PREDICTING EFFICACY TO TEACH WRITING

The Role of Attitudes, Perceptions of Students' Progress, and Epistemological Beliefs

ABSTRACT

Three studies examined if teachers' beliefs about writing predicted their efficacy to teach writing. We surveyed primary grade teachers from Taiwan ($N = 782$), Shanghai ($N = 429$), and the United States ($N = 214$). At each location, teachers completed surveys assessing attitudes toward writing and the teaching of writing, beliefs about students' progress as writers, and epistemological beliefs about writing instruction, writing development, and writing knowledge. We examined if each of these beliefs made unique and statistically significant contributions to predicting efficacy to teach writing after variance due to all other predictors, as well as personal and contextual variables, was controlled. With one exception, these three sets of beliefs each accounted for unique variance in predicting teacher efficacy at each location. There was, however, variability in unique variance in teacher efficacy scores accounted for by specific beliefs across locations and the factor structure of various measures by location.

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SELF-EFFICACY is the belief in "one's capabilities to organize and execute the courses of action required to produce given attainment" (Bandura, 1977, p. 3). It is commonly believed that teachers with more assured confidence in their teaching capabilities are better teachers, evidence higher levels of commitment and job satisfaction, and positively influence students' efficacy, motivation, and achievement (e.g., Aloe et al., 2014; Ross et al., 1996; Tschannen-Moran et al., 1998). This was supported by Zee and Koomen's (2016) meta-analysis of 165 studies showing that teacher efficacy had direct and indirect consequences on classroom practices, student outcomes, and teachers' well-being.

Although teacher efficacy has been studied as an omnibus trait (Ross et al., 1996), there has been increasing emphasis that it is task specific or situation specific (Tschannen-Moran et al., 1998). This has led researchers to study teacher efficacy in specific academic domains such as reading or math (Midgley et al., 1989; Yildirim, 2012). However, little attention has been directed at studying teacher efficacy and teaching writing. For instance, in Zee and Koomen's (2016) review of 165 teacher efficacy studies, none of the investigations examined writing.

This is not to say that teacher efficacy research is nonexistent in the writing literature. Several studies (De Smedt et al., 2016; Parker et al., 2006; Tschannen-Moran & Barr, 2004) have found that writing performance was higher for students in classrooms or schools where teachers were more positive about their capabilities to teach writing. Researchers further reported that more efficacious teachers provided students with better writing instruction than less efficacious teachers (Brindle et al., 2016; De Smedt et al., 2016; Gilbert & Graham, 2010; Hsiang & Graham, 2016; Hsiang et al., 2018, 2020; Rietdijk et al., 2018). Several investigators also demonstrated that efficacy is malleable and can be enhanced through instruction (Dillard, 2004; Oh, 2011).

Most pertinent to the present investigations are studies examining if specific contextual or personal factors predict teachers' efficacy for writing instruction. Such investigations are essential to creating a better understanding of how teacher efficacy in writing develops (Klassen et al., 2011). This includes studies examining traditional sources of efficacy (i.e., mastery experiences, verbal persuasion, vicarious experiences, and physiological and emotional determinants) as well as the role of setting and other teacher beliefs in predicting teacher efficacy (e.g., Hannum, 1995; Oh, 2011; Sutlive, 2008). Even so, Klassen et al. (2011) noted insufficient attention has been paid to possible sources of teachers' efficacy. This includes exploring relationships that exist between teacher efficacy and other teacher beliefs about writing. Although predictive studies such as the ones reported in this article do not establish causation, they provide valuable information for describing how teacher efficacy operates and for identifying possible malleable factors that may serve as important sources of teacher efficacy in future experiments.

Purpose of the Present Studies

The three studies included in this article were designed to answer the following research question: Do primary grade teachers' (1) attitudes toward their own writing and teaching writing, (2) their perceptions of students' progress as writers, and

(3) their epistemological beliefs about writing collectively and uniquely predict efficacy to teach writing? In examining the contribution of each of these variables in predicting teacher efficacy, we first controlled for variance due to all other predictors and personal and contextual variables. Personal variables included gender, preparation to teach writing, and teaching experience. Contextual variables were class size and the most common type of writer in a teacher's class (average, poor, or strong writers).

