THE ROLE OF RESEARCH-ARTICLE WRITING MOTIVATION AND SELF-REGULATORY STRATEGIES IN EXPLAINING RESEARCH-ARTICLE ABSTRACT WRITING ABILITY

MING-CHIA LIN
National Academy for Educational Research

YUH-SHOW CHENG AND SIEH-HWA LIN
National Taiwan Normal University

PEI-JUNG HSIEH
National Academy for Educational Research

Summary.—The purpose of the study was to investigate the effects of research-article writing motivation and use of self-regulatory writing strategies in explaining second language (L2) research-article abstract writing ability, alongside the L2 literacy effect. Four measures were administered: a L2 literacy test, a research abstract performance assessment, and inventories of writing motivation and strategy. Participants were L2 graduate students in Taiwan (N = 185; M age = 25.8 yr., SD = 4.5, range = 22–53). Results of structural equation modeling showed a direct effect of motivation on research-article writing ability, but no direct effect of strategy or indirect effect of motivation via strategy on research-article writing ability, with L2 literacy controlled. The findings suggest research-article writing instruction should address writing motivation, besides L2 literacy.

Motivation has been the target of a wealth of second language (L2) research and widely recognized as one of the key determinants for success in L2 learning (e.g., Gardner, 1985, 2006; Mori, 2002; Dörnyei, 2005, 2009). Most of these L2 studies addressed generalized motivation to learn L2. Recently, L2 researchers started to shift their attention to domain- or task-specific motivation (Dörnyei, 2002, 2005), including motivation to learn a specific language skill such as motivation to read (Mori, 2002; Komiyama, 2013) or to write (Zhang & Guo, 2013; Lin, Cheng, & Lin, 2014) in L2. This trend of research will help elucidate the nature of L2 learning motivation and the role of motivation in development of a particular L2 skill or performance on specific L2 tasks. Promising though this research trend appears to be, studies on language skill- or task-specific learning motivation are still too limited to inform L2 motivation theories or L2 pedagogy. The current study thus aims to fill this gap by testing a model of motivat-

1Address correspondence to Yuh-Show Cheng, National Taiwan Normal University, No. 162, Section 1, Heping East Road, Taipei, Taiwan (106) or e-mail (t22035@ntnu.edu.tw).

DOI 10.2466/50.PMS.120v17x9

ISSN 0031-5125
ed learning of L2 academic writing that is mainly based upon Lin, et al.’s (2014) theoretical framework of L2 writing motivation.

Lin, et al. (2014) have adopted a task-specific (and in Dörnyei’s, 2002, 2005 words, the most situated) approach to building a conceptual framework of L2 writing motivation and developing an instrument to measure it. There has been scarce quantitative research on English-as-a-foreign-language (EFL) researchers’ motivation to write English for academic purposes. Lin, et al. (2014) thus developed an inventory, the Research-Article Writing Motivation Inventory, to measure EFL graduate students’ motivation to write research papers, with the hope to inspire more quantitative investigations in the field of writing English for academic purposes. They mainly drew upon Eccles’ (2009) identity-based expectancy-value theory as the theoretical basis to conceptualize and operationalize L2 research-article writing motivation, which is posited to comprise five factors: ability self-concept, interest value, utility value, connectedness value, and cost. The reliability and construct validity of Lin, et al.’s (2014) Research-Article Writing Motivation Inventory were established by the results of exploratory and confirmatory factor analyses, as well as correlation analyses between the inventory and two criterion measures.

The current study took a step further to examine the role of this task-specific writing motivation, relative to self-regulatory strategies, in explaining research-article writing ability. More importantly, this study took into account the criticisms made by researchers who hold a strong view to explain differences in L2 achievement and performance in terms of language variables (e.g., Sparks & Ganschow, 1991, 1995). Specifically, according to Sparks, Ganschow, and their colleagues, many investigations into affective factors such as anxiety and motivation on L2 achievement were ineffective because they failed to consider an important confounding factor, namely, basic L1 or L2 skills (Sparks & Ganschow, 1991, 1995; Sparks, Patton, Ganschow, & Humbach, 2009). In response to this criticism, the effects of writing motivation and strategy use on writing ability were examined in conjunction with the effects of L2 literacy. In summary, this study attempted to construct a preliminary motivated research-article writing model by testing the interrelations between writing motivation, use of self-regulatory writing strategies, L2 literacy, and research-article writing ability.

