (including memory,

cognitive, and compensation strategies) and indirect strategies (including metacognitive, affective, and social strategies), and O'Malley and Chamot's (1990) taxonomy of cognitive, metacognitive, and social strategies. A large number of studies have examined the relationship between learning strategies and other cognitive, affective, and behavioral factors. For example, Green and Oxford (1995) found that females were more active strategy-users than males, and this difference was constant across proficiency levels, with women using higher levels of strategy use. Also, language proficiency has been consistently reported to be linked with strategy use. A fairly typical finding has been that the higher the use of learning strategies, the greater the L2 proficiency (e.g., Griffiths, 2003; Ku, 1995; Wharton, 2000). However, there have also been results suggesting that the relationship is more complex than a simple linear correspondence between strategy use and developing proficiency (e.g., Chen, 1990; Mahlobo, 2003; Murray, 2010), implying that an overemphasis on language learning strategies may not be appropriate, and that such strategies should be treated as only one among many variables in the language learning process.

While we do not wish to review individual studies in more detail here, we would like to point out that although the studies conducted so far offer various insights into effective L2 teaching, they also have at least three drawbacks or challenges. The first is that the majority of these studies have focused on each ID factor individually, thus failing to reflect on several ID factors together, and therefore they lack a holistic perspective. ID factors do not exist separately, but rather are in an interactive relationship with other IDs. If it is possible to determine the balance at which superior learners develop individual learner factors, it would be possible to obtain ideas for providing more effective educational support, and in order to accomplish this, studies based on a holistic or integrated perspective are essential.

The second drawback is that most previous studies have employed cross-sectional designs, thus lacking a developmental perspective. Although cross-sectional studies enable us to compare several groups of participants at a single point in time, they do not allow us to detect their developmental characteristics at the individual or group level. Thus, tracking the development of each individual learner or group of learners adds a new perspective to the

cross-sectional research.

The third drawback is that the majority of previous studies have dealt with each ID factor on a general level (i.e., language learning in general), and have not related these factors to specific language skills or tasks. We can easily imagine that learner factors are affected by numerous other factors such as the learning situation in which learners are placed, the language skills they practice, and the learning task they are engaged in. This means that future research needs to focus on a particular language skill or task and examine its effects on the factors responsible for IDs.

So far there have been few studies which have focused on more than two ID factors, but some have appeared. For example, Yamato (2002) examined the relationships among learner motivation, learning strategies, and proficiency in an EFL setting. In this study, significant correlations were reported between these factors, and hypotheses were formulated that motivation and strategy use can influence proficiency either directly or indirectly. Yamamori, Isoda, Hiromori, and Oxford (2003) also investigated the same ID variables (i.e., motivation, strategy, and proficiency) in another EFL setting. The results of this study revealed the non-linear developmental paths of these variables among learners, indicating that effective (or “orchestrated”) strategy use can promote motivation. The limited number of studies on these multiple IDs necessitates more investigation in this research field.

On the basis of the above, the objective of this study is to identify the profiles of successful and unsuccessful L2 readers in a holistic and developmental way. This study examines four ID variables together: learner motivation for reading which corresponds to “propensities” in Ellis’s (2004) classification (as mentioned in Table 1), reading strategy use corresponding to “learner actions,” learner beliefs matching “learner cognitions,” and reading achievement, which can be considered as almost equivalent to “abilities” in reading performance. We believe that this method of investigation (i.e., reflecting on ID factors together rather than on individual ID factors) can bring a more accurate understanding of various types of L2 reading performance.

We followed Ellis’s (2004) classification in terms of four categories of IDs in L2 learning by picking up one ID factor from each category. There are two reasons for this: (1) the relative importance among these factors and (2) the validity of research

design. We included learner motivation and strategy use because motivation is a crucial factor in L2 achievement (e.g., Dörnyei, 2005; Ellis, 2008) and affects L2 learners' strategy use (e.g., O'Malley & Chamot, 1990; Oxford & Nyikos, 1989). Learner beliefs were also included because they can have certain effects on motivation and strategy use in L2 learning (Horwitz, 1988) and restrict the range of learning strategies (Yang, 1999). The four ID factors (motivation, strategy use, beliefs, and achievement) chosen according to their relative importance appear to be valid, since it is almost impossible to examine all the ID factors in one study at the same time.

