

3-31-2015

Anxiety and Self-efficacy's Relationship with Undergraduate Students' Perceptions of the use of Metacognitive Writing Strategies

Graeme Stewart

Ontario Institute for Studies in Education, University of Toronto, jg.stewart@mail.utoronto.ca

Tricia Anne Seifert

Montana State University and Ontario Institute for Studies in Education, University of Toronto, tricia.seifert@utoronto.ca

Carol Rolheiser

Ontario Institute for Studies in Education, University of Toronto, carol.rolheiser@utoronto.ca

Follow this and additional works at: http://ir.lib.uwo.ca/cjsotl_rcacea

 Part of the [Curriculum and Instruction Commons](#), [Educational Psychology Commons](#), and the [Higher Education Commons](#)

<http://dx.doi.org/10.5206/cjsotl-rcacea.2015.1.4>

Recommended Citation

Stewart, G., Seifert, T. A., & Rolheiser, C. (2014). Anxiety and Self-efficacy's Relationship with Undergraduate Students' Perceptions of the use of Metacognitive Writing Strategies

Anxiety and Self-efficacy's Relationship with Undergraduate Students' Perceptions of the use of Metacognitive Writing Strategies

Abstract

There is growing interest in promoting metacognition among college and university students, as this has been linked with positive student learning outcomes. This study explores the relationship between student writing anxiety and self-efficacy on undergraduate students' self-reported use of metacognitive writing strategies. Using undergraduate student survey data from a large, research-intensive university in Ontario, Canada, we found reductions in writing anxiety and increased self-efficacy had a statistically significant association with students' perceptions of using metacognitive writing strategies. These findings have implications for both theory and practice. They demonstrate that writing metacognition is influenced by emotional factors, such as the level of anxiety and the extent of self-beliefs around writing. It also suggests that writing interventions that seek to reduce anxiety and increase undergraduate students' self-efficacy with respect to writing may positively enhance students' use of metacognitive writing strategies, and ultimately improve student writing outcomes.

On s'intéresse de plus en plus à promouvoir la métacognition parmi les étudiants des collèges et des universités car ce processus a été lié avec des résultats d'apprentissage positifs. Cette étude explore la relation qui existe entre l'anxiété que les étudiants ressentent devant les travaux d'écriture et l'efficacité personnelle tel que rapporté dans des questionnaires portant sur l'usage de stratégies d'écriture métacognitives remplis par des étudiants de premier cycle. À partir de données de sondages menés auprès d'étudiants de premier cycle d'une grande université d'Ontario, Canada, centrée sur la recherche, nous avons découvert que la réduction de l'anxiété ressentie devant les travaux d'écriture et l'augmentation de l'efficacité personnelle présentaient une association statistiquement significative avec les perceptions des étudiants qui utilisaient des stratégies d'écriture métacognitives. Ces résultats ont des implications à la fois théoriques et pratiques. Ils prouvent que la métacognition en écriture est influencée par des facteurs émotionnels, tels que le degré d'anxiété et la portée des auto-croyances en ce qui concerne les travaux d'écriture. Ils suggèrent également que les interventions d'écriture qui tentent de réduire l'anxiété et d'augmenter l'efficacité personnelle des étudiants en ce qui a trait à l'écriture pourraient améliorer de façon positive l'emploi fait par les étudiants de stratégies d'écriture métacognitives et, en fin de compte, améliorer les résultats des étudiants en matière d'écriture.

Keywords

writing, student, university, learning outcomes, metacognition, anxiety, self-efficacy

Cover Page Footnote

The authors are grateful to the Higher Education Quality Council of Ontario (HEQCO) and the Centre for Teaching Support and Innovation (CTSI) at the University of Toronto for supporting this work.

Among scholars interested in teaching and learning in higher education institutions, there has been growing interest in the conditions that promote metacognition – the ability to “think about thinking” (Allen & Armour-Thomas, 1993; Biggs, 1988; Hounsell, 1997; King, 2004; Nightingale, 1988). The term is often associated with John Flavell (1979, 1987), who conceived of metacognition as including metacognitive knowledge (acquired knowledge that can be used to control cognitive processes) and metacognitive experiences or regulation (cumulative use of metacognitive knowledge). This construct has been linked in the educational literature to desirable student outcomes (Allen & Armour-Thomas, 1993), and attention has now been turned to determining what factors allow students to take a metacognitive approach to learning, and therefore achieve better learning outcomes. Student writing, an important constituent activity of successful learning at all levels of education, has been examined from a metacognition perspective (Biggs, 1998). Similarly, the impact of emotional constructs – such as self-efficacy and anxiety – on student writing has also been explored (Jones, 2008; Lavelle & Guarino, 2003; Martinez, Kock, & Cass, 2011). The relationship between all of these constructs, and how they interact to influence writing outcomes, however, has not been analyzed in the existing literature.

The ability to communicate clearly and effectively both orally and in writing is often highlighted as a key undergraduate learning outcome (Association of American Colleges & Universities, 2007; Ontario Council of Academic Vice-Presidents, 2005). Moreover, past research has found those who use metacognitive strategies as part of their writing process at the postsecondary level are stronger writers (Biggs 1988; Connor, 2007; Lavelle & Bushrow, 2007; Lavelle & Guarino, 2003; Nightingale, 1988). Thus, it appears important to understand if and how these factors are interrelated in order to design holistic writing interventions at the postsecondary level.

Using student data collected from undergraduate students in the general arts and science faculty at a large Canadian research university, this study examined the relationship between writing anxiety and writing self-efficacy and students’ perceived use of metacognitive writing strategies.

Literature Review

The acquisition and application of effective writing skills during college and university is a growing area of concern particularly in terms of the movement of graduates into the workplace. Effective writing is frequently cited as a critical skill for undergraduates to acquire, important to their future workplace success and required by many employers. The National Commission on Writing in the United States surveyed human resource directors from 120 major American corporations and found writing to be a “threshold skill for both employment and promotion” (National Commission on Writing, 2004, p. 3). However, research by the Conference Board (Casner-Lotto & Silvert, 2008) found employers noted more than 25% of four-year college graduates deficient in written communications. “The ability to communicate accurately and reliably, orally and in writing to a range of audiences” is an undergraduate degree level expectation for Ontario degree holders (Ontario Council of Academic Vice-Presidents, 2005, p. 3), and thus, the focus of faculty and higher education administrators must be on ensuring students develop the strategies and skills to write effectively.