We examined these relationships in separate investigations replicated in three different locations, two in the Greater China region (Taiwan and Shanghai) and one in the United States. This allowed us to test two propositions inherent in the writer(s)-within-community model (WWC; Graham, 2018a, 2018b; Graham & Harris, 2018). The first is that teachers hold multiple beliefs about writing that are interrelated (e.g., attitudes, perceptions of student progress, and epistemological beliefs predict efficacy to teach writing). The second is that teachers' beliefs about writing and the relationships between them are shaped by context (e.g., efficacy to teach writing and beliefs that predict efficacy should vary across and within locations). This also made it possible for us to further explicate the WWC model in terms of teacher beliefs by specifically examining how teacher efficacy is related to other teacher beliefs (i.e., do these other beliefs about writing each uniquely predict efficacy?). The WWC model did not specifically detail how each type of belief is related to other writing beliefs. Furthermore, these three replication studies allowed us to determine the extent to which different contexts affect teacher beliefs about writing and associations between these beliefs. Although the WWC model assumes that context shapes teachers' beliefs, the strength of this effect is uncertain.

Our three replications in different locations are also important because exploring teacher efficacy in diverse settings is informative in that variations in culture and political context may influence teachers' beliefs (Klassen et al., 2011). Two of our locations, Taiwan and Shanghai, share a common cultural heritage, whereas the United States and Taiwan share similar political structures. These three separate studies in different locations allowed us to consider the generalizability of our findings concerning the relationship between efficacy for teaching writing and beliefs that predict it. Conflicting findings concerning the universality of what teachers believe have been reported in the literature (e.g., Chan, 2010; Klassen et al., 2009).

Theoretical Underpinnings

The WWC model (Graham, 2018a, 2018b; Graham & Harris, 2018) proposes that writing and teaching writing occur within specific writing communities such as a primary grade classroom. According to the model, writing and teaching writing are simultaneously and interactively shaped by the communities in which they take place as well as the cognitive capabilities and resources of community members who write or teach writing. Furthermore, the communities in which writing occurs and the actions, capabilities, and resources of community members are shaped by the unique historical, social, political, institutional, and cultural events that take place where the community resides.

According to the WWC model, teachers must make numerous decisions about how to teach writing and manage their classrooms. To do so, they draw on their

knowledge of writing, teaching, and the community itself while executing the control mechanisms that allow them to carry forward their intentions and manage the emotional, physiological, and personality traits of their students and themselves. The actions teachers take are further influenced by the characteristics of the writing community in which they operate. This includes its purposes, the number and capabilities of its members, typified actions for conducting community business, available tools for writing, the physical and social environment established, and the collective history of the writing community.

Particularly important to the current investigations are teachers' beliefs as they fuel the decisions teachers make, affecting which actions and teaching tools are applied as well as how much effort is invested in the teaching process. The WWC model proposes that teacher beliefs include judgments about competence to teach writing, attitudes about writing and teaching writing, how writing develops and is learned, the value and utility of writing and writing instruction, purposes for engaging in writing and writing instruction, why one is successful as a writing teacher, identity as a teacher and writer, and the value, capabilities, and purposes of the writing community and its members (including perceived writing competence of students).

Teacher beliefs about writing interact to influence teachers' behaviors. For instance, a teacher who is confident of their teaching capabilities may spend little time teaching writing, even though they judge that their students are not adequately progressing as writers, because they believe that writing development is due to factors outside their control such as genetics and financial affluence. In this instance, the teacher may decide not to teach writing, even though they are confident of their capabilities and that students need to improve, because they believe that students' growth is not influenced by teaching. In contrast, a teacher who may be less confident of their teaching capabilities may spend more time teaching writing to students they view as not making adequate progress as the teacher believes that writing can be learned by teaching it and through student effort and hard work. Contextual factors such as the size of the class or its composition (e.g., proportion of the class who are weaker writers) may further shape or constrain how teachers' beliefs influence their actions. For instance, the teacher above, who is less efficacious, may not be as likely to try to improve students' writing if that teacher views the task as overwhelming because there are too many students or too many of them are weaker writers.

Finally, the WWC model proposes that the creation and maintenance of a writing community does not occur in a vacuum (Graham, in press). Instead, factors that operate outside the classroom contribute to its shape and nature. This includes teachers' experiences in other socially derived communities as well as institutional, political, social, cultural, and historical circumstances in which they operate. These same factors influence teachers' beliefs about writing, including their efficacy beliefs (e.g., Klassen et al., 2009). This was particularly important to the studies reported here as they occurred in three different contexts: Taiwan, Shanghai, and the United States. These contexts differ in ways that are likely to influence not only the writing community established but teachers' beliefs about writing, their teaching capabilities, and the capabilities of their students.