We selected L2 reading, a specific language skill, as the target domain because specificity is believed to affect participants' performance and subsequent results, which may shed a new light on the ID research. Reading skill was also considered to be among potential alternatives for this vein of research due to the accumulation of domain-specific research (see Grabe, 2009).

We believe this study represents a useful attempt to uncover various IDs of successful and unsuccessful L2 learners and to orchestrate desirable learning environments that can serve these learners. EFL learners in Japan differ in the levels of proficiency, motivation, strategy use, beliefs, and other ID factors. In other words, the English language appears to have been learned diversely by different types of learners. Therefore, ample research focusing on various ID factors of EFL learning is necessary for more pedagogical improvement.

METHODS

Participants

The participants were 234 Japanese EFL university students enrolled in several classes of a required English language course. They participated in one 90-minute class per week. Their majors were education, literature, engineering, and business administration. Particular care was taken to include students with various majors and various levels of English proficiency. Non-probability convenient sampling was the only sampling method used: the participants were selected on the basis of being accessible and expedient. In this course, they were expected to acquire basic

reading skills (e.g., skimming, scanning, summarizing). They encountered a wide range of reading genres such as magazines, newspapers, textbooks, and journal articles, as well as graphic materials such as charts, graphs, and timelines. Emphasis was placed on reading and vocabulary activities, but other activities that focused on listening, speaking, and writing were also included, with the aim of improving the students' basic English ability.

Strategy Instruction

Strategy instruction was integrally combined into the course activities. The strategies explicitly taught and practiced were: identifying main ideas, summarizing, making inferences, and utilizing organization. Before class, students were asked to read a unit or review passages that focused on specific strategies. During class, each strategy was explained and demonstrated to the students, followed by hands-on practice with relevant activities. At the end of class, the students were frequently asked about how effective and efficient each strategy use was. After class, the students were instructed to review each strategy based on what they had learned during the class.

Measures

Four measures were used to achieve the objective of this study: reading motivation, reading strategy use, learner beliefs, and English reading achievement tests. They were originally developed by previous studies and had been validated for their psychometric properties for this study, except for the reading test developed by the researchers to assess basic reading skills. A description of each measure, along with Cronbach alphas, follows.

1) Reading Motivation Questionnaire

To measure motivation for reading, *the Motivation for Reading Questionnaire* (MRQ: Wigfield & Guthrie, 1997), which has been widely adopted in L1/L2 reading motivation research, was used. The MRQ consists of three components of

extrinsic motivation, intrinsic motivation, and reading efficacy. For the present study, we adopted these three components of the original MRQ and reworded the items so that the questionnaire would be relevant to the participants and the context in which the study was carried out. The following shows the three components used in this study, with examples, the number of items of which they were composed, and the Cronbach alpha coefficient for each component: (1) Extrinsic: “I look forward to finding out my reading grade” and “I am happy when someone recognizes my reading” (5 items, Cronbach $\alpha = .78$); (2) Intrinsic: “I like to read about new things” and “I like hard, challenging books” (2 items, Cronbach $\alpha = .70$); and (3) Reading efficacy: “I know that I will do well in reading” and “I can be a good reader if I try” (3 items, Cronbach $\alpha = .76$). All items were scored on a Likert-type scale from 1 (*not at all true of me*) to 5 (*very true of me*).

2) Reading Strategy Questionnaire

The Survey of Reading Strategies (SORS: Sheorey & Mokhtari, 2001) was adopted for use in this study. The SORS was originally developed to measure the perceived use of the type and frequency of various metacognitive/cognitive strategies by university students while reading academic materials in English. We used 24 items out of 30 of the original SORS and reworded the selected items so that each item would be relevant to the participants in this study. The following shows the four components used in the study, with examples, the number of items, and the Cronbach alpha coefficient for each component: (1) Adjusting: “I go back and forth in text to gather necessary information” and “I read slowly and carefully when text is difficult” (6 items, Cronbach $\alpha = .72$); (2) Inferring: “I guess the meaning of unknown words from the context” and “I predict or guess how text will develop” (5 items, Cronbach $\alpha = .70$); (3) Monitoring: “I confirm mentally the extent to which I understood the contents of the text” and “I confirm whether or not my own understanding is correct once I have finished reading” (3 items, Cronbach $\alpha = .80$); and (4) Comprehending: “I identify the main idea of each paragraph” and “I recognize patterns in the text structure” (10 items, Cronbach $\alpha = .79$). All items were scored on a Likert-type scale from 1 (*not at all true of me*) to 5 (*very true of me*).