To test the model, an abstract-writing task with a 10-page research article as the prompt was adopted to assess research-article writing ability for two major reasons. First, like the writing task on most standardized L2 language tests such as TOEFL and IELTS, such a writing task could be completed within a reasonable time limit, making it possible to administer the task in a standardized manner. More importantly, research-article abstracts have
been recognized as abbreviated representations of full texts and “mini-texts to preview full articles” (Chang & Foo, 2004, p. 106). In particular, in Swalesian genre theory, the abstract is considered to be not only a research-article brief displaying highlights of the full text, but a preview promoting perusal of the full research article (Swales, 1990; Bhatia, 1993; Swales & Feak, 2009; Gillaerts & Van de Velde, 2010). The perusal-invitation function of an abstract makes it an important task for research-article writers to accomplish because readers tend to utilize abstracts as a “screening device” to locate the research articles highly relevant to their own works in a myriad of publications (Swales & Feak, 2010). From this perspective, performance on the research-article abstract writing task arguably represents not only a micro-display of research-article writing ability, but a motivated outcome showing how well L2 students have learned research-article writing so as to pursue a desired researcher identity recognized by their chosen fields (Swales, 1990; Hsieh & Liou, 2008; Hancioğlu, 2009).

Below is a brief review of theories and research that contributed to the hypothesized relationships in the research-article writing model.

Research in Support of the Research-Article Writing Model

First, from the perspective of Swalesian genre theory, L2 research-article writing, highly related to the social practices of a chosen disciplinary community, is a complex task involving various conventionalized sections expressing different rhetorical functions (Swales, 1990; Flowerdew, 2000; Swales & Feak, 2009, 2010). A growing body of research taking this perspective has addressed how L2 graduate students become socially motivated and then strive to gain a legitimate researcher identity by writing research articles (Flowerdew, 2000) and research-article abstracts (Swales, 1990; Hsieh & Liou, 2008; Hancioğlu, 2009; Liou, Yang, & Chang, 2012) acceptable to a disciplinary community, according to its writing norms (such as specific lexis and schematic structures of research articles). These studies indicated that L2 learners’ motivation can largely influence their performances in research-article writing, including gaining journal publications (Flowerdew, 2000) and conference paper presentations (Swales, 1990) and writing better abstracts (Hsieh & Liou, 2008; Hancioğlu, 2009; Liou, et al., 2012). Thus, it was hypothesized that L2 graduate students’ research-article writing motivation (i.e., with five factors of interest value, utility value, connectedness value, cost, and ability self-concept) had a direct effect on research-article abstract writing ability.

Second, according to academic self-regulated learning theory (Wolters, Pintrich, & Karabenick, 2003; Pintrich, 2004), motivated learning engagement reflects individuals’ behavioral and mental efforts to approach learning tasks and thus plays a key role in task achievement (e.g., Wolters,
et al., 2003; Gao, Hannon, & Yi, 2007). Motivated engagement is often operationalized as motivated use of learning strategies to enhance learning (Wolters, et al., 2003; Bruinsma, 2004; Liem, Lau, & Nie, 2008; He, Chang, Chen, & Guo, 2012). Following this line of reasoning, if L2 graduate students are motivated to use research-article abstract writing strategies effectively, their L2 research-article abstract writing ability may be enhanced. Thus, it was hypothesized that use of self-regulatory writing strategies had a direct effect on L2 research-article abstract writing ability and also mediated the motivation effect on research-article abstract writing ability.

Third, previous studies have identified a few key factors interacting with the motivation effect in explaining achievement, including cultural and gender systems (Eccles, Adler, Futterman, Goff, Kaczala, Meece, et al., 1983; Eccles, 2009) and past learning experiences (Jones, 2008; Liem, et al., 2008). Among them, past learning experiences, often operationalized by ability or aptitude essential for a task (e.g., prior performance), have been identified as one of the most consistent predictors (i.e., independent variables) for learning achievement alongside learners’ motivational expectancy and value (Jones, 2008; Liem, et al., 2008). Similarly, English L2 proficiency has been found important in explaining English L2 research-article writing, such that limited proficiency often hindered English L2 researchers’ research-article writing (Flowerdew, 2000; Okamura, 2006). Therefore, a direct effect of English L2 proficiency (specifically English L2 reading and writing proficiency) on English research-article abstract writing ability was hypothesized. It should be noted that including L2 proficiency in the model not only echoed the findings of the above-mentioned studies but also served as a response to Sparks and his colleagues’ criticism on previous L2 motivational studies that did not consider the confounding effects of L1 or L2 skills and abilities.