This can be illustrated by considering how the context in which teachers in the Greater China region and the United States are different and how this influences

teachers' beliefs. Culturally, the Confucian philosophy, which is predominant in the Greater China region, advocates propriety of behavior and loyalty to social traditions. This is aimed at establishing individual responsibility for social harmony. As Cai (1993) noted, this influences what teachers view as acceptable writing. For example, there is a history of prizing persuasive writing that implies the intended message, allowing the writer to avoid conflict and maintain social tranquility. In contrast, students in the United States are taught to directly state their intentions (Newell et al., 2011), and self-discovery and personal expression are emphasized in the classroom and society at large (Calkins, 2020). Such cultural, social, and historical distinctions are important, and they manifest in teachers' beliefs. For instance, Li (1996) reported that Chinese teachers viewed writing as a tool for shaping and educating students' minds. Their US counterparts described writing as a means for promoting creativity, exploration, and voice. As a result, teachers' beliefs about writing, teaching the subject of writing, and their students are shaped, at least to some degree, by the historical, cultural, and social contexts in which they are situated.

An additional example of differences in the contexts in which Chinese and US teachers operate involves the perceived role of education. Historically, civil examinations provided the only route for upward mobility in China, and it was stressed that effort was the key to success on these exams. This led to a set of cultural beliefs that hard work is essential in school, rote learning is valuable, and high scores are more important than the relevance of the curriculum (Organization for Economic Co-operation and Development [OECD], 2011). Although rote learning, engagement, and insistence on success are not foreign concepts to US education, they are not emphasized as much as they are in the Greater China region (Hsiang et al., 2018). Again, such contextual distinctions can lead teachers to form different beliefs about writing, the teaching of it, and their students.

Another dissimilarity between Greater China and the United States involves differences in writing systems. The US writing system is alphabetic, and English is considered a relatively opaque orthography with many inconsistencies and complexities in the relationships between letters and sounds (Seymour et al., 2003). In contrast, writing in the Greater China region traditionally relies on a logographic and morphosyllabic writing system. The basic linguistic unit in this writing system is the character, and each character represents a syllable in spoken language. The acquisition of basic reading and writing skills in Chinese requires mastery of 2,500–3,000 characters (National Council of Linguistic Literacy, 1988). A character may be a word by itself or a meaning element used in the construction of multisyllabic words (Tse et al., 2007). Learning to write in Chinese is not an easy task as the construction of individual characters involves strokes, components, and shape, whereas compound characters include horizontal, vertical, and enclosure structures. The linguistic differences between alphabetic and logographic writing systems may lead teachers to form different beliefs about how writing is learned, their efficacy for and attitudes toward teaching it, and their students' competence in mastering it.

According to the WWC model, contextual differences can also influence teachers' beliefs even when teachers share a common heritage. Taiwan and Shanghai are distinctly Chinese, and the teachers living there share many historical, social, and cultural commonalities. As a result of their shared Confucian heritage, a proper education is valued and emphasized in both locations, which includes learning to write

(Elman, 2013). However, these two societies differ in many ways. For instance, in cities in mainland China, there is one series of official Chinese language textbooks for all students (Ministry of Education of the People's Republic of China, 2020). In Taiwan, schools determine which textbook series they choose (Chang et al., 2010). We observed how this difference in choice played out in an earlier study (Hsiang & Graham, 2016), where teachers in Taiwan were more likely than teachers in mainland China to devise their own writing programs. The option of choice allowed some Taiwanese teachers to put their own beliefs about writing into play.

Although the WWC model proposes that the larger context shapes and bounds the construction of individual writing communities, as well as the actions and beliefs of their teachers (Graham, in press), it is an open question as to whether its effects are a matter of degree or substance. Several studies (Hsiang & Graham, 2016; Hsiang et al., 2018) based on the WWC model have found that most teachers within and across different locations varied somewhat in their use of specific writing practices, but their writing programs were generally similar in nature. The studies reported in this article add to this exploration by examining possible differences in teacher efficacy and the predictive value of other beliefs about writing in three distinct societies.

