

Adaptation and Validation of Self-regulating Capacity in Vocabulary Learning Scale

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ABSTRACT

This paper reports on an adaptation and validation study of *Self-regulating Capacity in Vocabulary Learning Scale* (Tseng *et al.* 2006) in a Japanese EFL setting. The piloting phase revealed that factor structures were different from those in the original study. The main study, including a self-reported measure of procrastination to explore the convergent evidence of the construct validity, suggests that the scale can be a valid measure of self-regulation capacity in vocabulary learning in a Japanese EFL environment. These findings provide implications for future studies that utilize the same type of research paradigm.

INTRODUCTION

Self-regulating Capacity in Vocabulary Learning Scale (Tseng *et al.* 2006; hereafter SRCvoc) is a psychometric instrument (self-report questionnaire) intended to measure learners' self-regulating capacity in second language (L2) vocabulary learning. It was developed to (a) introduce the concept of self-regulation developed in educational psychology to the field of L2 acquisition and (b) operationalize learning strategies as self-regulatory capacity and create a psychometrically sound measure of strategic learning as a new alternative to the measurement instruments commonly used for this purpose. The instruments are problematic in terms of their psychometric properties (see also Dörnyei 2005).

Although the concept of self-regulation has been criticized (e.g. Gao 2006), Tseng *et al.*'s (2006) study has successfully made a conceptual advance by introducing it to the field of L2 acquisition. Among several theories of self-regulated learning (see Zimmerman and Schunk 2001 for a review), that of Tseng *et al.* (2006) is based on action and volitional control strategies proposed in Kuhl (1987) and Corno and Kanfer (1993). Action and volitional control strategies include those for protecting against distractions and facilitating task

completion toward goals; they are aimed at regulating emotions, motivation, and cognition in the process of goal striving (Corno and Kanfer 1993). Moreover, ‘self-regulating capacity acts as an important mediator between motivation and learning strategies’ (Tseng and Schmitt 2008: 362).

Tseng and Schmitt have demonstrated that ‘(s)elf-motivated vocabulary learning experts need to develop sufficient self-regulating capacity to support themselves in controlling and managing their vocabulary learning behaviors’ (2008: 388). That is, self-regulating capacity manifested in action and volitional control is crucial to learning L2 vocabulary. Tseng *et al.*’s (2006) scale is useful to measure this integral part of learning, but it has not yet been utilized and validated in other studies. Therefore, we adapted and validated the scale in a Japanese EFL environment in this study.

METHOD

Translation of the original questionnaire

The first author of this article translated the SRCvoc items into Japanese. An English-Japanese bilingual speaker back translated them to check for any ambiguities. Two other researchers with Ph.D’s in Applied Linguistics confirmed the appropriateness of wording.

Testing the questionnaire

The Japanese version of the SRCvoc was field-tested with 443 EFL learners who were humanities or engineering majors at four different universities in western Japan (208 males and 235 females, aged 18–22). They gave responses on a six-point Likert scale, the same used in Tseng *et al.*’s (2006) questionnaire.

Following the questionnaire pilot test, an item analysis with the criterion of a Corrected Item-Total Correlation higher than .40 revealed two of 20 items did not meet the criterion for acceptable items.¹ Hence, 18 items were selected to replicate Tseng *et al.*’s (2006) model. Table 1 shows the descriptive statistics, including Cronbach’s alpha reliability coefficients of the five subscales, which follow the original model’s categorization. The reliability coefficients were rather low compared with those in Tseng *et al.* (2006).

Table 1: Descriptive statistics of the subscales in the pilot study

Subscale	No. of Items	<i>M</i>	<i>SD</i>	α
Commitment control	4	3.03	0.79	.63
Metacognitive control	4	2.99	0.88	.74
Satiation control	3	2.93	0.87	.71
Emotion control	3	3.15	0.92	.66
Environment control	4	3.94	0.89	.67

Figure 1 displays the replicated model of SRCvoc proposed in Tseng *et al.*'s (2006) study. The goodness of fit indices in confirmatory factor analysis (CFA) were all acceptable. However, we noticed that the use of a summated or average score, as expressed in boxes in Figure 1, was problematic. This technique, known as 'item parceling' (Bandalos 2002, 2008; Little *et al.* 2002; Matsunaga 2008), creates an indicator instead of treating each item. It can be recommended if 'a construct has a large number of measured variable indicators' and 'all the items for a construct are unidimensional' with reliability of .90 or higher (Hair *et al.* 2006: 826). Item parceling can considerably improve model fit. However, without the unidimensionality of the items to be combined, 'the improvement in fit can be achieved by masking rather than correcting the source of model misfit' (Bandalos 2008: 212).² Given that the reliability coefficients in Table 1 were lower than recommended, it is highly likely that item parceling only hid the lack of unidimensionality.³