3) Learner Belief Questionnaire

Learner belief can be considered as preconceived notions, myths, or misconceptions about language learning. To measure this belief, a questionnaire was developed by analyzing previous learner belief questionnaires. Following Ueki (2002), which investigated Japanese EFL learners' beliefs about language learning, we identified two components of beliefs: environmental orientation (beliefs that assume the existence of good/bad environments for learning) and strategic orientation (beliefs that assume the existence of good/bad strategies for learning). Ueki's study was of value in extracting a factor of "environmental orientation," which had not been discovered in the previous studies. The following shows example items of these two components, the number of items they comprised, and the Cronbach alpha coefficient for each component: (1) Environmental orientation: "It is important to place myself in the right environment for studying" and "Performance improves when learning from a skilled teacher" (2 items, Cronbach $\alpha = .71$) and (2) Strategic orientation: "Persons with good grades are those that know how to study properly" and "It is effective to devise a manner of studying that fits you" (3 items, Cronbach $\alpha = .75$). As with the reading motivation and reading strategy use questionnaires, all items were scored on a Likert-type scale from 1 (*not at all true of me*) to 5 (*very true of me*).

4) English Reading Achievement Tests

Participants' L2 reading achievement was measured by the in-house tests constructed by the researchers managing the course. Each of the tests consisted of two passages of approximately 400 words, and 20 multiple-choice questions, and assessed the basic reading skills which were taught in class (i.e., skimming, scanning, summarizing) as well as reading achievement. The passage topics were "educational systems" and "environmental protection" in the pre-test, and "volunteer work" and "culture shock" in the post-test. The full score range for each test was from 0 to 100 (i.e., each correct answer multiplied by five). The Cronbach alpha coefficient was .90 for the pre-test and .91 for the post-test.

Data Collection and Analysis Procedures

All the data collection for the study was carried out during the students' regular English classes. To trace students' developmental traits, data were gathered at the middle and the end of the course (i.e., 7th week for a pre-test and 14th week for a post-test during a 15-week semester). Questionnaires regarding each ID factor were administered right after the students had finished the reading achievement test, so that they would have a specific task on which to base their responses. The reading test took about 30 minutes, and was followed by the questionnaires, which also took about 15 minutes.

As for the data analysis, cluster analysis was used to profile the students based on their pre-test scores on the four measures (i.e., reading motivation, reading strategy use, learner beliefs, and English reading achievement). Cluster analysis is reported to be useful in categorizing subjects on the basis of several different traits (Yamamori, et al., 2003). Scores were standardized before computation because the measures had differing score ranges. The Ward method with the squared Euclidean distance technique was chosen for cluster analysis, because this procedure tends to combine clusters with a small number of observations (Hair & Black, 2000). The number of meaningful clusters was decided by considering large changes in clustering distances and the characteristics of the resulting clusters.

With the aid of a dendrogram (a graphic representation of the clustering process) obtained from the analysis, the students who participated in this study were categorized into four groups. To confirm the validity of the grouping, ANOVAs were conducted on all the variables. The results indicated significant overall differences among the clusters (i.e., groups of students). Tukey's multiple comparison technique was also used to determine which means (in this case, clusters) amongst a set of means differed from the rest. All the analyses were conducted with SPSS Statistics 17.

RESULTS AND DISCUSSION

Table 2 displays detailed results that indicate the distinctiveness of the characteristics of the four groups that resulted from the cluster analysis. The results in this table lend credence to the validity of the classification.

General Description of the Four Groups in the Pre-Test

Figure 1 gives a visual representation indicating the means of the pre-test of ID factors in each group. Based on Table 2 and Figure 1, a general description of the four groups in the pre-test follows.

The four groups were classifiable into two broader categories according to their English achievement: high achievers (Cluster 2 and Cluster 4) and low achievers (Cluster 1 and Cluster 3) (see Table 2). In a nutshell, the high achievers showed active reading strategy use, high motivation for reading and strong belief in the need to learn English. Although these two groups generally demonstrated high means, the mean scores of the variables in Cluster 4 were statistically higher than those in Cluster 2 (Motivation_Extrinsic: $M_{diff} = 0.57, p < .01$; Motivation_Intrinsic: $M_{diff} = 0.79, p < .01$; Motivation_Reading efficacy: $M_{diff} = 0.77, p < .01$; Beliefs_Environment: $M_{diff} = 0.63, p < .01$; Beliefs_Strategy: $M_{diff} = 0.43, p < .01$). However, one exception was found in monitoring strategy use. Namely, the mean score of monitoring strategy in Cluster 2 was higher than that in Cluster 4 (Strategy_Monitoring: $M_{diff} = 0.63, p < .01$), meaning that students in Cluster 2 felt more certainty about what they were doing when reading English. To put it a different way, they expressed metacognitive awareness of their own reading behaviors.