The purpose of this study was to test a model of motivated research-article writing. While L2 literacy was included as an independent variable in the model, the major research focus was on the relative importance of motivation and strategy use to development of research-article abstract writing ability. Specifically, four hypotheses were tested:

**Hypothesis 1.** Research-article writing motivation has a direct effect on English L2 research-article abstract writing ability.

**Hypothesis 2.** Use of self-regulatory writing strategies has a direct effect on English L2 research-article abstract writing ability.

**Hypothesis 3.** Research-article writing motivation has an indirect effect on English L2 research-article abstract writing ability via use of self-regulatory writing strategies.

**Hypothesis 4.** The above effects hold when the effect of L2 literacy on English L2 research-article writing is controlled.
METHOD

Participants

On a voluntary basis, 185 participants were recruited over 2 mo. from 15 universities in Taiwan. They signed the study consent form detailing the study and informing them that their responses would be processed anonymously. The participants were graduate students majoring in applied linguistics. Of the participants, there were 131 women and 54 men, 151 master’s students (46 at Year 1 and 78 at Year 2; M age = 24.8 yr., SD = 3.5, range = 22–38), and 34 Ph.D. students (5 at Year 1, 8 at Year 2, and 7 at Year 3; M age = 30.1 yr., SD = 6.0, range = 25–53; overall, N = 185, M age = 25.8 yr., SD = 4.5, range = 22–53). Most of the participants reported having written at least one research-article abstract in English, while 26 master’s students at Year 1 had no experiences in writing research-article abstracts. However, these students reported having learned the elements and linguistic patterns of research-article abstracts, qualifying themselves for the study participation. Because the hypothesized model intended to capture a learning process of motivated research-article abstract writing ability, the participants at Year 1 in master’s programs were deemed at the early stage of this process.

Measures

Four measures were administered to participants: an English (L2) literacy test, an English Research-Article Abstract Writing Assessment (RAAWA), a Research-Article Writing Motivation Inventory (RAWMI; Lin et al., 2014), and a Self-regulatory Writing Strategy Inventory (SWSI). All measures were pilot tested and validated for their psychometric properties prior to the study.

English (L2) literacy test.—A complete set of the General English Proficiency Test (GEPT–Advanced was used, including 20 multiple-choice items for reading ability (α = .90) and an essay task for writing ability. Each essay was scored using the GEPT–advanced holistic scoring, ranging from 0-5 (full score). The GEPT–Advanced was an English proficiency test specifically designed for undergraduate English majors or for graduate non-English majors in a context of English as an L2, like Taiwan.

English Research-Article Abstract Writing Assessment (RAAWA).—RAAWA consists of a research-article abstract writing task and two corresponding rating scales. The task provided a prompt, a 10-page research-article written in Chinese that addresses effects of a web-based discussion forum on L2 college learners’ English proficiency and content knowledge, and the participants were required to write a 200-word abstract in English for the article within 60 min. According to Hyland (2007), L2 writing ability often denotes some latent traits observable in L2 learners’ writing performance in a given task, such as ways to structure the text and use
of language forms. In this logic, the participants’ research-article abstract writing ability was measured by their performance at two levels: Global Move and Local Pattern. The rating scales for Global Move and Local Pattern were developed through a series of expert-reviewing process: five experts (i.e., five professors in applied linguistics) independently reviewed the scales for content relevance and wording preciseness, and approved the iterative revisions. Global Move represents global rhetorical moves phrased for information structure of the abstracts, such as moves of aim, method, results, and conclusion. Local Pattern refers to local lexico-grammatical patterns phrased for moves realization in the abstracts, such as a pattern of “the results show” in the Result move. The global move scale and the local pattern scale each generated a score from 0 to 5 (full score). The preliminary version of the RAAWA was evaluated as a relevant and effective measure by the above-mentioned five experts in applied linguistics, supporting content validity of the RAAWA. Furthermore, the RAAWA was pilot-tested on five graduate students (i.e., 3 master’s and 2 Ph.D. students), who all commented that it was an accomplishable measure within the time limit. Thus, the RAAWA was preliminarily validated.