Predictors and Predictions

Attitudes, Perceived Competence of Students, and Epistemological Beliefs

For the three studies reported here, we examined relationships between efficacy to teach writing and three sets of beliefs: attitudes, perceived student progress, and epistemological beliefs. Attitudes provided an indication of how much a person likes or dislikes something (Ekholm et al., 2018). Only one study to our knowledge examined if teachers' attitudes toward writing were associated with efficacy to teach writing. Hsiang et al. (2020) reported that Taiwanese primary grade teachers' attitudes toward their own writing accounted for 13.7% of the variance in teachers' efficacy scores, whereas attitude toward teaching writing accounted for 29.3% of the variance. In the current study, we conducted a more stringent test of these relationships by examining the predictive power of attitudes once variance due to other beliefs and personal and contextual variables were controlled. We expected attitudes would account for unique variance in efficacy because teachers who like to write and teach writing are more likely to be motivated to learn how to teach this skill, leading to a stronger sense of efficacy.

We also examined if teachers' beliefs about their students' progress as writers predicted efficacy to teach writing. The only study to date examining the relationship between efficacy to teach writing and teachers' perceptions of their students' growth as writers was conducted with primary grade teachers in Taiwan. Hsiang et al. (2020) found that beliefs about students' writing progress accounted for 19.0% of variance in teachers' efficacy scores. We anticipated that beliefs about student progress would account for unique variance because teachers' beliefs about their students' growth as writers would inform their judgments about their competence as teachers.

We further examined if the epistemological value that teachers place on different approaches to writing instruction predicted teachers' efficacy. The only prior study

to examine this relationship was the Hsiang et al. (2020) study with Taiwanese teachers. Beliefs in the importance of explicit writing instruction and natural approaches to learning to write accounted for 7.1% and 1.0% of the variance in teacher efficacy scores, respectively. We expected that beliefs about teaching writing would account for unique variance in the present study because teachers who believed that specific types of writing instruction worked would be more likely to apply these approaches, providing information for determining teaching competence.

In addition, we examined if teachers' epistemological beliefs about how one becomes a good writer and knows about writing predict efficacy. To date, only one study has examined such epistemological beliefs in writing. Hsiang et al. (2020) asked primary grade teachers in Taiwan to indicate if they believed learning to write was innate or fixed, if it occurred through effort and process, and if it was a consequence of persistence (i.e., heart and mind). They also asked teachers to indicate if they believed that writing knowledge is certain and if it comes from experts/authority figures. The epistemological belief that writing is learned through effort and process accounted for 12.3% of the variance in teacher efficacy in this study. We expected that epistemological beliefs about how one becomes a good writer and knows about writing would collectively account for unique variance because these beliefs shape teachers' actions and serve as a filter for interpreting information about one's competence (Fives & Buehl, 2012).

To bring greater precision to our analyses, we controlled for variance due to the following personal and contextual variables: gender, preparation, teaching experience, class size, and students' overall writing capabilities. These personal and contextual variables are all related to how writing is taught (e.g., Brindle et al., 2016; Graham et al., 2003; Hsiang & Graham, 2016) and are likely to account for some of the variance in teacher efficacy as a result of this interaction (Imants & De Brabander, 1996; Trentham et al., 1985).

Predictions Related to the WWC Model

We anticipated that the findings for our three studies would support the theoretical assumption in the WWC model (Graham, 2018b) that teachers hold multiple beliefs about writing and these beliefs are interrelated. As noted above, we predicted that attitudes, perceptions of students' writing competence, and epistemological beliefs would each uniquely predict efficacy for teaching writing. This would demonstrate, at least for one identified belief in the WWC model (teacher efficacy), that separate and multiple beliefs are related to variability in this belief, providing support for the contention that writing beliefs are separate but interrelated.

In addition, previous research has demonstrated that teachers' efficacy is related to contextual differences (e.g., Ho & Hau, 2004) even when teachers have a similar historical cultural heritage, as would be the case with teachers from Hong Kong and Shanghai (Cheung, 2008). Klassen et al. (2009) also reported that the level of teacher efficacy varied across five Eastern and Western locations but that the relationship between teacher efficacy and job satisfaction showed similar patterns across teachers from these locations. Therefore, it is possible that the relationship between teacher beliefs about writing and teacher efficacy will evidence similar patterns and intensity of relationships in our three studies, even though the WWC model of writing (Graham,

2018b) would suggest otherwise. According to the WWC model, political, historical, social, institutional, cultural, and contextual differences among Taiwan, Shanghai, and the United States should influence the strength and structure of these relationships. Consequently, we predicted that the evidence from our three studies would support the assumption in the WWC model (Graham, 2018b) that beliefs about writing and the relationship between them are shaped by context. If this is the case, the psychometric characteristics of measures used to assess writing beliefs in this study should vary by location, teachers' scores on these measures should vary within and across locations, and the amount of variance in teacher efficacy accounted for by attitudes, perceived competence of students, and epistemological beliefs should vary by location.