TABLE 2
Means, Standard Deviations, and One-Way ANOVAs for Effects of Four Groups on 10 Dependent Variables

Time & Variables	Cluster 1 (n=41)		Cluster 2 (n=78)		Cluster 3 (n=58)		Cluster 4 (n=57)		ANOVA		Post hoc test
	M	SD	M	SD	M	SD	M	SD	F (3, 230)	p	
Pretest											
Motivation_Extrinsic	2.58	.72	3.69	.49	3.38	.63	4.26	.59	56.61	.00	1 < 2, 3, 4**; 2 > 3*, 2 < 4**
Motivation_Intrinsic	2.12	1.13	2.07	.73	1.65	.64	2.86	.97	19.16	.00	1 > 3*, 1 < 4**, 2 > 3*, 2 < 4**, 3 < 4**
Motivation_Reading efficacy	2.62	.86	3.27	.68	2.50	.70	4.04	.83	54.39	.00	1 < 2, 4**, 2 > 3**, 2 < 4**, 3 < 4**
Strategy_Adjusting	3.06	.87	3.94	.50	3.52	.65	3.97	.59	24.05	.00	1 < 2, 3, 4**, 2 > 3**, 3 < 4**
Strategy_Infering	2.78	.93	3.69	.55	2.99	.57	3.48	.67	22.34	.00	1 < 2, 4**, 2 > 3**, 3 < 4**
Strategy_Monitoring	2.41	.92	3.70	.62	2.58	.63	3.07	.98	36.56	.00	1 < 2, 4**, 2 > 3, 4**, 3 < 4**
Strategy_Comprehending	2.45	.75	3.15	.47	2.55	.52	3.10	.55	26.18	.00	1 < 2, 4**, 2 > 3**, 3 < 4**
Beliefs_Environment	2.59	.73	3.71	.76	3.80	.65	4.34	.68	48.93	.00	1 < 2, 3, 4**, 2 < 4**, 3 < 4**
Beliefs_Strategy	3.04	.63	3.96	.75	4.13	.65	4.39	.58	32.75	.00	1 < 2, 3, 4**, 2 < 4**
Achievement	52.79	23.42	59.83	20.37	49.65	19.93	64.09	18.56	4.42	.01	1 < 4*, 2 > 3**, 3 < 4**
Posttest											
Motivation_Extrinsic	3.05	.92	3.76	.62	3.58	.68	4.09	.79	16.32	.00	1 < 2, 3, 4**, 3 < 4**
Motivation_Intrinsic	2.13	1.07	2.31	.79	2.02	.77	2.92	1.08	10.76	.00	1 < 4**, 2 < 4**, 3 < 4**
Motivation_Reading efficacy	3.00	.99	3.45	.83	3.27	.84	4.06	.89	13.68	.00	1 < 2*, 1 < 4**, 2 < 4**, 3 < 4**
Strategy_Adjusting	3.67	.67	3.92	.61	3.77	.70	4.06	.51	3.82	.01	1 < 4*
Strategy_Infering	3.28	.81	3.76	.61	3.47	.57	3.67	.69	5.53	.00	1 < 4*, 1 < 2**
Strategy_Monitoring	2.92	.84	3.60	.85	3.14	.77	3.44	.95	7.03	.00	1 < 2**, 1 < 4*, 2 > 3*
Strategy_Comprehending	2.79	.79	3.33	.56	2.98	.59	3.41	.58	11.55	.00	1 < 2, 4**, 2 > 3**, 3 < 4**
Beliefs_Environment	3.46	1.01	3.73	.76	3.73	.82	4.08	.85	4.41	.01	1 < 4**
Beliefs_Strategy	3.67	.88	4.18	.63	4.11	.82	4.37	.69	7.46	.00	1 < 2, 4**, 1 < 3*
Achievement	54.02	18.95	60.38	16.09	54.83	17.17	60.61	20.25	2.14	.10	