Writing is a non-linear and complex process. Past research has examined a multitude of constructs associated with writing achievement. In the literature regarding postsecondary student writing, three constructs appear to be important: metacognition, self-efficacy, and relative

anxiety. The greater use of metacognitive writing strategies by students is associated with better writing outcomes (Connor 2007; Hayes, 2000; Nightingale, 1988). High self-efficacy is associated both with better use of metacognitive strategies or processes (Lavelle & Bushrow, 2007; Lavelle & Guarino, 2003) and with better writing outcomes generally (Jones, 2008; Pajares & Johnson, 1994; Prat-Sala & Redford, 2012; Shell, Murphy & Bruning, 1989). Anxiety, which can be considered a consequence of low self-efficacy, also plays a potentially detrimental role in student writing success (Martinez, Kock & Cass, 2011; Rechten & Dizinnio, 1998). While each of these constructs has been explored in some depth in the literature, the relationship amongst the constructs has not been fully theorized. This literature review examines each of these constructs separately, and concludes with a relational model that we proceed to test in this study, in an effort to identify potential avenues that college and university professors, writing centre staff, and other postsecondary administrators may pursue to improve undergraduates' writing skills.

Metacognition

The concept of metacognition is increasingly important to the study of learning, and the various tasks that take place within a learning environment (such as writing). Flavell (1979, 1987) pioneered the term, which has gone on to wide application in educational research. Allen and Armour-Thomas (1993) define “the common conception” of metacognition as “the knowledge and control individuals have over their own cognition and learning experiences” (p. 203). While cognition deals with solving a given problem, metacognition involves an understanding of the process by which the problem is solved (King, 2004). Understood this way, the term metacognition has been used analytically “to encompass beliefs and knowledge about learning, as well as monitoring, regulating, and reflecting on, learning” (Entwistle & McCune, 2004, p. 333).

In short, metacognition can be understood as how learners think about thinking (King, 2004). When it comes to writing specifically, metacognition deals with how students understand their own writing processes, and how they adapt their processes to evolving demands. It is an essential part of Hayes' (2000) model of cognition and affect in writing, which emphasizes the role of cognitive strategies in managing the complex relationship between the writer (including motivation, memory, and cognitive processes) and the task environment (composed of the audience, collaborators, the text to be created, and the composing medium). The literature indicates that metacognition is composed of several different mental processes, what Allen and Armour-Thomas (1993) describe as “metacomponents” (p. 205). Sternberg (as cited in Allen & Armour-Thomas, 1993), for example, breaks metacognition into six components: (a) deciding upon the nature of the problem; (b) selecting the components or steps needed to solve the problem; (c) selecting a strategy for ordering the components of problem solving; (d) selecting a mental representation for information; (e) allocating resources; and (f) solution monitoring.

Based on the administration of a metacognition instrument of their own design, Allen and Armour-Thomas (1993) found “some empirical support that metacognition is a general, multi-dimensional construct, the components of which work in interaction” (p. 209). In their view, the multi-dimensional and component-based conception of metacognition supports Sternberg's assertion that metacognition is composed of a variety of constituent processes. This observation also reflects Nightingale's (1988) finding that writing in the university requires the integration of numerous skills: the ability to analyze and address the needs of readers according to the purpose

of the assignment; fluency with the style and requirements of their discipline; and the need to understand the structure of knowledge within a given discipline.

The importance of metacognition to writing is well established in the literature. Lavelle and Bushrow (2007) observe, “writers at all levels rely on strategies, or patterns of writing tactics, to achieve their writing goals” (p. 808). These strategies are essentially metacognitive in nature. Moreover, the relative quality of the strategies employed by student writers will have an impact on how effectively they are able to write within an academic context (Connor, 2007; Lavelle & Bushrow, 2007). The widely used concepts of deep learning and surface learning strategies (first suggested by Marton and Saljo, 1976) are applicable to student writing, and several studies have pointed to the connection between deep approaches to writing and successful writing outcomes (Biggs, 1988; Hounsell, 1997; Lavelle, 1993; Lavelle & Bushrow, 2007; Lavelle & Guarino, 2003). As Lavelle and Bushrow (2007) observe, deep writing approaches take “a proactive position geared towards making new meaning” and use “strategies such as complex revision” (p. 808). Conversely, surface writing approaches are “primarily reproductive and involve a listing strategy and a linear outcome or an “ordered” presentation of facts” (Lavelle & Bushrow, 2007, p. 808). Deep writing approaches can be understood as fundamentally metacognitive writing strategies, and students who have better metacognitive abilities will tend to choose and deploy deep writing strategies in their written work. There can also be a variety of different writing approaches that fit within either the deep or surface writing strategy categories. In a study of undergraduate writers, Lavelle and Guarino (2003) identified five approaches to writing, one of which (elaborative) related to deep writing approaches and favourable writing outcomes. In a study of graduate student writers similar to the earlier study of undergraduates, Lavelle and Bushrow (2007) identified no less than eight approaches employed by student writers, and found that at least one of these sub-approaches (the “intuitive” approach) is predictive of quality writing. The intuitive approach allows students to “hear, or envision, writing” beyond the strictly cognitive level (p. 816). The ability to choose and actualize an effective—or deep—writing approach is therefore connected to the ability of students to conceive of writing beyond simple cognition and effectively manage its constituent tasks (Allen & Armour-Thomas, 1993; Connor, 2007; Lavelle & Bushrow, 2007). Drawing a connection between theorists working on metacognition (for example, Allen & Armour-Thomas, 1993) and those working on deep writing approaches (for example, Lavelle & Bushrow, 2007), it becomes clear that deep and effective writers must fundamentally also be metacognitive writers. For this reason, deep writing and metacognitive writing are to some extent interchangeable terms.