Thus, we tested the higher order model (Figure 2), which should represent the same concept as that intended by Tseng *et al.* (2006). We also checked the goodness of fit at each factor level (i.e. Commitment control with four items only). Results showed the model did not produce an adequate fit to the data; besides, it generated an improper solution (One of the standardized factor loadings had a value greater than 1.0). We concluded that approximate replication of Tseng *et al.*'s model in our study would be unjustifiable. Therefore, an exploratory factor analysis (EFA) using maximum likelihood with promax rotation was conducted to reexamine the factor structures of SRCvoc. Table 2 shows the results of EFA.

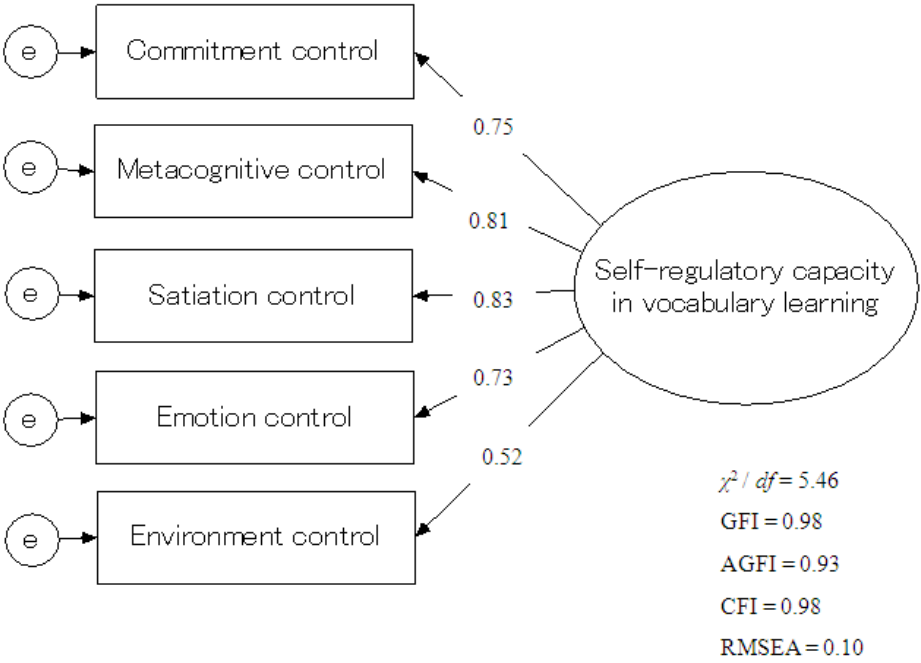


Figure 1: Replicated model of self-regulating capacity suggested in Tseng *et al.*'s (2006) study.