Note: *p < .05, **p < .01

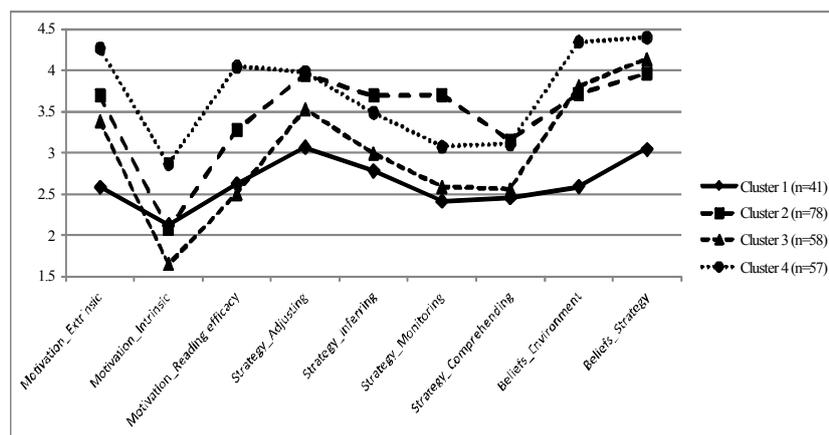


FIGURE 1

Visual Representation of the Pre-Test of ID Measures in the Four Groups

On the other hand, the other two groups, Cluster 1 and Cluster 3, were low-achieving. They differed from each other in several ways. The mean scores of the four variables in Cluster 3 were statistically higher than those in Cluster 1 (Motivation_Extrinsic: $M_{diff} = 0.80, p < .01$; Strategy_Adjusting: $M_{diff} = 0.46, p < .01$; Beliefs_Environment: $M_{diff} = 1.21, p < .01$; Beliefs_Strategy: $M_{diff} = 1.09, p < .01$), while one variable showed the opposite results (Motivation_Intrinsic: $M_{diff} = 0.47, p < .05$). The mean scores of beliefs, certain components of reading motivation and reading strategy use in Cluster 3 were almost the same as those for the high achievers, but the mean score of intrinsic motivation was the lowest among the four groups at a statistically significant level. In the case of Cluster 1, the mean scores appeared to be rather low in a consistent way throughout all the variables.

As a tentative summary for the pre-test, the four groups can be characterized as follows: Cluster 1 – low achievement, low motivation/strategy/beliefs; Cluster 2 – high achievement, high strategy (especially, monitoring); Cluster 3 – low achievement, low intrinsic motivation; and Cluster 4 – high achievement, high motivation/beliefs. These results indicate the possibility that different ID factors were the cause of students' high or low achievement. This point will be discussed in more detail in a later section.

General Description of the Four Groups in the Post-Test

As can be seen in Table 2, the English achievement mean in the pre-test was significantly higher for Cluster 4 (64.09) than for both Cluster 3 (49.65), $p < .01$, and Cluster 1 (52.79), $p < .05$. Cluster 2 had a significantly higher achievement mean (59.83) than Cluster 3 (49.65), $p < .01$. However, in the post-test, no significant achievement difference emerged among the four groups. Figure 2 gives a visual representation indicating the means of the post-test of ID measures in each group. Based on Table 2 and Figure 2, a description follows of the four groups in the post-test and possible reasons behind the change mentioned above.

The general view of each measure in the four groups tended to be the same as the pre-test. Namely, the high achievers (Cluster 2 and Cluster 4) maintained strong motivation for reading, strong belief in the need to learn English, and active reading strategy use, whereas the low achievers (Cluster 1 and Cluster 3) showed lower mean scores in almost all the cases of ID measures. For example, the mean scores of the motivation components in Cluster 4 were statistically higher than those in both Cluster 1 and Cluster 3 (Motivation_Extrinsic: $M_{\text{diff}} = 1.04$, $p < .01$, and $M_{\text{diff}} = 0.51$, $p < .01$; Motivation_Intrinsic: $M_{\text{diff}} = 1.06$, $p < .01$, and $M_{\text{diff}} = 0.79$, $p < .01$; Motivation_Reading efficacy: $M_{\text{diff}} = 0.79$, $p < .01$, and $M_{\text{diff}} = 0.90$, $p < .01$, respectively). However, compared to the differences among the four groups found in the pre-test, the number of overall differences among them in the post-test appeared to decrease. This may be due to the development of reading motivation, strategy use, and learner beliefs of the lower achievers. At the same time, this change can be considered to explain the result that no significant group difference emerged in the post achievement test.