Metacognition in writing, as with metacognition generally, is also not static. As new knowledge and skills are acquired, a learner will adapt their cognition accordingly (Allen & Armour-Thomas, 1993). Not surprisingly, the evolution of these skills corresponds to a student’s level of education. This is demonstrated by Lavelle’s (1993) work using her Inventory of College Composition (IPIC) (see also Lavelle & Bushrow, 2007; Lavelle & Guarino, 2003; Lavelle, Smith, & O’Ryan, 2002). At the undergraduate level, there are five factors (or approaches) adopted by students (Lavelle, 1993; Lavelle & Guarino, 2003). At the graduate level, new and more effective strategies begin to emerge (Lavelle & Bushrow, 2007). Writing approaches also vary according to the learning environment (Lavelle & Guarino, 2003). It is therefore important to recognize that the assignments and expectations of a certain course influence student approaches. Care must be taken to assess writing approaches across a variety of contexts rather than extending the conclusions drawn from a single context to an entire institution or collection of institutions.

Based on this understanding of effective writing metacognition as the use of deep writing approaches, writing instruction—either stand-alone or integrated within a disciplinary course—should aim to encourage the acquisition and application of behaviours that collectively compose deep writing (Lavelle & Guarino, 2003), and should broadly aim to increase the metacognitive capacity of student writers.

Self-efficacy

Metacognitive writing strategies are presented as rational and organized, belonging to the control level of the mind (Hayes, 2000). Metacognition is deliberate and typically involves the imposition of order onto a series of disparate tasks. What metacognition does not capture as a construct is how emotional factors may intervene to promote or impair the use of metacognitive strategies. Self-efficacy is one such emotional factor. The idea of self-efficacy as a means to understand behavioural change was first articulated by Albert Bandura in 1977. In his conception, self-efficacy involves individuals' beliefs as to whether they can perform tasks that will influence events in their own lives (Bandura, 1995). Jones (2008) presents a more technical definition of self-efficacy, as “composed of confidence in the ability to accomplish particular tasks and perform particular skills...(i)t is also composed of confidence in self-regulatory strategies to accomplish those tasks” (p. 230). He also notes,

those with high self-efficacy tend to take on interesting challenges, set both long-term and intermediate goals, use strategies to attain them, self-regulate cognitive development, work harder, persist in spite of obstacles, and show a tendency to experience less task-related anxiety. (p. 211)

The ability to identify the need for assistance, and to seek out that assistance, has also been identified as an important component of self-efficacy (Williams & Takaku, 2011). The inclusion of strategic approaches, cognitive self-regulation, and goal setting in self-efficacy suggests that the construct is related to metacognition. In other words, greater belief in one's ability to write successfully promotes the use of better writing strategies, including those we would define as metacognitive. The literature indicates a strong connection between self-efficacy and academic outcomes (Jones, 2008; Prat-Sala & Redford, 2012). Prat-Sala and Redford (2012) also found that reading and writing self-efficacy are correlated with each other, and also correlate with successful undergraduate essay writing. Both metacognition and self-efficacy are therefore associated with better writing outcomes.

In terms of student writing, self-efficacy centres on whether or not students believe they can accomplish a given writing task, and whether or not they are confident that their chosen strategies will be effective. There is some evidence in the literature that students with lower writing skills are more affected by self-efficacy than high-skilled writers (Multon, Brown, & Lent, 1991). Self-beliefs appear to be more persuasive when understanding of the writing process is low, or if the writer is inexperienced. As writing skills advance, high or low self-confidence becomes less important. Jones (2008) has also found evidence that, unlike metacognition, which develops over time, self-efficacy is relatively stable in individuals, as demonstrated by strong correlations between pre- and post-test self-efficacy scores. In the same study, both pre- and post-test measurements, self-efficacy correlates with academic performance (Jones, 2008).

Self-efficacy appears to play an important role in the development of metacognition, and Pintrich (2002) suggests that self-efficacy is actually a form of metacognitive knowledge. In the Inventory of Processes in College Composition, Lavelle (1993; Lavelle & Guarino, 2003) identified “low self-efficacy” as a factor that correlates negatively with effective metacognitive writing approaches. Students who score high on the low self-efficacy scale are “virtually without strategy and see the acquisition of microskills and teacher encouragement as necessary for success” (Lavelle & Guarino, 2003, p. 298). These microskills focus on the bare mechanics of writing to the requirements of the assignment, with little use of metacognitive strategies like considering the audience or revising effectively. This work suggests that self-efficacy and metacognition are conceptually related, not empirically related. That is, self-efficacy might describe aspects of metacognition, rather than exist as an independent construct. Given the unique importance of self-efficacy to student writing identified in the literature, we feel confident treating it as a distinct construct for the purposes of this paper.

Despite the prevalence of self-efficacy in studies of writing ability, one should use caution when applying this construct analytically. As Jones (2008) points out, theorists have conceptualized self-efficacy differently, and the lack of conceptual clarity may erode the predictive power of the concept in certain contexts. For example, two different types of self-efficacy—task-and-skill and regulatory—may play different roles in writing achievement. Therefore, clarity and consistency on what type of self-efficacy is being examined is important to any research on self-efficacy. Given the accompanying focus on metacognition, this study will thus focus on task-and-skill self-efficacy—the belief in one’s ability to accomplish specific tasks, such as writing a paper or completing a written exam.

Anxiety

Another important emotional factor that appears to affect student writing is anxiety, or the fear of failure. Anxiety is a particularly interesting construct for analysis, as it can be considered a consequence of low self-efficacy. In the absence of strong self-beliefs, uncertainty may creep in. The relevant literature indicates that anxiety can affect learning in different ways for different students. Based on their own assessment of research into anxiety and learning, Entwistle and McCune (2004) observe that “fear of failure was linked to conscientious study methods, high motivation, and high academic performance, and yet anxiety could also be debilitating or associated with ineffective studying, leading to poor grades” (p. 327). Nevertheless, most inquiry into the effects of anxiety on writing practice focuses on how it can negatively affect self-efficacy generally (Bandura, 1977) and student writing specifically (Martinez, Kock, & Cass, 2011). Anxiety appears to be negatively related to self-efficacy; those with low self-efficacy are more prone to experience stress and anxiety in association with their academic work (Jones, 2008; Martinez, Kock, & Cass, 2011; Prat-Sala & Redford, 2012). Other negative effects include unpleasant feelings, nervousness, and tension, as well as unproductive writing approaches like avoidance, withdrawal, and procrastination (Martinez, Kock, & Cass, 2011).