Research-Article Writing Motivation Inventory (RAWMI).—Constructed mainly according to Eccles’ (2009) identity-based expectancy-value theory, Lin, et al.’s (2014) RAWMI is a 25-item questionnaire that comprises five subscales: Ability Self-concept (i.e., perceived ability in English RA writing), Interest Value (i.e., enjoyment of English RA writing), Utility Value (i.e., perceived usefulness of English RA writing for achieving academic or career goals), Cost (i.e., perceived effort and price required to write effective English RAs), and Connectedness Value (i.e., perceived value for gaining social connections with the disciplinary communities through writing English RAs). Each of the subscales consists of five items. The first four subscales were adapted from expectancy-value scales (Conley, 2007; Luttrell, Callen, Allen, Wood, Deeds, & Richard, 2010), while the fifth scale was adapted from Gardner’s (2004) L2 Attitude/Motivation Test Battery “to connect expectancy-value theory to L2 learning and to highlight the identity element of Eccles’s (2009) attainment value, which has not been explicitly operationalized in previous research” (Lin, et al., 2014, p. 391). All items were responded to on a 5-point scale with anchors 1: Strongly disagree and 5: Strongly agree. Higher scores reflect higher motivation. The five subscales had good internal consistency; Cronbach’s $\alpha$s ranged from .80 to .90.

Self-Regulatory Writing Strategy Inventory (SWSI).—The 39-item SWSI was developed mainly based on Oxford’s (2011) theory of self-regulatory L2 learning. While directly adopting the concepts of cognition regulation and motivation regulation from Wolters, et al.’s (2003) theory for general academic learning, Oxford (2011) revised behavior regulation into socio-
interactive resources regulation to highlight the social nature of L2 learning. The SWSI was operationalized by three subscales: 18 items in Cognition Regulation (i.e., efforts to use cognitive strategies for learning), 9 items in Motivation Regulation (i.e., efforts to stimulate and sustain the motivation for learning), and 12 items in Socio-interactive Resources Regulation (i.e., efforts to maneuver context, interpersonal relationships, and culture for better learning effects).

The items on Cognition Regulation were adapted from Petrić and Czarl’s (2003) L2 writing strategy scale; those on Motivation Regulation from Wolters, et al.’s (2003) self-regulated learning scale; and those on Socio-interactive Resources Regulation from Petrić and Czarl’s (2003) and Wolters, et al.’s (2003) scales. All items were responded on a 5-point scale with anchors 1: Never true of me and 5: Always true of me. The 39 items' ratings were averaged, with higher scores reflecting more use of the strategies. The SWSI demonstrated acceptable internal consistency in the three subscales: Cognition Regulation, Motivation Regulation, and Socio-interactive Resources Regulation (Cronbach’s αs ranged from .76 to .85).

Procedure

The participants took a series of tasks within 130 min. First, they were assigned to Group A or Group B for counterbalancing the order of two language tasks. Group A took an English (L2) literacy test first (55 min.) and then completed an English research-article abstract writing task (60 min.). Group B completed the English research-article abstract writing task first and then took the English literacy test. After the two language tasks, both groups were given a survey on English writing motivation and strategies (15 min.). Finally, they received a small compensation of NT 200 dollars (approximately 7 USD).

The writing section in the English literacy test was scored by two expert raters who had master’s degrees in applied linguistics and at least three years of experience in scoring essays. They attended a rater training session in which they reviewed task instructions and scoring rubrics for the GEPT–Advanced and rated 15 intentionally selected essays on site. These rated essays provided benchmarks from Scores 5 to 1 for the ensuing independent rating (a higher score indicating a higher English-writing ability, and vice versa). One-fourth of the essays (43 out of 170) were randomly selected for co-rating. The inter-rater reliability of Cohen’s kappa was .92 (higher than the cutoff 0.80). The remaining essays were then equally distributed to the two raters, 64 and 63, respectively.

The research-article abstract writing ability was scored by another two expert raters, an associate professor in applied linguistics and the lead researcher. They attended a rater training session in which they reviewed task instructions and the two rating scales developed for assessing two aspects of
research-article abstract writing performance—Global Move and Local Pattern. They then rated 15 intentionally selected essays on site. These rated essays provided benchmarks for Scores 5 to 1 for the ensuing independent rating. Half of the essays (85 out of 170) were randomly selected for co-rating. The inter-rater reliabilities of Cohen’s kappa yielded for the two aspects of research-article abstract writing ability were both close to .92, demonstrating excellent agreement between the two raters. Thus, the first half of abstracts was rated by the co-rater and the second half by the lead researcher.

Analysis

In data analysis, descriptive statistics were computed via SPSS Version 19, while SEM analysis was conducted via LISREL 8.8 with a two-step procedure of measurement and structural models. Both the models were tested by maximum likelihood estimation and evaluated by a few fit indices, including $\chi^2$ (low and nonsignificant values), normed $\chi^2$ (a range of 1–3), RMSEA (less than 0.08 with confidence interval reported), CFI (equal to or greater than 0.90 on the 0–1 scale), NNFI (equal to or greater than 0.90 on the 0–1 scale), and EVCI (the lower, the better for cross-model validation; Hair, Black, Babin, Anderson, & Tatham, 2010).