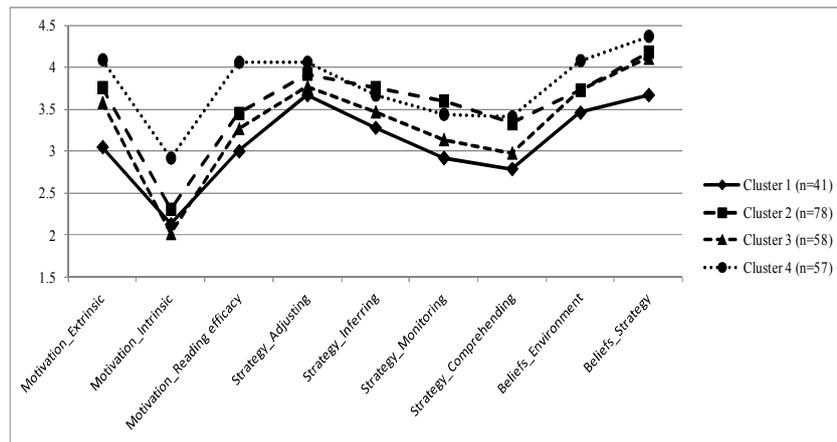


FIGURE 2

Visual Representation of the Post-Test of ID Measures in the Four Groups

So far, we have explored inter-individual differences in the sample of participants by identifying four groups within the whole. Now let us discuss the intra-individual differences by comparing the changes in mean scores of each ID measure so that we can examine the developmental changes in more detail. Table 3 shows the mean change in pre-test / post-test scores in the four groups. Effect size (Cohen's *d*) for the mean change is also reported in parentheses. Cohen (1988) describes effect sizes as “small” when *d* is (more than) 0.20, “medium” when *d* is more than 0.50, and “large” when *d* is more than 0.80. In the following interpretation, we will follow this original guideline.

As can be seen, the high achievers (Cluster 2 and Cluster 4) tended to show small changes across the measures. This may be due to the ceiling effect, suggesting that their mean scores in the pre-test were already high to some extent. Thus, in the following, we will focus on the two low achievers (Cluster 1 and Cluster 3).

TABLE 3.
Mean Changes and Cohen's Effect Sizes in the Four Groups

Variable	Cluster 1 (<i>n</i> =41)	Cluster 2 (<i>n</i> =78)	Cluster 3 (<i>n</i> =58)	Cluster 4 (<i>n</i> =57)
	Mean change	Mean change	Mean change	Mean change
M_Extrinsic	0.47(0.57)**	0.09(0.13)	0.20(0.31)*	-0.17(0.24)*
M_Intrinsic	0.01(0.01)	0.24(0.32)*	0.37(0.52)**	0.06 (0.06)
M_Reading efficacy	0.38 (0.41)*	0.18 (0.24)*	0.77(1.00)***	0.02 (0.02)
S_Adjusting	0.61(0.79)**	-0.02(0.04)	0.25(0.37)*	0.09(0.16)
S_Infering	0.50(0.57)**	0.07(0.12)	0.48(0.84)***	0.19(0.28)*
S_Monitoring	0.51(0.58)**	-0.10 (0.14)	0.56(0.80)**	0.37(0.38)*
S_Comprehending	0.34(0.44)*	0.18(0.35)*	0.43(0.77)**	0.31(0.55)**
B_Environment	0.87(0.99)***	0.02(0.03)	-0.07(0.10)	-0.26(0.34)*
B_Strategy	0.63(0.82)***	0.22(0.32)*	-0.02(0.03)	-0.02(0.03)

Note. * small ($0.20 < ES$), ** medium ($0.50 < ES$), *** large ($0.80 < ES$)