By examining anxiety directly, we are able to better understand self-efficacy. As demonstrated above, certain beliefs and behaviours indicate high self-efficacy, while the presence of significant anxiety indicates a lack of self-efficacy.

From separate constructs towards an integrated model

This literature review has identified metacognition, self-efficacy, and anxiety as concepts essential for understanding student writing achievement. The literature suggests a relationship between self-efficacy and metacognition, and between anxiety and self-efficacy. However, little research has looked at how anxiety may negatively affect the use of metacognitive writing strategies, or how all three constructs interact in student writing. This is a deficiency in the extant literature addressed by our study. Our model examined the individual and unique relationships between students' reduction in anxiety, self-efficacy, and perceptions of using metacognitive writing strategies, controlling for student background characteristics such as age, gender and year of study. The model can be visualized as in Figure 1.

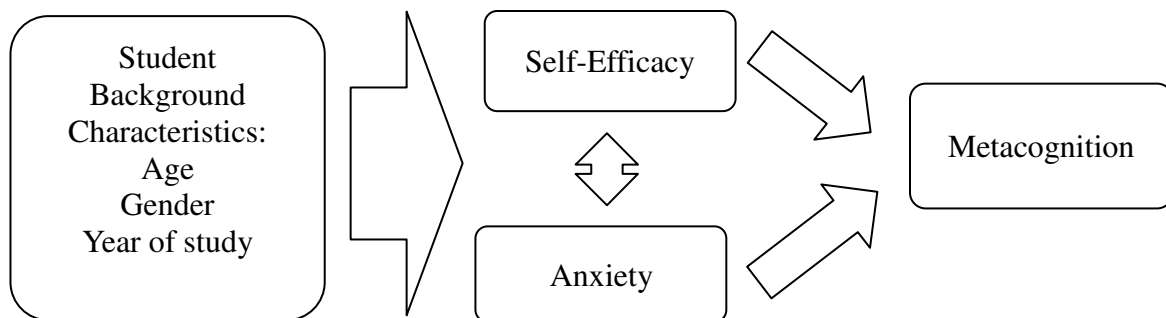


Figure 1. Proposed model for student writing metacognition.

From this conceptual model we examined three research questions:

1. Controlling for student background characteristics, to what extent is reduction in writing anxiety related to students' use of metacognitive writing strategies?
2. Controlling for student background characteristics, to what extent is self-efficacy related to student use of metacognitive writing strategies?
3. Controlling for student background characteristics, what are the unique relationships between reduction in writing anxiety, self-efficacy and student use of metacognitive writing strategies?

This model differs from other models of adult writing (such as that proposed by Hayes, 2000), in that it explicitly attempts to account for belief (self-efficacy) and emotional state (anxiety). If student writing metacognition, self-efficacy, and anxiety are indeed related, then this is an important insight for better understanding the factors that affect student writing success and designing effective writing interventions at the postsecondary level.

Method

Sample

The population for this study was undergraduate students enrolled primarily in first- and second-year courses at a large urban research university in Toronto, Ontario. Sampling was undertaken as part of a larger research project (Rolheiser et al., 2013). All data gathering undertaken for this project and this article received ethics clearance from our home institution under normal research protocols. To be eligible for inclusion in the sample, students must have been enrolled in a course participating in one of two training programs intended to improve the teaching effectiveness of teaching assistants (TAs). One program targets teaching practice generally, while the other focuses on improving the ability of TAs to provide support for student writing. In the TA program that focused on training TAs in providing writing feedback, purposeful sampling was undertaken first at the course level. Specific courses were identified based on overall enrolment and number of TAs (with priority given to larger enrolment courses with large number of TAs), as well as representation across the Faculty of Arts and Science's major academic divisions (humanities, social sciences, physical sciences, and life sciences). Invitations to participate in the study were sent to instructors whose courses met the criteria. Of these, 17 course instructors agreed to volunteer their class for the study, eight of which were first year courses, eight were second year, and one was a third year course. In the second TA program, TAs participating in a program offered by the university to develop their teaching expertise volunteered their course section. This method identified nine courses: six second-year courses, two first year courses, and one third-year course dispersed across the university's major academic divisions. It is worth noting that none of these courses were exclusively focused on writing skills. They were courses taken as part of a degree program, and therefore permit an examination of writing beliefs and behaviours in the context of discipline-based coursework. This follows Prat-Sala and Redford's (2012) observation that writing behaviour is better observed in normal coursework as opposed to a writing development course where skills acquisition is the primary focus. The recruitment of courses into this study by TA training program was done to satisfy requirements of the larger research study cited above. The TA training variable itself was not relevant to this particular study.

Once the target courses were identified, students were sampled at random from each course. Because course sizes varied, students had varying sampling probabilities. Sample weights were computed for each course and incorporated in the regression analysis. Students were invited to complete surveys at the beginning and end of their course in which they were asked about their approaches to studying and writing. For the purpose of this analysis, we used data from the pre-course survey. Thus, the TA training program in which the course was affiliated did not confound the analysis as the surveys were completed prior to students' experiences with course TAs. Complete data were available from 795 student respondents. The average age in the sample was 20.1 years with a median of 19 years, while the median age in the population is 20.9 years. The gender breakdown in our analytic sample is 32 per cent male, and 68 per cent female, compared to 38 per cent male and 62 per cent female in the general arts and science full-time undergraduate population.

