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ABSTRACT

This study examined the profiles of L2 strategy use and their association with different types of L2 reading achievement. A total of 1491 college students responded to a strategy use questionnaire evaluating the efficiency of strategy use immediately after they took an English reading test. Results of latent profile analysis revealed: 1) there were three profiles of strategy users, namely, low-efficiency, moderate-efficiency, and high-efficiency strategy users; 2) higher strategy use profiles had a higher probability of belonging to higher levels of reading achievers; meanwhile 3) lower-efficiency strategy users displayed to a substantial extent the probability (albeit relatively small) of belonging to higher-level reading achievers and higher-strategy users also had probability of belonging to lower-level reading achievers. The study added value by focusing on the efficiency aspect of strategy use and by providing granular information regarding the uneven membership belongingness of different strategy users across different types of L2 readers.

Introduction

Numerous studies have shown that English as a second/foreign language (L2) readers' use of metacognitive and cognitive strategies plays an important role in determining L2 reading achievement (Hong-Nam and Page 2014; Sheorey and Mokhtari 2001; Zhang, Goh, and Kunnan 2014). However, results from existing studies are mixed. While some studies showed that more use of reading strategies is associated with higher reading proficiency (Sheorey and Mokhtari 2001), others revealed that unsuccessful L2 readers use as much these strategies as their successful peers (Hong-Nam and Page 2014). Oxford (2017) posits what actually counts is the quality of strategy use. Nevertheless, very few studies focused on the quality of reading strategy use except Tseng, Dörnyei, and Schmitt (2006). Moreover, the relation between reading strategy use and reading achievement has been conceived to be incremental (i.e. more use of strategies always leads to higher reading proficiency), and proceed in a vacuum (i.e. all students use strategy in the same pattern and the effect of strategy use on reading achievement is the same across all students). These beliefs, however, are countered by undertakings in relevant fields. Ning and Downing (2015) conducted a person-centred study and identified four types of strategy users: competent, cognitive-oriented, behavioural-

oriented, and minimal self-regulated learners. Likewise, Han, Farruggia, and Solomon (2018) identified three profiles of strategy users (i.e. low-, moderate- and high-frequency strategy users) and found higher profile strategy users obtained higher learning outcomes (GPA). In the case of reading strategies, whether different profiles (patterns) of strategy use exist in terms of strategy use quality and how different profiles are related to different levels of L2 reading achievement are yet to be unveiled.

The aims of the current study are (1) to explore whether students display different patterns of strategy use quality during reading performance; and (2) whether different patterns of strategy use quality are associated with different levels of reading achievement.

Materials and methods

Participants

A pool of 1491 college students from eight medical institutes participated in the study. They took an English reading test and then responded to a strategy use questionnaire measuring their efficiency of strategy use during the reading test.

Measures

The English reading test consisted of four passages, each with five multiple-choice questions. The strategy use questionnaire contained six subscales, asking students to evaluate the extent to which they successfully used different types of strategies (i.e. planning, monitoring, evaluating, memorising, retrieving and comprehending strategies) to facilitate their comprehension. In this way, we expect what we measured was students' self-evaluation of the efficiency (quality) of task-dependent strategy use instead of the conventional measure of strategy use frequency.

The measurement quality of the reading test and the questionnaire used in the current study have been assessed using multidimensional item response theory (MIRT) (see Cai & Kunnan, 2018 for reading and Cai, 2013 for strategy). MIRT models structure the relation between the knowledge or ability of the individual (e.g. reading comprehension and strategy use capacity) and the probability of answering an item correctly (Reckase 2009). This approach is capable of controlling for confounding factors, such as item features (e.g. item difficulty and item discrimination) and local dependence between items, which may contribute to the accuracy of scoring (Reise and Revicki 2014). The current study conducted analysis with MIRT-calibrated scores, one representing reading and the other six representing strategy use.

Data analysis

Just like factor analysis that is for classifying items, latent class analysis is a powerful analytical tool for classifying people (Hagennars and McCutcheon 2002). When used with polytomous data, this model is also known as latent profile analysis (LPA). In our study, we first conducted LPA to identify different patterns of strategy users. Next, we

used identified profiles to predict different levels of reading achievement (grouped into three equal sizes using MIRT-calibrated scores of −.55 and .51 as cut-off values).

Results

LPA models of k = 1–5 profiles were fit to the strategy use data. Table 1 shows the model-data fit indices. The AIC, BIC and ABIC all preferred models with larger-number of profiles, but the significance level of BLRT and LRT p values suggested the three-profile model.