Results

Table 1 displays descriptive statistics of the 12 indicators. The inter-indicator correlations showed a desirable pattern: the within-construct indicator correlations were generally greater than the between-construct indicator correlations. However, some inter-indicator correlations warranted attention. First, within the RAWMI scale, the Cost indicator was found correlated with the Interest Value and the Ability Self-concept, but not with the Utility Value and Connectedness Value indicators. While less than satisfactory, this finding corresponds to a few previous L2 studies (Mori, 2002, 2004) that excluded the Cost indicator for a more stable motivation scale using the expectancy-value framework. Instead of being excluded, the Cost indicator was, however, kept in this study to better manifest the framework. Second, across the scales, the indicators of Global Move and Local Pattern (i.e., the indicators for the research-article abstract writing ability) showed no correlations with some of the indicators, including the motivation indicators of Interest Value and Cost, and the strategy indicators of Motivation Regulation and Socio-interactive Resources Regulation. Also, the Local Pattern did not correlate with Cognition Regulation though Global Move did. The nonsignificant correlations may account for the lower variance explained in the RA abstract writing ability in subsequent analysis.

The Measurement Model

Table 1 shows the hypothesized CFA model had a poor fit to the data ($\chi^2_{48} = 213.89, p < .05$, normed $\chi^2 = 4.46$, RMSEA = 0.140, CFI = 0.83, NNFI = 0.76),
suggesting the original model might not fit the data well. Modifications were thus made based on modification indices in analysis and proceeded with one additional parameter estimated at a time. A decrease in \( \chi^2 \) larger than 5.00 is generally considered a significant improvement (Gagne, Mikail, & D’Eon, 1995). Testing the decrease in \( \chi^2 \) is deemed justifiable when the modified models are subsets of the hypothesized model with additional parameters specified and particularly when it is those in the subscales of the same measure that are specified, which often reflects non-random measurement errors attributable to method effect on subscales of the same measure (Gagne, et al., 1995). On these grounds, model modification proceeded by co-varying errors among subscales of the same measure one at a time so as to identify a more acceptable model.

### TABLE 1

**DESCRIPTIVE STATISTICS AND ZERO-ORDER CORRELATIONS OF THE 12 INDICATORS**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>L2 literacy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Reading</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Writing</td>
<td>.49</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Motivation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Interest value</td>
<td>.06</td>
<td>.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Utility value</td>
<td>.12</td>
<td>.15</td>
<td>.53</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Cost</td>
<td>.18</td>
<td>.30</td>
<td>.36</td>
<td>.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Connectedness</td>
<td>.10</td>
<td>.04</td>
<td>.45</td>
<td>.71</td>
<td>.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Ability self-</td>
<td>.12</td>
<td>.23</td>
<td>.66</td>
<td>.44</td>
<td>.50</td>
<td>.38</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>concept</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Cognition</td>
<td>.21</td>
<td>.18</td>
<td>.26</td>
<td>.37</td>
<td>.08</td>
<td>.40</td>
<td>.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>regulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Motivation</td>
<td>−.20</td>
<td>−.18</td>
<td>.21</td>
<td>.15</td>
<td>−.18</td>
<td>.23</td>
<td>.13</td>
<td>.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>regulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Socio-resource</td>
<td>−.04</td>
<td>−.07</td>
<td>.25</td>
<td>.20</td>
<td>−.09</td>
<td>.31</td>
<td>.20</td>
<td>.48</td>
<td>.58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>regulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RA writing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Local pattern</td>
<td>.24</td>
<td>.40</td>
<td>.13</td>
<td>.23</td>
<td>.10</td>
<td>.16</td>
<td>.24</td>
<td>.14</td>
<td>−.13</td>
<td>−.03</td>
<td>.63</td>
<td></td>
</tr>
</tbody>
</table>

| \[ M \]            | 8.64| 2.59| 2.66| 3.92| 2.38| 3.86| 3.11| 3.93| 3.20| 3.50| 1.63| 2.42 |
| \[ SD \]           | 4.46| 0.86| 0.76| 0.70| 0.74| 0.62| 0.66| 0.41| 0.69| 0.51| 1.18| 0.90 |
| \[ α \]            | .81 | .90 | .85 | .82 | .80 | .85 | .81 | .76 |     |     |     |     |
| \[ κ \]            |     |     |     |     |     |     |     |     | .92 | .92 |     |     |

*Note.*—\( N=185 \). *p* < .05; †*p* < .001.
Table 2 shows a series of model modifications that added one error-covariance at a time. The modified model with four subscale-based error-covariances appears to reach an acceptable fit, with the RMSEA value of 0.084 approaching the 0.080 cutoff, the CFI and NNFI indices above the 0.90 desired value, and the normed $\chi^2$ within the less-than-3 desired range.