Instruments

Writing is increasingly recognized as a complex, non-linear exercise, and the study of writing therefore requires an integrative approach (Nightingale, 1988). To this end, we employed items from existing surveys, as well as new items created and piloted for the current study to measure anxiety, self-efficacy, and the use of metacognitive writing strategies. Although it is possible to measure student writing achievement through an objective measure (see for example ACT (2014) writing skills module of the Collegiate Assessment of Academic Proficiency), the constructs of interest in this study are based on respondent perception and recollection of past behaviour. Writing research has frequently used multi-item, self-report instruments composed of Likert-type items to assess writing ability and related constructs (Allen & Armour-Thomas, 1993; Jones, 2008; Lavelle, 1993; Lavelle & Guarino, 2003; Lavelle, Smith, & O’Ryan, 2002; Martinez, Kock, & Cass, 2011; Pajares & Johnson, 1994; Prat-Sala & Redford, 2012; Shell, Murphy, & Bruning, 1989). Moreover, calculating scales from self-report instruments has become a well-established mechanism for analyzing student writing metacognition, self-efficacy, and anxiety. Factor analysis of responses is the preferred means of creating scales throughout the literature. Indeed, “factor analysis has been supported as both a data reduction and model building procedure, and has commonly been used to develop inventories of student writing” (Lavelle & Bushrow, 2007, p. 810-811). Guided by the use of self-report Likert-scale response items factor analyzed into composite scores in past research, we used principal components factor analysis with orthogonal varimax rotation for each construct within the study: reduced writing anxiety, self-efficacy, and students’ perceptions of using metacognitive writing strategies.

To assess writing anxiety, we adopted two items from Martinez, Kock, and Cass (2011) and modified them to fit the new inventory. Students were asked to indicate their level of nervousness related to writing tasks, from exams to in-class exercises. For example, students identified the extent to which they agreed or disagreed with the statement, “Completing written assignments for a class makes me anxious.” For the purposes of our analysis, both items were coded to ensure that the lowest level of anxiety was given the highest value, which can be thought of as reduced writing anxiety. The two items loaded onto a single factor explaining 72% of the variance with an internal consistency of 0.619.

Items measuring writing self-efficacy were similarly adapted from Jones’ (2008) *Writing Behaviours Scale*, which in turn was adapted from Ferrari and Parker’s (1992) earlier general self-efficacy instrument. There are 10 items in the scale that measure student self-beliefs about their ability to accomplish writing tasks and respond to challenges encountered while writing. Asking students to identify their level of agreement, constituent items included: “I do not seem capable of dealing with most problems that come up in completing written work” (reverse-coded) and “Failure to write well just makes me try harder.” In his 2008 study, Jones reported a Cronbach’s alpha score of 0.85. The principle components factor analysis yielded a solution in which three factors had an Eigenvalue of greater than 1, explaining 60% of the variance. However, reviewing the scree plot suggested a single factor was a better solution with the individual items loading between 0.46 and 0.68 on the single factor. The internal consistency of the ten-item self-efficacy composite measure was 0.77.

In developing items to measure writing metacognition, we examined several existing inventories. One of the best established is Lavelle’s (2002, 2003, 2007) *Inventory of Processes in College Composition (IPIC)*, an instrument which seeks to measure metacognition and self-

efficacy in university writing. However, at 74 items, it was felt the IPIC was too long to be included in a survey measuring multiple constructs. Drawing upon the major themes in the IPIC and King's (2004) typology of writers, the research team engaged an iterative process to create a brief set of items that measured students' perceptions of using metacognitive writing strategies. These included items that focused on: (a) considering the purpose of the writing assignment and intended audience; (b) generating ideas, and developing organization and thesis statements; and (c) recognizing writing as a process. We pilot tested the items with 135 students enrolled in a university summer writing course and sought feedback from writing experts working in the general and writing TA training programs at the university.

The principal components factor analysis resulted in four factors with an Eigenvalue of greater than 1. However, upon reviewing the scree plot, two factors were below the elbow of the plot and eliminated. Forcing a two-factor solution resulted in the second factor being comprised solely of negatively worded survey items. In a forced single factor solution, only items that loaded onto the factor at 0.45 or greater were retained for the composite measure. This yielded a 12-item composite with an internal consistency of 0.78. Table 1 presents all of the descriptive statistics for the variables in the analysis and Table 2 includes the constituent items and factor loadings for the metacognition composite measure.

Table 1

Descriptive Statistics for Model Variables, unweighted (n=795)

	Mean	SD	Min	Max
Female	0.68	NA	0	1
Age	20.14	4.37	17	69
2 nd year or greater study	0.54	NA	0	1
Reduced Anxiety	2.83	1.19	1	5
Self-efficacy	3.28	0.68	1.1	5
Metacognition	3.70	0.63	1.67	5

Table 2

Metacognition Constituent Items and Factor Loadings (Cronbach's alpha = 0.78)

<i>Indicate the extent to which you agree or disagree with each of the following statements:</i>	Factor Loading
I think about the audience for whom I am writing.	0.56
I see revision as part of the writing process.	0.50
I tend to forget about the purpose of the writing assignment. (reverse-coded)	0.54
I have a hard time organizing my ideas. (reverse-coded)	0.52
I support my thesis with evidence.	0.56
I divide the writing process into parts.	0.54
I tend to forget to consider the intended audience for my writing. (reverse-coded)	0.57
I am comfortable gathering information to inform my writing.	0.55
I get frustrated by having to put my ideas down in writing. (reverse-coded)	0.55
Before I start writing, I consider the purpose of the assignment.	0.55
I detect gaps where my thesis statement is not well supported.	0.45
I complete written assignments in a timely manner.	0.53

Analytic Procedure

To examine the individual and unique effects of reduced anxiety and self-efficacy on students' perceptions of using metacognitive writing strategies, a stepwise regression procedure was used. The baseline model included student background characteristics: age, gender, and year in school. Model 2a added the measure for reduced anxiety to the regression equation and the change in explained variance was computed. Model 2b followed the same procedure but for self-efficacy. The baseline model was first run and then self-efficacy was added to the regression equation. The complete model estimated the unique relationship between reduced anxiety, self-efficacy and students' perceptions of using metacognitive writing strategies.