Methods: Taiwan, Shanghai, and US Studies

Procedures

In all three studies (i.e., Taiwan, Shanghai, and the United States), a random sampling procedure stratified by region and grade level was used to identify grades 1–3 teachers who were invited to complete a survey about their beliefs about writing. In each study, the number of teachers selected was determined by establishing how many teachers were needed to provide a sampling error less than 5% for the most common type of Likert item in the survey (6-point Likert-type item) using a 95% confidence level, assuming a return rate of 25%, 42%, and 21% for the population of public and private primary school teachers in Taiwan (25,431 teachers), Shanghai (10,000 teachers), and the United States (603,000 teachers), respectively (Dillman, 2000). Higher return rates for the Taiwan and Shanghai samples in comparison with the US sample were set because we obtained relatively high response rates in previous survey studies conducted in the Greater China region (Hsiang & Graham, 2016; Hsiang et al., 2018) but generally low response rates in recent survey studies of writing practices conducted in the United States (e.g., Brindle et al., 2016; Troia & Graham, 2017). The return rate for the Shanghai study was set higher than the Taiwan study because the former involved just a single city, whereas the latter involved a larger area including urban, suburban, and rural locations (excluding outlying counties). These procedures resulted in the identification of 886, 495, and 2,000 primary grade teachers, respectively, in the Taiwan, Shanghai, and US studies.

In each study, all identified teachers received a packet with a letter explaining the study purpose. Teachers were asked to answer questions honestly, and the letter emphasized their responses would not be shared with other school personnel and would remain anonymous.

Teachers in Taiwan were asked to complete the survey in 2 weeks and return it in a stamped and sealed envelope; they were told that 100 randomly selected participating teachers would receive a thank-you gift equal to $6.50. In contrast, teachers in Shanghai were asked to return the completed survey in a sealed envelope to a research assistant in 2 weeks, and the packet included a thank-you gift equal to $1. In the United States, addresses and emails of the randomly selected teachers were provided by Market Data Retrieval (MDR). We mailed the survey to identified teachers a total of two times and emailed it a total of six times as a result of the expected low

response rate. If the survey was returned from one of the mailings or emails, the letter and survey were not mailed or emailed again. If a teacher indicated they did not want to complete the survey, it was not mailed or emailed again. US teachers were told that 20 randomly selected participants who completed the survey were eligible to receive a $25 gift card.

The contents of the letter and the survey sent to teachers in each of the three studies were identical. The only exception involved the survey sent to US teachers. Due to an inadvertent mistake, questions about gender and type of school (public or private) were not included.

Participants

Taiwan: study 1. Of the 886 teachers who received the survey, 802 returned it. Twenty surveys were eliminated as the identified teachers did not teach writing or only completed a few items, resulting in an effective return rate of 88.3% and a sampling error of plus or minus 2.4%. Of the remaining 782 teachers (see Table 1), 32% taught first grade, 32% second grade, and 36% third grade. They were mostly female (87%), public school employees (98%), and certified elementary grade teachers (95%). Almost one-half of them had a bachelor degree (46%), about one-half had a master's degree (49%), and a small minority of teachers had coursework beyond the master's level (4%). Even so, their average response to three items that assessed their preparation to teach writing (see "Measures") revealed that they viewed their preparation as inadequate ($M = 1.40$; $SD = 0.52$). As a group, they averaged 10.88 years of teaching experience with primary grade students ($SD = 6.87$). The mean number of students in their classes was 24.3 ($SD = 5.79$), and 76% of the teachers indicated most of their students were average writers, 20% identified most of their students as poor writers, and 3% described most of their students as above-average writers.

Shanghai: study 2. Of the 495 Shanghai teachers who received the survey, 454 returned it. Twenty-five surveys were eliminated as teachers either did not teach writing or a small portion of the survey was not completed. This resulted in an effective return rate of 87% and a sampling error of plus or minus 3.5%. Of the remaining 429 teachers (see Table 1), 31% taught first grade, 32% second grade, and 38% third grade. The participating teachers were mostly female (93%), public school employees (96%), and certified elementary grade teachers (97%). Almost five of every six teachers had a bachelor degree (87%), and the remaining teachers had a master's degree (13%). As a group, they were not positive about their preparation to teach writing ($M = 1.25$; $SD = 0.58$). They averaged 9.20 years of teaching experience with primary grade students ($SD = 8.03$). The mean number of students in their classes was 39.07 ($SD = 8.13$), and 84% of the teachers indicated most of their students were average writers, 11% identified most of their students as poor writers, and 4% described most of their students as above-average writers.

