



Title of Project:

Structural Equation Models of the Impact of Cognitive and Metacognitive Lexico-grammatical Strategic Processing on EFL Students' Lexico-grammatical Test Performances Over Time: A Multitrait-multimethod Approach

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Project Summary:

Language assessment has long been an important aspect of language education, providing useful information to benchmark the performance of students, as well as the functioning of educational systems. In the past decade in language assessment, one of the key research areas that has been theorized and studied is *strategic competence*. In Bachman and Palmer's (1996) communicative language ability model, strategic competence is defined as a set of metacognitive strategies "that provide a management function in language use" (Bachman & Palmer, 2010, p. 48), while later scholars have identified a set of both cognitive and metacognitive strategies used by test-takers in responding to test tasks (Phakiti, 2007, 2008a, 2008b; Purpura, 1999, 2004, 2013) as one of the key factors that determines second language (L2) test-takers' performance. Despite the importance of strategic competence theory in language assessment, so far only a few studies have set out to validate it using empirical data. Phakiti (2007) further points out that while human cognitive processing is subtle and highly dependent on specific contexts, little is known about stability or variation in the influences of strategic competence on test performance over time.

In this dissertation, two empirical studies were designed and conducted in order to address the above issues. Study One was a large scale cross-sectional study investigating the nature of strategic competence, and how and to what extent it may be related to performance in a lexico-grammar test through the use of structural equation modeling (SEM). Three types of strategic processing that may possibly affect test performance were examined to test the hypothesised hierarchical and interactive relationships between them. The test performances and survey responses of 416 Chinese intermediate level EFL learners were used to measure their strategic processing and test performance. Firstly test-takers were asked to answer a general learner use strategy questionnaire (eliciting their strategic processing when applying lexico-grammatical knowledge) and a trait strategy questionnaire (eliciting their general perceived knowledge of



strategic processing in test-taking). One week later, test-takers completed a lexico-grammar test and a state strategy questionnaire (eliciting their knowledge of actual strategic processing in a test). It was found that strategic awareness, which was measured by general learner use strategies and trait strategies, acted as a higher order factor, and directly regulated state metacognitive processing ($\beta = 0.85$; $R^2 = 0.72$). Strategic awareness also had an indirect, positive effect on state cognitive processing ($R^2 = 0.69$). Meanwhile, state cognitive processing directly accounted for around 21% of the lexico-grammar test performance variance.

The results of *Study One* suggested that the nature of strategic competence is highly complex. Strategic competence was found to be a metacognitive function of human cognition associated with general *offline strategic awareness* (L2 test-takers' perceived knowledge of what they normally do in a given situation) and *online strategic processing* (L2 test-takers' actual thinking or behaviors under test conditions). Strategic awareness can be viewed as a long-term mental process in the minds of L2 test-takers, which constantly manages and regulates their use of language in test-taking. The results suggest, furthermore, that neither offline strategic awareness (i.e., strategic behaviors in general language use and test-taking situations) nor online strategic processing (i.e. strategic behaviors in specific test-taking situations), alone is enough to allow students to use metacognitive and cognitive strategies in test-taking: only when strategic awareness and online strategic processing work together, do they have the potential to have a positive impact on test-takers' test performance.

By using the data collection procedures and baseline SEM model produced in *Study One*, a longitudinal *Study Two* was devised and administered in which three lexico-grammatical tests and various learner, trait and state strategy use questionnaires were given to Chinese EFL students over a three month period (one-month interval; $N = 519$). The nexus of this method of data collection was to assess and evaluate the theoretical issues of 'performance consistency' (Chapelle, 1998), including both lexico-grammatical and strategic abilities, over time through a multi-trait multi-method (MTMM) approach (Campbell & Fiske, 1959) using structural equation modeling (SEM).

The SEM results of *Study Two* suggested that although test-takers' test performance was relatively stable (β s ranged from 0.73 at Time 1 to 0.74 at Time 3), the direct effect of their strategic processing on test performance varied significantly over time (β s ranged from 0.37 at time 1 to 0.02 at Time 3). The results suggested that test-takers' cognitive strategic processing employed in tests became more stabilized and automatic. In other words, test-takers might experience a transition from being conscious to being unconscious regarding their mental processing. Additionally, strategic behaviors would account for more when test-takers faced unfamiliar and difficult test tasks. However, even when the difficulty of the test tasks was similar, after test-takers' strategic processing became an automatic process, the impact of strategic thinking and behavior would account for less or little in their actual performances.

The two empirical studies in this dissertation provide more empirical evidence in the area of strategic competence research, particularly by attempting to fill the gap in the area of lexico-grammatical strategies in L2 test performance. In particular, these studies model strategic processing data by utilizing instruments from theories of strategic competence, human



information processing, and metacognition on the one hand and by including factors affecting lexico-grammatical test performance on the other, thus, yielding more convincing findings. Due to the lack hitherto of empirical data to validate strategic competence theory, this research represents one of the few attempts to provide empirical evidence for the nature of strategic competence. Furthermore, while little was understood from previous studies about changes in strategic processing over time, the current studies provide further empirical evidence suggesting that the nature of strategic competence is highly complex and variable across contexts.

Given the complicated findings in the dissertation, further studies in this under-researched area are needed to advance our knowledge of strategic processing in relation to other language abilities and test formats or tasks. Additionally, the limitations in this study of using questionnaires to capture an individual's mental processing suggest that other in-depth investigating methods, e.g., qualitative studies, are needed to complement the quantitative data presented here. Last, but not least, strategic processing is context specific, and hence, more research needs to be done to compare test-takers of different ages, ethnicities and learning contexts.



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