Results

The null hypothesis advanced no relationship between either reduced writing anxiety or student writing self-efficacy and undergraduate students' perceptions of using metacognitive writing strategies. Although the baseline model, with controls for student background characteristics, explained less than one per cent of the variance in the outcome measure, both reduced anxiety and self-efficacy were positively related to students' perceptions of using metacognitive writing strategies. Adding reduced anxiety to the regression model increased the amount of explained variance by .236, with a beta weight of .484 ($p < .001$). Reduction in undergraduate students' writing anxiety was associated with increased student reports of using metacognitive writing strategies. Comparing model 2b to that of the baseline, it was evident that self-efficacy was a strong predictor of students' use of metacognitive writing strategies (beta = 0.712, $p < .001$) and explained an additional 51% of variance in the outcome over the baseline model. Thus, an increase in students' writing self-efficacy was associated with increased student perceptions of using metacognitive writing strategies. Moreover, in the complete model in which

the unique relationships between reduced anxiety and self-efficacy were examined, the magnitude of the relationships from the independent models (models 2a and 2b) were reduced but still statistically significant. The total amount of explained variance in student perceptions of using metacognitive writing strategies was 0.521 and the beta weight for reduced anxiety was 0.101 ($p < .01$) and 0.654 for self-efficacy ($p < .001$), controlling for student background characteristics. Controlling for undergraduate students' writing self-efficacy and other background characteristics, reduction in anxiety had a small but statistically significant association with student perceptions of using metacognitive writing strategies. Additionally, when accounting for writing anxiety and other background characteristics, self-efficacy had a modest statistically significant relationship with student perceptions of using metacognitive writing strategies.

Table 3

Effect of Reduced Anxiety and Self-efficacy on Students' Perceptions of Using Metacognitive Writing Strategies (n=795)

	Model 1 – Controls		Model 2a		Model 2b		Model 3 – Complete	
	Beta	SE	Beta	SE	Beta	SE	Beta	SE
Reduced Anxiety	-	-	0.484***	0.02	-	-	0.101**	0.019
Self-Efficacy	-	-	-	-	0.712***	0.027	0.654***	0.032
R^2	0.007		0.240		0.515		0.521	
ΔR^2	-		0.236		0.512		0.518	

Note. Baseline and subsequent models control for age, gender, and year of study.

ΔR^2 is based on the control model. All models include weights for probability of students from courses being selection into the sample. SEs are robust standard errors.

* $p < .05$. ** $p < .01$. *** $p < .001$.

From these results, there is good evidence that reductions in students' writing anxiety and increased self-efficacy are associated with increases in students' perceptions of using metacognitive writing strategies, both independently and together. Self-efficacy was a much stronger predictor of students' perceptions of using metacognitive writing strategies, although reduced anxiety had a small but statistically significant relationship with the outcome.

Limitations

This study was conducted at a single (yet large) institution and within a single faculty (albeit the largest at the institution). Although students were randomly sampled from a diverse cross-section of courses representing the humanities, social sciences, physical sciences, and life sciences, the study's sampling conditions may limit the generalizability of these findings. The

relationships identified in the present analysis may not exist in other instructional, institutional, geographic, or jurisdictional settings. Additionally, the small number of anxiety items (two) used in this analysis may have underestimated the actual relationship between reduced anxiety and students' perceptions of using metacognitive writing strategies. It is difficult to assess the effect of this limitation, but future research may include a more robust measure of student writing anxiety.

Discussion

Returning to the three research questions that began this study, it appears that self-efficacy and anxiety have statistically significant, individual and unique effects on students' perceptions of using metacognitive writing strategies when controlling for student characteristics. These significant relationships persist when self-efficacy and anxiety were placed in a single model, although the effect of anxiety tended to weaken. Overall, there is good evidence to support the model we have proposed for describing the relationship between these constructs. This finding has important implications for both the theory around metacognition, and for those working to improve student writing in practical settings.

Implications for Theory and Measurement

Our results confirm previous conclusions that self-efficacy and anxiety are related to student writing metacognition (Jones, 2008; Lavelle, 1993; Lavelle & Bushrow, 2007; Lavelle & Guarino, 2003; Lavelle, Smith, & O'Ryan, 2002; Martinez, Kock, & Cass, 2011; Pintrich, 2002; Prat-Sala & Redford, 2012). Our findings also extend the knowledge base and help clarify the relationship between these three constructs: self-efficacy and anxiety each have an independent effect on writing metacognition, as they retain their influence when both are placed in a single explanatory model, although self-efficacy had a stronger effect than anxiety on writing metacognition. The literature suggests that high anxiety is related to low self-efficacy (Bandura, 1977; Martinez, Kock, & Cass, 2011; Prat-Sala & Redford, 2012), and this is confirmed in our study with an r of 0.60 between the two constructs. However, from our findings, it is incorrect to assume that anxiety's relationship with metacognition exists only by reducing self-efficacy. Anxiety continued to have a significant relationship with metacognition even when accounting for self-efficacy. While no doubt related to self-efficacy, anxiety has a consistent effect of its own. The effects of both higher self-efficacy and lower anxiety are positive; our findings suggest that increasing students' self-efficacy and reducing anxiety will be associated with greater perceptions of metacognitive writing strategy use. To the extent that perceptions of using metacognitive writing strategies results in the actual use of metacognitive strategies in writing, one may expect improved student writing outcomes when self-efficacy is encouraged and anxiety reduced.

Methodologically, we believe we have developed a useful and compact instrument for assessing student writing anxiety, self-efficacy, and metacognition that combines the work of previous studies (Jones, 2008; Lavelle, 1993; Martinez, Kock, & Cass, 2011) with a new series of metacognition items. As we have noted, the anxiety portion could certainly be expanded and strengthened. However, the reliability of the composite measure and the significant results of our analysis suggest that our instrument can be useful in other contexts and research projects.

Implications for Practice

From the results of this study, it is reasonable to conclude that increasing self-efficacy and reducing anxiety will positively affect student writing metacognition, thereby improving real-world writing outcomes. The challenge for practitioners is to structure learning environments that take advantage of this finding. Bandura (1977, 1986, 1997) suggests that self-efficacy is the result of interactions between internal factors (such as states of “emotional arousal” like anxiety) and external factors. The important insight here is that external factors can be manipulated to change internal emotional states. By creating positive learning environments and interventions, anxiety can be reduced, self-efficacy can be enhanced, and the use of metacognitive strategies encouraged. As van Dinther, Dochy, and Segers (2011) note in their meta-analysis of writing interventions, efforts to improve self-efficacy can and do have a positive impact on student writing.