United States: study 3. Of the 2,000 US teachers who were sent the survey, 214 returned it completed. This resulted in an effective return rate of 16% and a sampling error of plus or minus 5%. Of the 214 teachers (see Table 1), 29% taught first grade, 33% second grade, and 38% third grade. The participating teachers were mostly certified elementary grade teachers (98%). Two out of every five teachers had a bachelor degree (42%), and all but one of the remaining teachers had a master's degree (58%).

Table 1. Demographic Information about Participants, School, and Class by Location

	Taiwan (N = 782)	Shanghai (N = 429)	United States (N = 214)
Variables	(%)	(%)	(%)
Grade:			
First	32	31	29
Second	32	32	33
Third	36	38	38
Gender:			
Female	87	93	N/A
Male	13	7	N/A
School type:			
Public	98	96	N/A
Private	2	4	N/A
Certified elementary grade teachers	95	97	98
Degree:			
Associate	0	0	0
Associate +	0	0	0
Bachelor	46	87	42
Bachelor +	0	0	0
Master's	49	23	58
Master's +	4	0	0
Doctorate	0	0	0
Years spent teaching:			
M	10.88	9.20	11.86
SD	6.87	8.03	8.46
Class size:			
M	24.30	39.07	20.88
SD	5.79	8.13	4.85
Overall writing achievement level of all students:			
Above-average writers	3	4	6
Average writers	76	84	58
Poor writers	20	11	37
Preservice preparation[a]:			
M	1.39	1.26	2.31
SD	.68	.73	.80
In-service preparation[a]:			
M	1.51	1.48	2.61
SD	.60	.69	.68
Personal preparation[a]:			
M	1.28	1.01	2.89
SD	.68	.74	.80

Note.—N/A. We did not obtain information about gender and type of school in the US survey.

[a] Teachers responded to a 4-point scale that ranged from none (0), minimal (1), and adequate (2) to extensive (3).

As a group, they were slightly negative about their preservice preparation (M = 2.31; SD = 0.80) and slightly positive about their in-service (M = 2.61; SD = 0.680) and personal preparation to teach writing (M = 2.89; SD = 0.80). They averaged 11.86 years of teaching experience with primary grade students (SD = 8.46). The mean number of students in their classes was 20.88 (SD = 4.85), and 58% of the teachers indicated most of their students were average writers, 37% identified most of their students as poor writers, and 6% described most of their students as above-average writers.

Because US teachers' addresses were obtained from MDR (https://mdreducation.com/), they provided specific information allowing us to compare teachers who did

and did not complete the survey. There were no differences between responders and nonresponders for grade, school size, location (i.e., urban, suburban, or rural), annual expenditures for materials per pupil, special education funding, and percentage of students living below the poverty line (all p's $< .32$). Such data were not available for the Taiwan and Shanghai studies.

Measures

The surveys administered in the Taiwan, Shanghai, and US studies were identical (except questions about gender and type of school were inadvertently omitted in the US survey). Before the survey was administered to teachers at these locations, five current or previous primary grade teachers completed the survey in the United States and the Greater China region, providing feedback on it and indicating if any items were unclear or difficult to understand. This resulted in small changes in wording. The survey can be obtained from the first author (steve.graham@asu.edu).

The survey directed teachers to indicate the grade they currently taught, number of years teaching primary grade students, gender, class size, education completed, and level of their students' writing ability. In addition, the survey included items designed to assess teachers' beliefs about their efficacy to teach writing, attitude toward writing, attitude toward teaching writing, students' progress as writers, epistemological beliefs about how to teach writing, epistemological beliefs about the nature of writing and knowledge about writing, and preparation to do so (a control variable). Teachers responded to items on all of the belief measures described below, except preparation to teach writing, using a 6-point Likert-type scale (strongly disagree [1] to strongly agree [6]; higher scores were a more positive response).

Teacher efficacy for teaching writing. Teachers completed an eight-item scale on efficacy for teaching writing taken from Graham et al. (2001). The scale included items such as "I have effective ways to teach writing," "I can help students with the most difficult writing problems," and "I know the steps for teaching a writing concept so it can be mastered quickly."