Apart from the goodness-of-fit indices, this modified model was chosen as the final model for three reasons.

First, in this modified model two error-covariances were drawn between the subscales of Interest Value and Cost, and between Cost and Ability Self-concept in Research-Article Writing Motivation, because each of them contains self-oriented reasons for writing English research articles. For example, the Interest Value subscale had an item of “I find English research-article writing very interesting.” The Cost subscale had an item of “I have to give up a lot to do well in writing research-articles in English.” The Ability Self-concept subscale had an item of “I am good at writing English research-articles.” This specification decision was consistent with the recognized higher interrelations between each of the two constructs (Eccles, 2009) and might reveal one additional latent construct not captured by the original model.

Second, one subscale-based error-covariance was drawn between the subscales of Utility Value and Connectedness Value in Research-Article Writing Motivation because they both have items concerning society-oriented reasons to write research-articles. For example, the Utility Value subscale had an item of “Being good at writing research-articles in English will be important when I look for a job or pursue further studies.” The Connectedness Value subscale had an item of “Being good at writing English research-articles is important to me because it will allow me to gain a social prestige in my disciplinary community.” These society-oriented reasons might account for this error-covariance, which was also consistent with the recognized higher interrelations between the constructs of utility.
value and attainment value (specified as connectedness value in Lin, et al., 2014; Eccles, 2009) and might reflect another latent construct not captured by the original model.

Finally, one subscale-based error-covariance was drawn between the subscales of Cognition Regulation and Motivation Regulation in Self-Regulatory Writing Strategy because both concern management of internal resources while Socio-interactive Resources Regulation concerns external resources. Interestingly, this covariance was negative, suggesting a possible bipolar nature of Cognition Regulation and Motivation Regulation in management of an individual’s internal resources.

Figure 1 provides factor loadings, error-variances, and correlations between latent constructs in the modified measurement model. Nine out of the 12 factor loadings were higher than the .60 cutoff (Hair, et al., 2010). Composite reliability values of the four measures for the theoretical latent constructs were shown below: .69 for L2 Literacy, .74 for Research-Article Writing Motivation, .77 for Self-Regulatory Writing Strategies, and .78 for Research-Article Abstract Writing Ability. These values suggest good internal consistency reliability (Hair, et al., 2010). The factor loadings and composite reliabilities support convergent validity of the measurement model. Overall, the model was a good approximation to the data, providing a basis for testing the structural model.

---

**Figure 1.** The modified measurement model
The Structural Model

Table 3 showed a series of model tests that basically followed the CFA results. Model 4 with four error-covariances shows an acceptable fit of the model to the data, according to the fit indices ($\chi^2 = 99.16$, $p < .05$, normed $\chi^2 = 2.20$, RMSEA = 0.085, CFI = 0.94, NNFI = 0.92).

Table 3

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\Delta \chi$</th>
<th>df</th>
<th>EVCI (90%CI)</th>
<th>RMSEA (90%CI)</th>
<th>CFI</th>
<th>NNFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>211.52</td>
<td>49</td>
<td>1.52</td>
<td>50</td>
<td>1.29–1.79</td>
<td>0.140 (0.120–0.160)</td>
<td>0.84</td>
<td>0.78</td>
</tr>
<tr>
<td>1</td>
<td>171.22</td>
<td>48</td>
<td>40.30</td>
<td>1</td>
<td>1.25</td>
<td>0.120 (0.098–0.140)</td>
<td>0.87</td>
<td>0.82</td>
</tr>
<tr>
<td>2</td>
<td>164.71</td>
<td>47</td>
<td>6.51</td>
<td>1</td>
<td>1.26</td>
<td>0.120 (0.100–0.140)</td>
<td>0.88</td>
<td>0.83</td>
</tr>
<tr>
<td>3</td>
<td>116.70</td>
<td>46</td>
<td>48.01</td>
<td>1</td>
<td>1.02</td>
<td>0.096 (0.076–0.120)</td>
<td>0.93</td>
<td>0.89</td>
</tr>
<tr>
<td>4</td>
<td>99.16</td>
<td>45</td>
<td>17.54</td>
<td>1</td>
<td>0.93</td>
<td>0.085 (0.064–0.110)</td>
<td>0.94</td>
<td>0.92</td>
</tr>
</tbody>
</table>