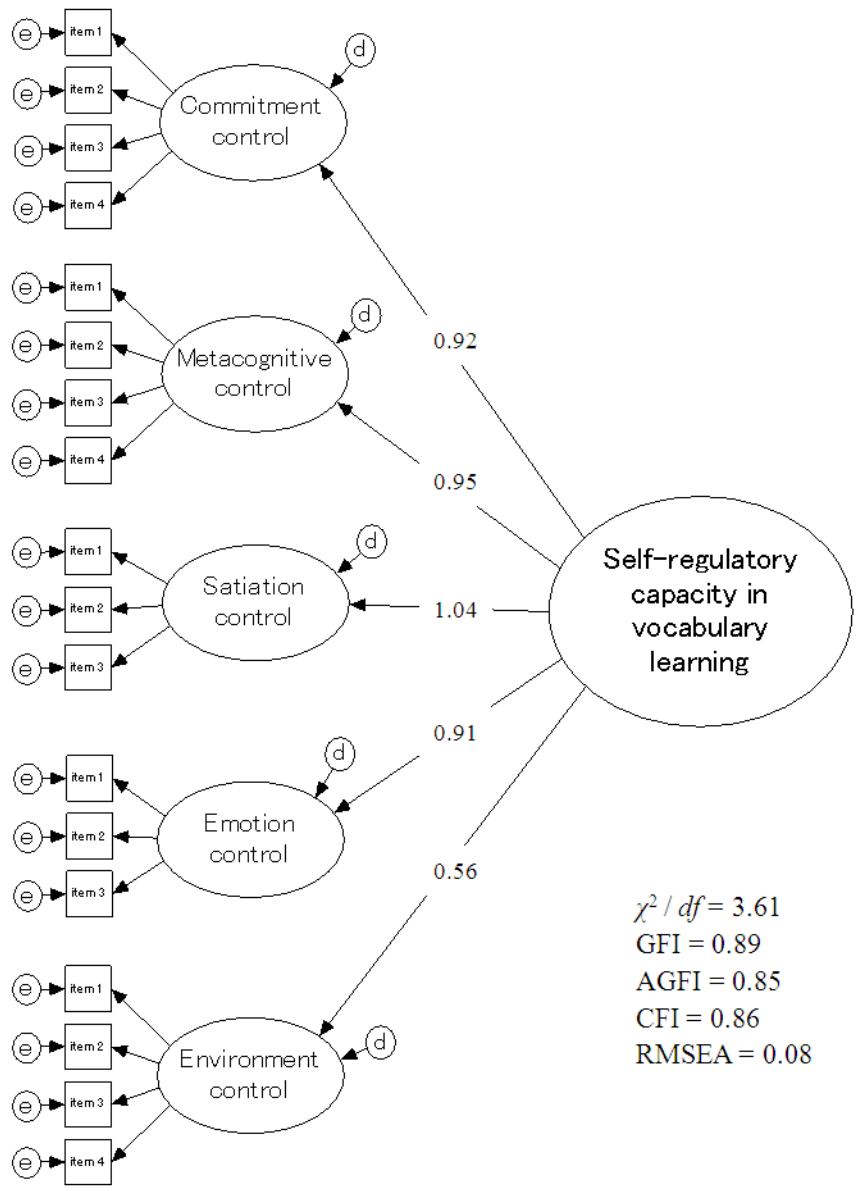


Figure 2: Higher order model (improper solution).

Table 2: Results of exploratory factor analysis

Original Subscale	Original Item Number	Factor 1	Factor 2	Factor 3	α	$M(SD)$
Emotion	6	.88	-.10	-.07	.81	3.02 (0.90)
Satiation	8	.69	.11	-.05		
Metacognitive	5	.64	-.01	.12		
Emotion	2	.60	-.04	.09		
Metacognitive	9	.51	.10	.02		
Metacognitive	11	.06	.72	-.04	.71	3.14 (0.85)
Metacognitive	16	.19	.62	-.08		
Commitment	13	-.09	.57	.05		
Commitment	10	-.05	.48	.16		
Environment	20	.03	-.01	.85		
Environment	17	-.06	.05	.62	.71	4.14 (0.98)
Environment	3	.11	.03	.49		

Main study

In total, 12 items remained because of EFA. These were administered again, this time to 914 EFL learners who were humanities or engineering majors at different five universities in Japan (425 males and 489 females, aged 18–22). Because the decisions about factor models were made a priori, the construct validity of the questionnaires was investigated with CFA.

Previous studies have suggested that procrastination has a negative effect on self-regulation: the ‘quintessential self-regulatory failure’ (Steel 2007). The two constructs should be related to each other, as expected, if convergent evidence of the construct validity is found (i.e. external aspect of validity in Messick 1995). Four items measuring procrastinating behaviors from the questionnaire developed by Aitken (1982), translated into Japanese by Fujita (2005), were given to the participants. Cronbach’s alpha coefficient of the procrastination measure was relatively high ($\alpha = .84$). Furthermore, the model showed a good fit to the data in CFA ($\chi^2/df = 6.82$, GFI = .99, AGFI = .97, CFI = .99, RMSEA = .08).

RESULTS AND DISCUSSION

Table 3 summarizes the descriptive statistics and Cronbach’s alpha coefficients of the two scales in the main study. Reliability for each subscale was relatively high. As Figure 3 shows, fit indices revealed that the hypothesized three-factor model of SRCvoc provided an adequate fit to the data.