Table 2 shows the means of strategy use across different strategy use profiles. For low-efficiency strategy users, the means of strategy use efficiency ranged from $M = -1.18$ (for evaluating and comprehending strategies, SD = 0.55 and SD = 0.62, respectively) to $M = -1.04$ for retrieving (SD = 0.71). For moderate-efficiency strategy users, the means ranged from $M = -0.17$ (for memorising, $SD = 0.56$) to -0.12 (for monitoring, SD = 0.49). For high-efficiency strategy users, the means ranged from M = 0.86 (for retrieving and monitoring, SD = 0.68 and 0.64, respectively) to .94 (for evaluating, SD = 62). Overall, higher-efficiency profiles had higher overall means across all six strategy types (Ms = −1.13, −0.15 and 0.90, respectively).

The effect of strategy use profiles on type of reading achievement is represented by the relative proportions of each strategy profile scattered across different types of reading achievers (see Figure 1). For low-efficiency strategy users, 42% of students went to low-reading achievers, 38% belonged to moderate-reading achievers, and 20% were high-achievers. For moderate-efficiency strategy users, the distributions were 35%, 34% and 32%. For high-efficiency strategy users, the distributions became 20%, 30% and 50. Clearly, low-efficiency strategy users could also be moderate- and high-reading achievers and high-strategy users could be moderate- and low-reading

Table 1. Model fit statistics for latent profile models.

Model	AIC	BIC	ABIC	Entropy	BLRT	LRT
1-profile	24162.619	24226.305	24188.185	1.000	–	–
2-profile	20243.905	20344.742	20284.384	0.856	.000	.000
3-profile	18226.411	18364.398	18281.804	0.894	.0001	.0001
4-profile	17241.029	17416.167	17311.335	0.886	.355	.360
5-profile	16544.076	16756.364	16629.295	0.894	.120	.122

Table 2. Prevalence (mean) of strategy use efficiency across different profiles.

	Low-efficiency strategy use profile (n = 342)	SD	Moderate-efficiency strategy use profile (n = 808)	SD	High-efficiency strategy use profile (n = 340)	SD
Planning	−1.12	0.64	−0.14	0.51	0.88	0.66
Monitoring	−1.10	0.61	−0.12	0.49	0.86	0.69
Evaluating	−1.18	0.55	−0.15	0.38	0.94	0.62
memorising	−1.15	0.61	−0.17	0.56	0.92	0.68
Retrieving	−1.04	0.71	−0.16	0.54	0.86	0.68
Comprehending	−1.18	0.62	−0.14	0.49	0.91	0.64
Mean	−1.13	0.62	−0.15	0.50	0.90	0.66
Reading	−0.29	0.84	−0.13	0.94	0.25	1.04
Reading score mean difference: Cohen's d1 = 0.18; Cohen's d2 = .38						

Cohen's d1 = effect size of reading mean difference between low- and moderate-efficiency strategy use profiles; Cohen's d2 = effect size of reading mean difference between moderate- and high-efficiency strategy use profiles.
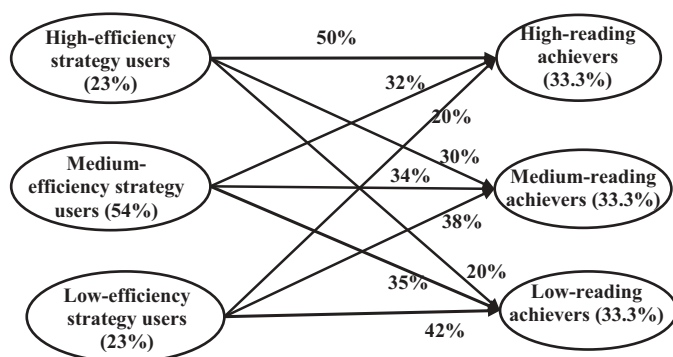
Figure 1. The path model illustrating the predictive effect of strategy use profiles on different types of reading-achievers.

Percentages in brackets represent the proportion of students out of the total sample; percentages on the path represent proportions of strategy users out their profiles belonging to a corresponding types of reading achievers.

achievers as well. However, more high-efficiency strategy users appeared to be high-reading achievers and more low-efficiency strategy users appeared to be low-reading achievers.

Discussion

The study applied a person-centred approach to examine the predictive effect of strategy use efficiency profiles on different types/levels of L2 reading achievers. The results showed that: 1) student could be classified into three groups: low-efficiency, moderate-efficiency, and high-efficiency strategy users; 2) most high-efficiency strategy users were high-reading achievers, most low-efficiency strategy users were low-reading achievers, and moderate-efficiency strategy users were almost evenly distributed across three levels of reading achievers; and interestingly 3) a small portion of low-efficiency strategy users also belonged to moderate- and high-reading achievers and a small portion of high-strategy users also belonged to moderate- and low-reading achievers.