Attitude toward writing and teaching writing. Three items drawn from Brindle et al. (2016) assessed teachers' attitude toward writing ("I like to write," "I am good at writing," and "I write often"). Four items from Brindle et al. (2016) assessed teachers' attitude toward teaching writing (e.g., "I enjoy teaching writing; teaching writing gives me a lot of personal satisfaction").

Perceived student progress as writers. Five items from a survey by Hsiang et al. (2020) assessed teachers' beliefs about their students' progress in writing (e.g., "My students' understanding of writing changed considerably this school year"; "My students made more than one year's gain in writing this school year").

Epistemological beliefs about how to teach writing. Teachers were asked 12 items about their epistemological beliefs about how to teach writing. These items were taken from Graham et al. (2002) and were designed to assess two instructional orientations: an explicit instruction orientation (emphasizes teaching of skills, strategies, and processes to enhance writing development) and a natural learning orientation (emphasizes the use of informal and incidental teaching methods to enhance writing development). Items assessing an explicit orientation included statements like "Writing cannot be learned unless it is taught" and "It is important to teach children how to

plan and revise." Items assessing a natural learning orientation included statements such as "Students who write frequently will not need formal writing instruction" and "Students who read frequently will not need formal writing instruction."

Epistemological beliefs about writing. Teachers were asked 30 items assessing their beliefs about the nature of writing, writing development, and knowing about writing. These items were taken from Hsiang et al. (2020) and addressed the following five dimensions of epistemological beliefs about writing: innate/fixed (e.g., "Some people are born with special gifts and writing talents"), learning effort/process (e.g., "Becoming a good writer takes a lot of effort"), authority/experts (e.g., "Experts know more about teaching writing than I do, so I rely on their judgment"), certain knowledge (e.g., "What is considered good writing today will be considered good writing tomorrow"), and heart and mind (e.g., "People should train their mind to overcome difficulties when writing").

Preparation to teach writing. The survey included three items from Brindle et al. (2016) asking teachers about the adequacy (none [0], minimal [1], adequate [2], and extensive [3]) of their preservice, in-service, and personal preparation to teach writing.

Data Analysis

Exploratory factor analyses were conducted to determine the factor structure of efficacy for teaching writing, attitude toward writing, attitude toward teaching writing, perceived student progress, epistemological beliefs about how to teach writing, epistemological beliefs about writing, and preparation to teach writing. This was done separately for the studies conducted in Taiwan, Shanghai, and the United States. For measures that were not unidimensional, we applied an oblique rotation, allowing factors to be related to each other. We made this decision because we anticipated that the constructs assessed by the measures we administered were multidimensional (i.e., epistemological beliefs about how to teach writing, epistemological beliefs about writing) and would be correlated with each other. As a result, we expected that an oblique rotation would accommodate the data better than an orthogonal rotation. We used ordinal omega coefficients to establish the reliability of each measure as this approach is better suited to scales with a small number of items than coefficient alpha. For constructs with only two items, ordinal coefficient alpha was used because we could not compute a reliability with ordinal omega. If reliability was 0.60 or lower, that measure was not used in subsequent analyses.

For each study (Taiwan, Shanghai, and the United States), we present the means and standard deviations for the teacher beliefs assessed in this investigation (e.g., teacher efficacy for teaching writing, attitude toward writing). We did not statistically compare differences in means across the three studies because the factor analyses did not yield an identical set of measures for each study. We also present the correlations between efficacy for teaching writing (criterion variable) and the other teacher beliefs assessed (predictors) for each study. For these simple correlations, the p-value was set at .006, .007, and .005 for Taiwan, Shanghai, and the United States because the number of predictor variables in these studies ranged from seven (Shanghai) to nine (United States).

For each investigation, we conducted three hierarchical regression analyses. One analysis examined if teacher attitudes (attitude toward writing and attitude toward

teaching writing) accounted for statistically unique variance in efficacy for teaching writing after controlling for the other predictors (perceived student progress, epistemological beliefs about how to teach writing, and epistemological beliefs about writing) and the control variables (i.e., gender, years teaching primary grade students, class size, overall writing capabilities of students [low, average, high], and perceived preparation to teach writing). The second regression analysis examined if teachers' perceptions of their students' progress as writers accounted for statistically unique variance in teacher efficacy for teaching writing after controlling for the other predictor and control variables. The third regression analysis determined if teachers' epistemological beliefs (epistemological beliefs about how to teach writing and epistemological beliefs about writing) accounted for statistically unique variance in teacher efficacy for teaching writing after controlling for the other predictor and control variables. In the third study conducted in the United States, gender was not entered into the three analyses because we did not collect this information.