Table 3: Descriptive statistics of the subscales in the two questionnaires (n = 914)

Scale	Subscales	No. of Items	M	SD	α
SRCvoc	Emotion control	5	3.32	0.93	.83
	Metacognitive control	4	3.23	0.89	.77
	Environment control	3	4.12	0.91	.68
Procrastination		4	4.12	0.97	.84

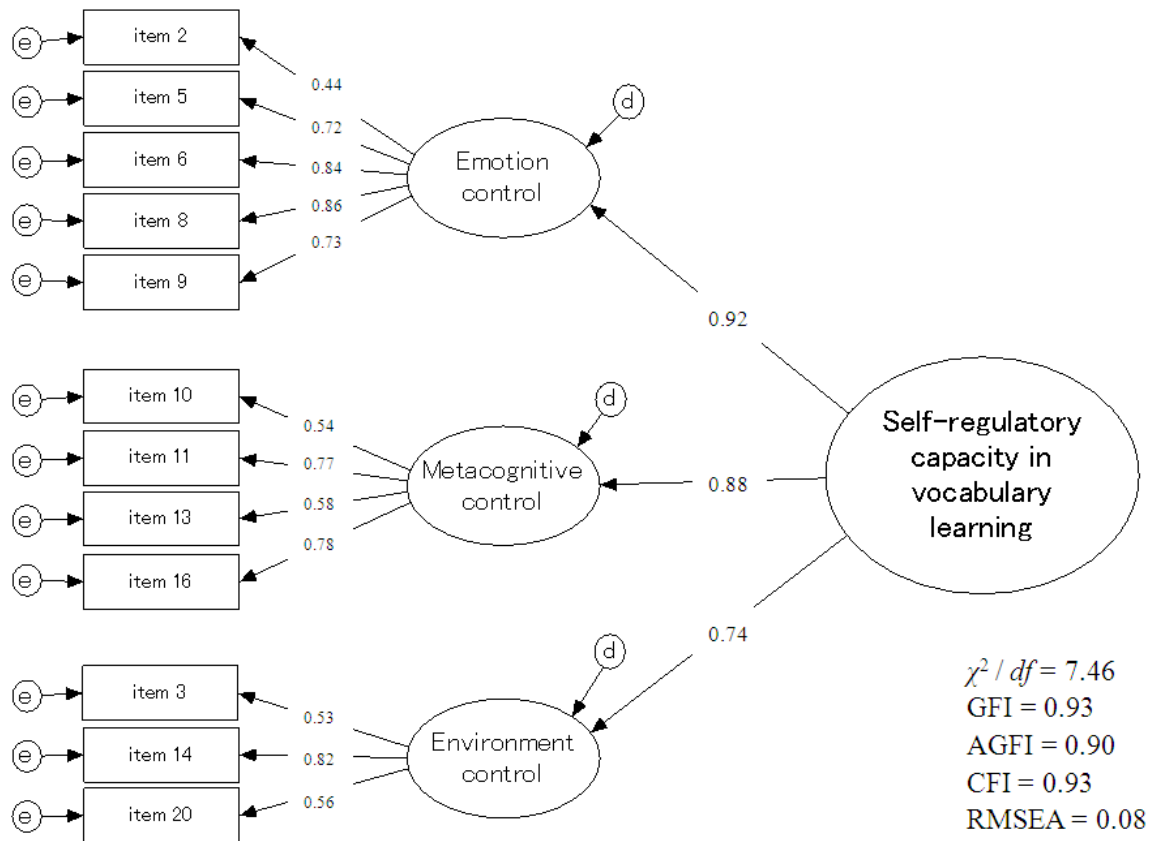


Figure 3: CFA of SRCvoc in the main study.

Figure 4 illustrates the hypothesized model of the relationship between SRCvoc as a whole (higher order factor) and Procrastination. The goodness of fit indices show that the model fit the data satisfactorily. The standardized path coefficient from self-regulating capacity to Procrastination is -0.29 ($p < .001$); thus, self-regulating capacity negatively affects Procrastination. As stated in the literature (Steel 2007), the greater the self-regulating capacity of a learner, the less likely he or she is to procrastinate learning.

Figure 5 shows a similar model in which the paths from each subscale are directed to Procrastination. Metacognitive control indicates the highest standardized path coefficient because its items directly ask the degree of one’s procrastinating behavior (e.g. ‘When it comes to learning vocabulary, I have my special techniques to prevent procrastination’).

These results suggest SRCvoc as a whole (higher order model) measures not only procrastination but also other aspects of volitional control in vocabulary learning, such as emotion and environment control. This may be why the higher order model exhibited a lower standardized path coefficient than the model with each subscale.

Overall, although factor structures were different from those suggested in Tseng *et al.* (2006), our study demonstrated that SRCvoc could be a valid and reliable measure of the volitional aspect of self-regulating capacity in vocabulary learning.