The finding of low-, moderate, and high-efficiency strategy use profiles is partly consistent with other person-centred studies focusing on the frequency of generally oriented strategy use (e.g. Han, Farruggia, and Solomon 2018). The added value of the current study is that, reading strategy users can also be differentiated by the efficiency of strategy use. The distributions of different strategy use profiles across different levels of reading achievers suggest that, in general, efficient strategy use benefits L2 reading achievement. This finding provided direct evidence to the hypothesised interpretation that strategy use efficiency is an important aspect of strategy use for determining L2 learning outcome (Oxford 2017).

However, the uneven distributions of different strategy use profiles across different levels of reading achievers suggest that, the beneficial effect of strategy use is not straightforward. This finding adds more details to what Hong-Nam and Page (2014) have found that poor readers used as many strategies as good readers. For instance, our study showed that the probability of low-efficiency strategy users being high-reading achievers can be as high as the probability of high-strategy users being low-reading

achievers. We assume that the actual effect of strategy use is moderated by other factors such as students' L2 language proficiency, difficulty of L2 tasks, among others. This reinforces the need for further studies to see how these factors interact with strategy use efficiency across different types of L2 learners.

Disclosure statement

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Notes on contributors

Yuyang Cai is Professor and Eastern Scholar in School of Languages, Shanghai University of International Business and Economics. He obtained a PhD in language testing and assessment and is an experienced developer of English for Specific/Academic Purposes. His research interest extends to educational psychology (i.e., self-regulation and academic motivation), and the application and development of various psychometric (e.g., Rasch modeling, multidimensional item response theory, cognitive diagnostic measurement) and statistical models (structural equation modeling, multilevel modeling, mixture modeling, dynamic modeling, multi-layered moderation analysis, etc.).

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References

Cai, Y. 2013. "Validating a Scale Measuring Strategic Competence in ESP Reading Test Context: an Application of bifactor-MGRM." *The Asian ESP Journal [Special Edition]* 9 (2): 26–51.

Cai, Y., and A. J. Kunnan. 2018. "Examining the Inseparability of Content Knowledge from LSP Reading Ability: an Approach Combining Bifactor-multidimensional Item Response Theory and Structural Equation Modeling." *Language Assessment Quarterly* 15 (2): 109–129. doi:10.1080/15434303.2018.1451532.

Hagennars, J. A., and A. L. McCutcheon. 2002. *Applied Latent Class Analysis*. Cambridge, New York: Cambridge University Press.

Han, C.-W., S. P. Farruggia, and B. J. Solomon. 2018. "Latent Profiling University Students' Learning Strategies Use and Effects on Academic Performance and Retention." *Higher Education Research & Development* 37 (7): 1409–1423. doi:10.1080/07294360.2018.1498460.

Hong-Nam, K., and L. Page. 2014. "ELL High School Students' Metacognitive Awareness of Reading Strategy Use and Reading Proficiency." *TESL-EJ* 18 (1): 1–16. http://www.tesl-ej.org/wordpress/issues/volume18/ej69/ej69a4/.

Ning, H. K., and K. Downing. 2015. "A Latent Profile Analysis of University Students' Self-regulated Learning Strategies." *Studies in Higher Education* 40 (7): 1328–1346. doi:10.1080/03075079.2014.880832.

Oxford, R. 2017. *Teaching and Researching Language Learning Strategies: Self-regulation in Context*. 2nd ed. New York, USA: Routledge.

Reckase, M. D. 2009. *Multidimensional Item Response Theory*. London, New York: Springer Verlag.

Reise, S. P., and D. A. Revicki. 2014. "Introduction: Age-old Problems and Modern Solutions." In *Handbook of Item Response Theory Modeling*, edited by S. P. Reise and D. A. Revicki, 21–30. New York: Routledge.

Sheorey, R., and K. Mokhtari. 2001. "Differences in the Metacognitive Awareness of Reading Strategies among Native and Non-native Readers." *System* 29 (4): 431–449. doi:10.1016/S0346-251X(01)00039-2.

Tseng, W.-T., Z. Dörnyei, and N. Schmitt. 2006. "A New Approach to Assessing Strategic Learning: the Case of Self-regulation in Vocabulary Acquisition." *Applied Linguistics* 27 (1): 78–102. doi:10.1093/applin/ami046.

Zhang, L. M., C. M. Goh, and A. J. Kunnan. 2014. "Analysis of Test Takers' Metacognitive and Cognitive Strategy Use and EFL Reading Test Performance: A Multi-sample SEM Approach." *Language Assessment Quarterly* 11 (1): 76–102. doi:10.1080/15434303.2013.853770.