Our study did not seek to identify specific interventions that will reduce anxiety and increase self-efficacy. However, the student writing literature provides some important insights. Rehtien and Dizinnio (1998) suggest that tutoring—by instructors, peers, or specialized writing support staff—can help reduce writing anxiety. We also know that it is important for tutors to “label” and “model” effective writing practices and to teach these methods explicitly (Pintrich, 2002). There is widespread agreement in the literature that quality feedback can have a positive effect on self-efficacy and metacognition (Armstrong, Wallace, & Chang, 2008; Boscolo, Arfe, & Quarisa, 2007; Connor, 2007; van Dinther, Dochy & Segers, 2011). There is also evidence that repetition, or frequent writing, is important to enhancing self-efficacy. According to van Dinther, Dochy, and Segers (2011), “Educational institutions could also actively stimulate self-efficacy of students by providing a programme that provides students with authentic tasks, requiring them to apply more frequently knowledge and skills within diverse situations” (p.105). They also note that “safe” or low-risk writing environments are important to promoting self-efficacy. Finally, the literature strongly suggests that writing interventions are most effective when incorporated into a student’s normal coursework, as was the case in this current study (Connor, 2007; Hounsell, 1987; Pintrich, 2002; Rolheiser et al., 2013; Wingate, 2010). The larger study that yielded data for our analysis (Rolheiser et al., 2013), provided qualitative, interview-based data that suggest students perceive modeling of specific writing techniques and iterative assignments with specific formative feedback to be useful to their writing. This suggests that the teaching assistant training program examined by the larger study, featuring discipline-specific writing integration and support around the activities outlined above, is a potential example of an effective writing intervention.

Together, these observations sketch the outline of effective postsecondary writing interventions that seek to increase writing self-efficacy and reduce writing anxiety. As suggested by the results of our study, such interventions may have a beneficial effect on student use of metacognitive writing strategies. The elements identified by the literature—labeling by instructors, incorporation into varied coursework, frequency, feedback, and low risk activities—have not been examined relative to the anxiety/self-efficacy/metacognition model advanced by this paper. It would be particularly interesting to examine how specific interventions interact with the model we have articulated here. Such research would yield insights valuable to practitioners seeking to develop writing interventions in the postsecondary context. Using our data, it is possible to assess the impact of one of these elements—feedback—on anxiety, self-

efficacy, and student writing metacognition. A future paper is planned that will examine this relationship in depth.

Conclusion

Overall, this study finds compelling evidence to support the idea that student writing anxiety, self-efficacy, and metacognition are related constructs. Low anxiety and high self-efficacy have separate, consistent, significant, and positive effects on writing metacognition within our sample. This suggests that writing interventions that seek to reduce anxiety and improve student writing confidence will promote metacognitive writing and support the goal of better writing outcomes for undergraduate students. This insight, combined with the relevant literature on writing interventions, implies a structure for effective writing programs.

There are several interesting potential research avenues suggested by this study. While we have provided evidence to support a particular model of student writing metacognition, our research is confined to a single institution and particular group of students within that institution. It would be interesting to expand this analysis to other institutions—in Ontario and beyond—to see if the pattern of relationships we observed persists in different contexts.

While we believe we have developed a useful instrument for measuring student writing anxiety, self-efficacy, and metacognition, it will be necessary to apply this instrument in different research contexts to better assess its reliability and validity. It would also be interesting to expand and strengthen the anxiety portion of our instrument to see if this affects the dynamics of the model.

As suggested by Pintrich (2002), it is important to recognize that the *accuracy* of self-knowledge is important to positive learning outcomes. That is, it is not enough to have positive self-beliefs about writing—these beliefs must be an accurate representation of the actual skills possessed by an individual. It would be very interesting to enrich the model proposed by this study by assessing the accuracy of self-beliefs for respondents and how this influences the model we have proposed (see Bowman, 2010).

It would also be useful to track the effectiveness of particular writing interventions over time using our student writing metacognition model. How effective is the intervention in reducing anxiety, enhancing self-efficacy, and promoting metacognition? By using our instrument in a longitudinal analysis, it should be possible to measure how well a given program performs according to these criteria. The Association of American Colleges and Universities has identified writing-intensive courses as a “high impact practice” that promotes good learning outcomes (Kuh, 2008). As such, the proper design and evaluation of these course and programs is an important focus for future research.

Writing is an important skill, and an essential part of a balanced university education and a successful transition to the workforce. By helping to clarify the relationship between writing anxiety, self-efficacy, and metacognition, we believe this study has made a contribution to the work of promoting student writing success, both in and beyond the university.

References

- ACT. (2014). *Writing skills test*. Retrieved from <http://www.act.org/caap/test/writing.html>
- Allen, B. A., & Armour-Thomas, E. (1993). Construct validation of metacognition. *The Journal of Psychology, 127*(2), 203-211. <http://dx.doi.org/10.1080/00223980.1993.9915555>