In regard to Cluster 1, most of the variables showed significant changes in the pre-test / post-test scores. For example, the mean scores of learner beliefs indicated large changes (Beliefs_Environment: $M_{diff} = 0.87$, $d = 0.99$; Beliefs_Strategy: $M_{diff} = 0.63$, $d = 0.82$). One exception, however, was intrinsic motivation. This did not show any change in mean score (Motivation_Intrinsic: $M_{diff} = 0.01$, $d = 0.01$), indicating that it might have been difficult for some students to enjoy learning itself, make decisions for themselves, and engage in learning willingly. On the other hand, as for Cluster 3, the mean scores of reading motivation and reading strategy use showed relatively large changes. Let us take reading efficacy in the motivation components for instance. A large change is shown in the pre-test / post-test scores (Motivation_Reading efficacy: $M_{diff} = 0.77$, $d = 1.00$). The motivational changes appeared to help students' strategic development, since it is not surprising that there is a strong link between both factors. Although learner beliefs did not show any changes (Beliefs_Environment: $M_{diff} = -0.07$, $d = 0.10$; Beliefs_Strategy: $M_{diff} = -0.02$, $d = 0.03$), this can be considered due to the ceiling effect (i.e., their mean scores in the pre-test were already high ($M = 3.80$ and 4.13 , respectively), and this

helped the scores in the post-test to show smaller changes).

As a tentative summary for the post-test and pre-test-post-test changes, while the high achievers maintained or slightly developed their ID factors, the low achievers also showed positive changes in significant ways. More detailed analysis focusing on the latter two groups found that there were different developmental patterns. Specifically, belief changes (Cluster 1) or motivational changes (Cluster 3) appeared to have positive influences on students' strategy use, suggesting that there were individual differences in factors that help strategic development.

Interaction of Multiple ID Factors

As was mentioned before, in the pre-test, although the learners belonging to Cluster 2 and Cluster 4 were evaluated as high achievers, it is possible that the cause of high achievement in both groups differed. Namely, in contrast to all the ID factors having high mean scores in Cluster 4, the mean score of intrinsic motivation in Cluster 2 was low ($M = 2.07$, $SD = 0.73$ for the pre-test and $M = 2.31$, $SD = 0.79$ for the post-test), and in fact was almost the same mean as with the low achievers. However, the effective utilization of strategies (especially, monitoring strategy) can be considered to have compensated for their L2 reading, leading to the high level of achievement.

Similarly, there were also some differences observed between the learners belonging to Cluster 1 and Cluster 3, who were evaluated as low achievers. That is, there is a high likelihood that the low level of beliefs was the cause of low achievement in Cluster 1, while the low level of intrinsic motivation was likely to have been the cause in Cluster 3. However, since this low mean score was improved to a certain extent in the post-test, results for the reading achievement test are also thought to have improved.

As for the relationships among motivation, strategy use, and learner beliefs, several studies have been conducted based on the (reasonable) assumption that learners' motivation and beliefs promote their use of learning strategies (e.g., Oxford & Nyikos, 1989; Shimizu, 2003; Yang, 1999), whereas other studies have shown the possibility that the opposite relationship exists. For example, Hiromori (2004) has shown that awareness of the use of learning strategies has the potential

to enhance student motivation. In addition, Okada (2007) has identified that failure to acquire a proper learning strategy leads to a decrease in motivation and learner beliefs. These studies indicate that quite strong interactive relationships appear to exist among the factors.

When reconsidering the results of the study with respect to the earlier research findings mentioned above, they can be summarized in the following manner. Multiple ID factors (such as motivation, learning strategies, and learner beliefs) affect L2 learning to varying degrees among individual learners, thus yielding different learner profiles. Therefore, it is not sufficient to examine each ID factor individually for learner profiles. In other words, learner profiles must be explored as a complex combination or interaction of various ID factors to differing degrees. In the actual learning setting, since ID factors interact in an organic manner, there are limitations on the extent to which it is possible to analyze their roles independently of one another. This is the reason we should adopt the holistic approach when designing research on ID factors. In addition to that, a study of learner development focusing on a specific language skill (i.e., in this case, reading) is considered to be extremely important in terms of gaining a more accurate understanding of students' learning processes as well as providing specific learning methods suitable for them.

CONCLUSION

In this study, Japanese EFL university students were tracked for a semester with regard to changes in motivation for reading, reading strategy use, learner beliefs, and L2 reading achievement. The results showed that there were close interactions among ID factors based on Ellis's (2004) classification. We believe the results of the present study provide confirmation that the holistic approach to focusing on ID factors is a fruitful one and that cluster analysis is an effective statistical procedure to apply in this context. This study also uncovered four concrete profiles of L2 readers and their developmental patterns by making use of the holistic approach, focusing on the specific skill of reading comprehension. The high achievers were basically good readers but had different learner characteristics, while the low

achievers appeared to have different problems in their English learning. This suggests that more than one route exists to success or failure in learning an L2, which suggests that teachers should adjust their teaching strategies according to the profiles of L2 learners.

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