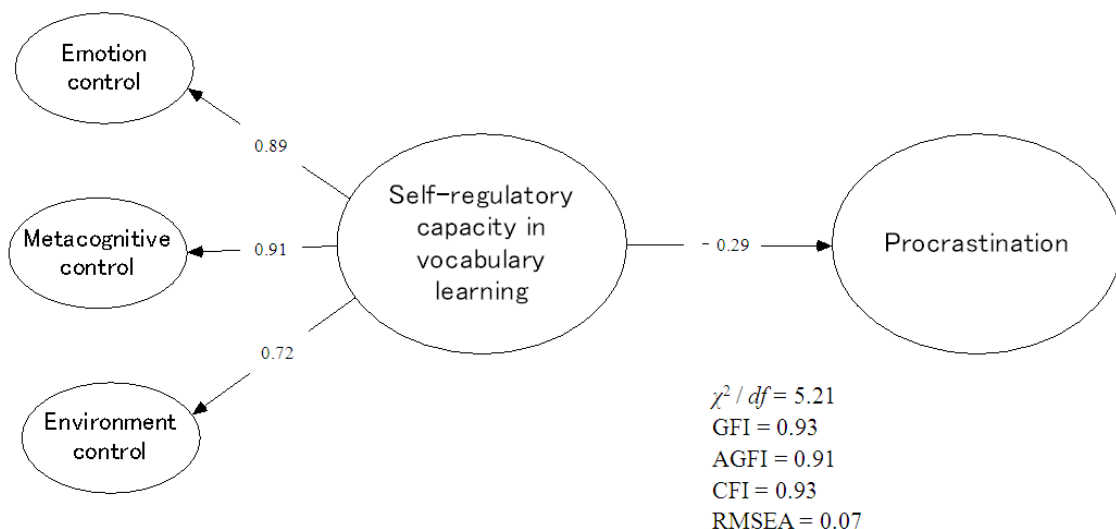


Figure 4: Effect of self-regulatory capacity on procrastination. Items for each subscale are not shown for simplicity. All paths are significant ($p < .001$).

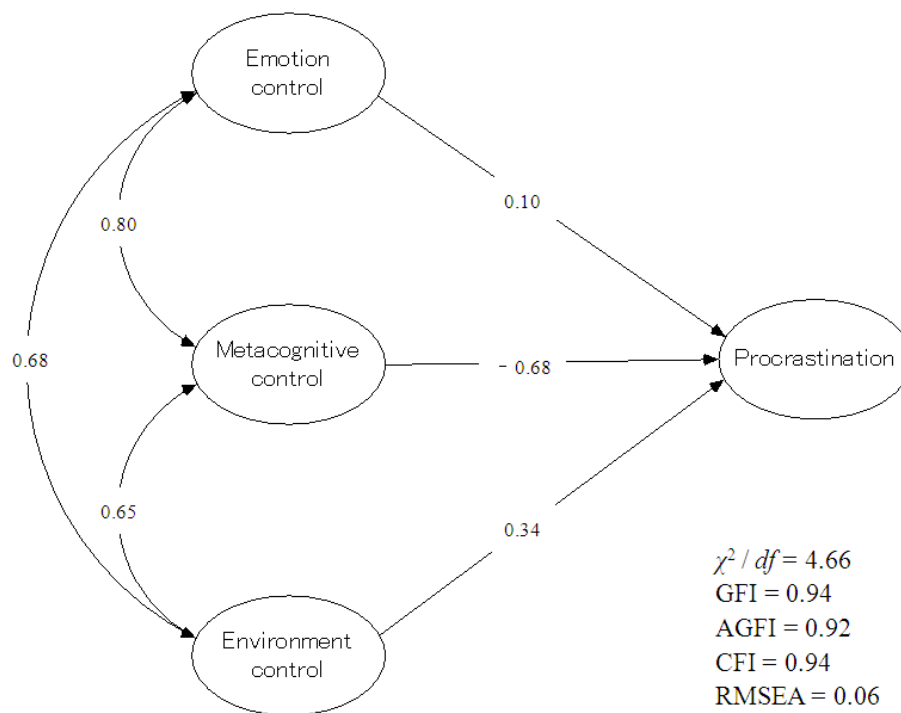


Figure 5: Effect of SRCvoc subscales on procrastination. Items for each subscale are not shown for simplicity. All paths are significant ($p < .001$).

CONCLUSION

Undertaken as an approximate replication of Tseng *et al.*'s (2006), this study investigated the validity of *Self-regulating Capacity in Vocabulary Learning Scale* (SRCvoc) in a Japanese EFL setting and found it to be a reliable and valid measure of self-regulation capacity in vocabulary learning. However, the factor structures were not the same as those proposed in Tseng *et al.*'s original study, presumably because of cultural differences or item parceling.