Figure 2 shows factor loadings, error-variances, error-covariances, and regression coefficients of the structural model that respond to the four hypotheses. According to Fig. 2, L2 Literacy showed a direct effect on research-article abstract writing ability of L2 graduate students ($\beta = 0.53$, $p < .05$). With L2 Literacy included in the model, a test purely focusing on motivation effect or self-regulatory strategy effect was enabled. Accordingly, a direct effect of Research-Article Writing Motivation on Research-Article Abstract Writing Ability was confirmed ($\beta = 0.19$, $p < .05$), supporting Hypothesis 1. However, Hypothesis 2 was not supported: the use of Self-Regulatory Writing Strategies had no direct effect on Research-Article Abstract Writing Ability ($\beta = -0.05$, $p > .05$). Hypothesis 3 was also not supported; Research-Article Writing Motivation had no indirect effect on Research-Article Abstract Writing Ability via Self-Regulatory Writing Strategies ($\beta = -0.02$, $p > .05$). Due to the rejection of Hypotheses 2 and 3, Hypothesis 4 was only partially supported. In total, 34% of the variance in research-article abstract writing ability could be explained by its predictor variables. Additionally, there was a direct effect of motivation on strategy, explaining 21% of the variance in strategy use.

DISCUSSION

Motivation and Strategy Use in Research-article Abstract Writing Ability

With the effect of L2 Literacy controlled, Research-Article Writing Motivation, operationalized by the RAWMI within the expectancy-value framework, shows a direct effect on research-article abstract writing ability ($\beta = 0.19$). This finding supports the significant motivational effect on academic achievement long found in the expectancy-value research, even when prior academic performance or achievement is taken into account.
In other words, the finding suggests that high research-article writing motivation may help L2 graduate students write better research-article abstracts. The finding thus supports that contextualized motivational effect can be conducive to L2 graduate students’ learning of research-article abstract writing, making this study a successful response to Dörnyei’s (2005) call for contextualizing L2 motivation effect into a specific task as well as to Sparks and colleagues’ (1991, 1995, 2009) criticism of L2 motivational studies that did not control language skills. Likewise, this finding also corresponds to the discovery of genre-based studies that revealed L2 graduate students’ motivation to seek their future identities in a chosen disciplinary community was a key determinant of their research-article writing ability (Swales, 1990; Hsieh & Liou, 2008; Hancioğlu, 2009).

This study did not support the effect of strategy use on Research-Article Abstract Writing Ability, suggesting that frequent use of Self-Regulatory Writing Strategies (i.e., Cognition Regulation, Motivation Regulation, and Socio-interactive Resources Regulation) does not necessarily lead to improvements in research-article abstract writing ability. This finding is
contradictory to much previous research that showed a significant effect of strategy use on academic performance or achievement (e.g., Liem, \textit{et al.}, 2008; Yang & Plakans, 2012), but is consistent with several studies (e.g., Jones, 2008; Lu, 2010). A closer examination of these studies reveals that the contradictory results may be due to whether the independent variable of prior academic performance or achievement was simultaneously included in the analysis of the strategy effect. Without including prior or performance or achievement, significant direct effects of strategy use were found in, e.g., Swalander and Taube’s (2007) SEM study on reading ability, and Yang and Plakans’s (2012) SEM study on integrative writing. However, when L2 prior performance or achievement was included in either SEM analysis (e.g., Liem, \textit{et al.}, 2008) or regression analysis (e.g., Jones, 2008; Lu, 2010), the effect of strategy use became small (Liem, \textit{et al.}, 2008; Lu, 2010) or non-significant (Jones, 2008). In other words, the finding of a non-significant effect of self-regulatory writing strategy in this study seems less surprising because the L2 literacy effects were included in the analysis. Therefore, future studies should include L2 prior performance for a better estimate of L2 writing-strategy effect on writing ability.

Effects of Motivation

As strategy did not yield a significant direct effect on writing ability, significant indirect effect of motivation via strategy on writing ability was not supported, either. This result suggests that high motivation did not indirectly contribute to a high research-article abstract writing ability via frequent use of self-regulatory writing strategy. This finding seems to be different from that of Liem, \textit{et al.}'s (2008) study, which tested a more complex model of L2 achievement and found indirect motivation effects on L2 achievement via achievement goals as well as learning strategies. Caution should be used in comparing these two studies. Liem, \textit{et al.} (2008) and the current study differ greatly in language ability investigated (general language proficiency vs. research-article writing ability), theories of motivation drawn upon (achievement goal theory vs expectancy-value theory), complexity of models tested (a model of 11 latent constructs vs a model of 4 latent constructs), and, particularly, sample size ($N = 1,475$ vs $N = 185$). If possible, further research on research-article writing should include a larger sample; model more complex relationships among motivation, strategy, and achievement; and compare the effects of different motivational constructs in the model.