- Armstrong, N., Wallace, C., & Chang, S. (2008). Learning from writing in college biology. *Research in Science Education*, 38(4), 483-499.
<http://dx.doi.org/10.1007/s11165-007-9062-9>
- Association of American Colleges and Universities. (2007). *College learning for the new global century*. Washington, DC: Author.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215. <http://dx.doi.org/10.1037/0033-295X.84.2.191>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs: Prentice Hall.
- Bandura, A. (1995). Perceived self-efficacy. In A. S. R Manstead & M. Hewstone (Eds.), *Blackwell encyclopedia of social psychology* (pp. 434-436). Oxford: Blackwell
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.
- Biggs, J. (1988). Approaches to learning and essay writing. In R. R. Schmeck (Ed.), *Learning strategies and learning styles* (pp. 185-228). New York: Plenum.
http://dx.doi.org/10.1007/978-1-4899-2118-5_8
- Boscolo, P., Arfe, B., & Quarisa, M. (2007). Improving the quality of students' academic writing: an intervention study. *Studies in Higher Education*, 32(4), 419-438.
<http://dx.doi.org/10.1080/03075070701476092>
- Bowman, N. A. (2010). Can first-year college students accurately report their learning and development? *American Educational Research Journal*, 47, 466-496.
<http://dx.doi.org/10.3102/0002831209353595>
- Casner-Lotto, J., & Silvert, H. (2008). *New graduates' workforce readiness: The mid-market perspective*. Research Report R-1413-08-RR. New York: Conference Board.
- Connor, L. (2007). Cueing metacognition to improve researching and essay writing in a final year high school biology class. *Research in Science Education*, 37(1), 1-16.
<http://dx.doi.org/10.1007/s11165-004-3952-x>
- Entwistle, N., & McCune, V. (2004). The conceptual bases of study strategy inventories. *Educational Psychology Review*, 16(4), 325-345.
<http://dx.doi.org/10.1007/s10648-004-0003-0>
- Ferrari, J. R., & Parker, J. T. (1992). High school achievement, self-efficacy, and locus of control as predictors of freshman academic performance. *Psychological Reports*, 71, 515-518.
<http://dx.doi.org/10.2466/pr0.1992.71.2.515>
- Flavell, J. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, 34(10), 906-911.
<http://dx.doi.org/10.1037/0003-066X.34.10.906>
- Flavell, J. (1987). Speculations about the nature and development of metacognition. In F. E. Weinert & R. Kluwe (Eds.), *Metacognition, motivation, and understanding* (pp. 21-29). Hillsdale, NJ: Lawrence Erlbaum.
- Hayes, J. (2000). A new framework for understanding cognition and affect in writing. In R. Indrisano & J. Squire (Eds.), *Perspectives on writing: Research, theory, and practice* (pp. 6-44). Newark: International Reading Association.
- Hounsell, D. (1997). Learning and essay writing. In F. Marton, D. Hounsell, & N. Entwistle (Eds.) *The experience of learning* (pp. 103-123). Edinburgh: Scottish Academic Press.
- Jones, E. (2008). Predicting performance in first semester college basic writers: Revisiting the role of self beliefs. *Contemporary Educational Psychology*, 33, 209-238.
<http://dx.doi.org/10.1016/j.cedpsych.2006.11.001>

- King, K. (2004). Just don't make me think: Metacognition in college classes. In *Selected papers from the 15th Annual Conference on College Teaching and Learning*. Jacksonville, FL: Center for the Advancement of Teaching and Learning.
- Kuh, G. (2008). *High impact educational practices: What they are, who has access to them, and why they matter*. Washington, DC: American Association of Colleges and Universities.
- Lavelle, E. (1993). Development and validation of an inventory to assess processes in college composition. *British Journal of Educational Psychology*, 63, 489-499. <http://dx.doi.org/10.1111/j.2044-8279.1993.tb01073.x>
- Lavelle, E., & Bushrow, K. (2007). Writing approaches of graduate students. *Educational Psychology*, 27(6), 807-822. <http://dx.doi.org/10.1080/01443410701366001>
- Lavelle, E., & Guarino, A. J. (2003). A multidimensional approach to understanding college writing processes. *Educational Psychology*, 23(3), 295-305. <http://dx.doi.org/10.1080/0144341032000060138>
- Lavelle, E., Smith, J., & O'Ryan, L. (2002). The writing approaches of secondary students. *British Journal of Educational Psychology*, 72, 399-418. <http://dx.doi.org/10.1348/000709902320634564>
- Martinez, C. T., Kock, N., & Cass, J. (2011). Pain and pleasure in short essay writing: factors predicting university students' writing anxiety and writing self-efficacy. *Journal of Adolescent & Adult Literacy*, 54(5), 351-360. <http://dx.doi.org/10.1598/JAAL.54.5.5>
- Marton, F., & Saljo, R. (1976). On qualitative differences in learning: Outcomes and processes. *British Journal of Educational Psychology*, 43, 4-11. <http://dx.doi.org/10.1111/j.2044-8279.1976.tb02980.x>
- Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *Journal of Counselling Psychology*, 38(1), 30-38. <http://dx.doi.org/10.1037/0022-0167.38.1.30>
- National Commission on Writing. (2004). *Writing: A ticket to work or a ticket out: A survey of business leaders*. New York: College Board.
- Nightingale, P. (1988). Understanding problems and processes in student writing. *Studies in Higher Education*, 13(3), 263-283. <http://dx.doi.org/10.1080/03075078812331377720>
- Ontario Council of Academic Vice-Presidents. (2005). *Guidelines for university undergraduate degree level expectations*. Toronto: Council of Ontario Universities.
- Pajares, F., & Johnson, M. (1994). Confidence and competency in writing: The role of self-efficacy, outcome expectancy, and apprehension. *Research in the Teaching of English*, 29, 313-331.
- Pintrich, P. (2002). The role of metacognitive knowledge in learning, teaching, and assessing. *Theory into Practice*, 41(4), 219-225. http://dx.doi.org/10.1207/s15430421tip4104_3
- Prat-Sala, M., & Redford, P. (2012). Writing essays: Does self-efficacy matter? The relationship between self-efficacy in reading and in writing and undergraduate students' performance in essay writing. *Educational Psychology*, 32(1), 9-20. <http://dx.doi.org/10.1080/01443410.2011.621411>
- Rechtien, J. G., & Dizinnio, G. (1998). Apprehension about writing: Further results. *Psychological Reports*, 82(1), 221-222. <http://dx.doi.org/10.2466/pr0.1998.82.1.221>
- Rolheiser, C., Seifert, T., McCloy, C., Gravestock, P., Stewart, G., Greenleaf, E., Burnett, M., Carpenter, S., Pottruff, B., & McKean, S. (2013). *Developing teaching assistants as members of the university teaching team*. Toronto: Higher Education Quality Council of Ontario.

- Shell, D. F., Murphy, C. C., & Bruning, R. H. (1989). Self-efficacy, attribution, and outcome expectancy mechanisms in reading and writing achievement. *Journal of Educational Psychology, 81*, 91-100. <http://dx.doi.org/10.1037/0022-0663.81.1.91>
- van Dinther, M., Dochy, F., & Segers, M. (2011). Factors affecting students' self-efficacy in higher education. *Educational Research Review, 6*, 95-108. <http://dx.doi.org/10.1016/j.edurev.2010.10.003>
- Willians, J. D., & Takaku, S. (2011). Help seeking, self-efficacy, and writing performance among college students. *Journal of Writing Research, 3*(1), 1-18.
- Wingate, U. (2010). The impact of formative feedback on the development of academic writing. *Assessment and Evaluation in Higher Education, 35*(5), 519-533. <http://dx.doi.org/10.1080/02602930903512909>