Based on our findings, we can suggest directions for future research to gain further insight into the role of self-regulation in vocabulary learning. First, future studies could investigate the teachability of self-regulation (volitional control). Some studies in educational psychology (e.g. McCann and Turner 2004; Randi and Corno 1999) have reported that it is feasible and useful to teach volitional control. Tseng and Schmitt (2008) have proposed a model of motivated vocabulary learning in which self-regulating capacity plays an integral role in bridging initial motivation state and strategy use. This supports the idea that teaching students self-regulation may be worth pursuing. Second, the concept of self-regulated learning should be severely scrutinized. Self-regulating capacity, with its focus on volition, is only part of a complex picture of self-regulated learning (Zimmerman and Schunk 2001). Thus, researchers should carefully consider which theory of self-regulated learning is appropriate for L2

vocabulary acquisition. Because self-regulated learning links motivation and strategy in the vocabulary learning process, future studies utilizing the same research paradigm may enable us to synthesize existing research in both motivation and strategy in language learning.

NOTES

- 1 Both of them are reversed items.
- 2 Similarly, adding the paths among error covariances within a construct can also improve the model fit, but Hair *et al.* (2006) argue that researchers should not do this. This is because the existence of such cross-loadings is evidence of a lack of unidimensionality, thereby violating the assumptions of good measurement.
- 3 CFA at each factor level also indicated that the goodness of fit measures were inadequate.

REFERENCES

- Aitken, M. E.** 1982. 'A personality profile of the college student procrastinator.' Doctoral dissertation, University of Pittsburgh. *Dissertation Abstracts International* 43: 722.
- Bandalos, D. L.** 2002. 'The effects of item parceling on goodness-of-fit and parameter estimate bias in structural equation modeling.' *Structural Equation Modeling* 9: 78–102.
- Bandalos, D. L.** 2008. 'Is parceling really necessary? A comparison of results from item parceling and categorical variable methodology.' *Structural Equation Modeling* 15: 211–240.
- Corno, L.** and **R. Kanfer.** 1993. 'The role of volition in learning and performance.' *Review of Research in Education* 19: 301–41.
- Dörnyei, Z.** 2005. *The Psychology of the Language Learner: Individual Differences in Second Language Acquisition*. Lawrence Erlbaum Associates.
- Fujita, T.** 2005. 'A study of the relation of procrastination behavior and error behavior.' *Bulletin of Center for Educational Research and Development* 14: 43–46.
- Gao, X.** 2007. 'Has language learning strategy research come to an end? A response to Tseng et al. (2006).' *Applied Linguistics* 28: 615–620.
- Hair, J. F., W. C. Black, B. J. Babin, R. E. Anderson, and R. L. Tatham.** 2006. *Multivariate Data Analysis* (6th ed.). Pearson Prentice Hall.
- Kuhl, J.** (1987). 'Action control: The maintenance of motivational states' in Halish, F. and J. Kuhl (eds.): *Motivation, Intention, and Volition* (pp. 279–291). Springer.
- Little, T. D., W. A. Cunningham, G. Shahar, and K. F. Widaman.** 2002. 'To parcel or not to parcel: Exploring the question, weighing the merits.' *Structural Equation Modeling* 9: 151–173.
- Matsunaga, M.** 2008. 'Item parceling in structural equation modeling: A primer.' *Communication Methods and Measures* 2: 260–293.
- McCann, E. J.** and **J. E. Turner.** 2004. 'Increasing student learning through volitional control.' *Teachers College Record* 106: 1695–1714.

- Messic, S.** 1995. 'Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning.' *American Psychologist* 50: 741–749.
- Randi, J. and L. Corno.** 1999. 'Teacher innovations in self-regulated learning' in Boekaerts, M., P. Pintrich, and M. Zeidner (eds.): *Handbook of Self-regulation* (pp. 651–685). Academic Press.
- Steel, P.** 2007. 'The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure.' *Psychological Bulletin* 133: 65–94.
- Tseng, W.T. and N. Schmitt.** 2008. 'Toward a model of motivated vocabulary learning: A structural equation modeling approach.' *Language Learning* 58: 357–400.
- 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: 78–102.
- Zimmerman, B. J. and D. H. Schunk.** (eds.). 2001. *Self-regulated Learning and Academic Achievement: Theoretical Perspectives* (2nd ed.). Lawrence Erlbaum.