Research-Article Writing Motivation showed a direct effect on use of Self-Regulatory Writing Strategies ($\beta = 0.46$), suggesting that high motivation may increase L2 graduate students’ reported use of strategy. Note that research-article writing motivation was conceptualized as “an identity-
seeking process in which non-native learners seek a researcher identity by writing L2 research articles acceptable to their chosen fields” in Lin, et al. (2014, p. 391). The finding thus suggests that in this identity-seeking process, once L2 graduate students are motivated to learn research-article writing, they will often increase their use of self-regulatory writing strategies. This finding corroborates Oyserman, Terry, and Bybee’s (2002) statement that identity-based motivation serves as a trigger for subsequent learning actions directed toward achievement critical to their future identities.

**Implications**

Although the effect of L2 literacy was not the major focus of this study, L2 literacy was found to have a strong direct effect on L2 research-article writing. This finding supports Lu’s (2010) L2 writing theory and previous studies on L2 research-article writing (Flowerdew, 2000; Curry & Lilis, 2004), particularly for the claim that high L2 literacy is a prerequisite for good research-article writing. The result suggests a need to include L2 literacy or prior L2 achievement in an L2-learning model. Including such key variables, along with motivational variables, may be especially helpful in clarifying the role of strategy use in academic performance/achievement.

On the other hand, the finding of a direct effect of Research-Article Writing Motivation, operationalized by Lin, et al.’s (2014) RAWMI, on research-article abstract writing ability lends support to the value of Lin, et al.’s synthesis of the identity-based expectancy-value theory (Eccles, 2009), the socio-educational theory (Gardner, 2006), and the genre theory (Swales, 1990), which captures a common construct of collective identity (i.e., English L2 researcher identity with the ability to write English research-articles acceptable to a field) among these theories. This synthesis enables a wider generalization of identity-based motivation in L2 writing research.

The findings indicated that L2 literacy (i.e., L2 reading and writing) had the strongest direct effect on research-article abstract writing ability, as compared to writing motivation and strategy use. However, high L2 literacy alone does not necessarily lead to better research-article abstract writing ability. To ensure success in English L2 research-article writing, instruction should consider some other factors, such as writing motivation.

The direct effect of Research-Article Writing Motivation appears worthy of instructional concern. Most instructors often stress skills for reading and writing research articles, but rarely emphasize writing motivation. However, without writing motivation individuals would not have any drive to engage in learning how to write, nor could they develop the intended writing ability in a successful and sustainable manner. Therefore, besides instruction of writing skills, instructors should recognize and stress the importance of writing motivation to L2 learners. Specifically,
English L2 graduate students should be led to conceptualize learning English research-article writing as an identity-seeking process in which a future identity of English L2 researchers could be obtained by writing research articles acceptable to their disciplinary communities. They should also be encouraged to strengthen their intention for such an identity by assigning higher values to the task of learning research-article writing and expecting themselves to perform well. With higher values and expectations, L2 graduate students may launch and sustain learning until they perceive the learning as relatively completed (i.e., acquiring higher research-article writing ability).

Limitations and Suggestions for Future Research

Some limitations of the study warrant attention. First, despite the direct effects of L2 literacy and motivation on research-article abstract writing ability, the study hesitated to interpret such effects as causal relations until longitudinal data are available. Second, as a preliminary exploration, the current study simply included L2 literacy (a variable widely recognized as influential in L2 research-article abstract writing ability) in the motivated research-article writing model.

Future attempts to build and test a motivated model of research-article writing may include more variables related to language skills and knowledge, such as an L2 graduate student’s knowledge of abstract writing or related research-article writing skills. Third, the study used self-report surveys on self-regulatory writing strategy use. Whether self-report surveys can fully capture learning engagement remains debatable (He, et al., 2012). Future studies on research-article writing engagement should include other measures (e.g., think-aloud and behavior-tracking protocols). Fourth, while the research-article writing motivation was found to be influential for research-article abstract writing ability, whether a similar motivation effect holds on writing full papers or other sections of a research-article remains unknown. Future studies could investigate how the model hypothesized in the current study works in explaining L2 graduate students’ or L2 researchers’ writing of full research-articles or varying research-article sections such as introduction, method, results, and discussion.

REFERENCES


Motivated Abstract-Writing Model


Accepted January 19, 2015.