In each of these analyses, the other predictor variables (e.g., perceived student progress, epistemological beliefs about how to teach writing, and epistemological beliefs about writing) and control variables were entered into the regression analysis as a block (step 1). The targeted predictor(s) (e.g., attitude toward writing and attitude toward teaching writing) were then entered as a second block into the analysis (step 2). This approach allowed us to isolate the unique collective effects of the target predictors (e.g., the two attitude measures) by examining if their entry at step 2 of the analysis resulted in a statistically significant increase in the amount of variance accounted for in efficacy to teach writing. By examining if the coefficient for a specific predictor or control variable was statistically significant (when all variables were in the model), we were also able to determine if that specific measure made a unique and statistically significant contribution to predicting efficacy for teaching writing.

Results

Means and standard deviations for the outcome variable (efficacy to teach writing) and all predictors by study are presented in Table 2. Table 3 presents the findings from the regression analyses predicting teacher efficacy by study. Tables A1–A3 present the findings from the factor analyses for the outcome and all predictor variables by study.

Taiwan: Study 1

Factor analyses. As expected, the factor analyses for efficacy to teach writing, attitude toward writing, attitude toward teaching writing, perceptions of student progress, and preparation to teach writing supported the proposition that each were reliable (0.80–0.98) and unidimensional scales (Table A1). Also as expected, the factor analysis of epistemological beliefs about how to teach writing (Table A2) resulted in the anticipated two-factor solution (reliabilities of 0.68 and 0.69), with seven items loading on an explicit instruction construct and two items loading on a natural learning construct (two items had low communalities, and another item did not load on any factor). The factor analysis for writing epistemology beliefs (Table A3) did not result in the expected five-factor solution. Instead, the data support a three-factor

Table 2. Teacher Beliefs by Location

	Taiwan $N = 782$		Shanghai $N = 429$		United States $N = 214$	
Predictor Variables	*M*	*SD*	*M*	*SD*	*M*	*SD*
Efficacy:						
Efficacy for teaching writing	4.24	.51	4.27	.68	–	–
General efficacy for teaching writing	–	–	–	–	4.00	.92
Efficacy overcoming writing difficulties	–	–	–	–	4.40	.86
Beliefs about student writing progress	3.91	.61	4.02	.72	3.34	.47
Attitudes:						
Attitudes about own writing	3.67	.87	4.21	.95	4.44	1.13
Attitudes about teaching writing	3.80	.89	4.13	.99	4.22	1.30
Epistemological beliefs:						
Explicit instruction	3.88	.53	4.83	.69	4.02	.76
Natural learning	2.52	.75	–	–	1.91	.96
Learning effort and process	4.27	.59	4.51	.68	4.08	.51
Authority and experts	3.71	.64	3.70	.85	3.56	.99
Fixed development and knowledge	2.60	.57	2.85	.95	–	–
Certain knowledge	–	–	–	–	2.35	.91
Writing as innate and fixed	–	–	–	–	3.54	1.14

Note.—Scoring for *M* and *SD* is as follows: 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = slightly agree, 5 = moderately agree, 6 = strongly agree.

solution, with seven items loading on an effort/process scale, four items on an authority/expert scale, and seven items on a fixed development/knowledge scale. Twelve items did not load at 0.40 or greater on these three factors. Reliability for each of these factors was acceptable (0.73–0.81).

Teacher beliefs. Teachers slightly agreed they were efficacious writing teachers ($M = 4.24$; $SD = 0.51$; Table 2). They held slightly positive attitudes about their writing ($M = 3.67$; $SD = 0.87$) and teaching writing ($M = 3.80$; $SD = 0.89$). They were slightly positive about students' writing progress ($M = 3.91$; $SD = 0.61$). For epistemological beliefs, they slightly agreed on the importance of explicit instruction ($M = 3.88$; $SD = 0.53$) while slightly disagreeing with a natural learning writing orientation ($M = 2.52$; $SD = 0.75$). They slightly agreed that writing and learning to write were due to effort and process ($M = 4.27$; $SD = 0.59$) and that authorities and experts were more knowledgeable about writing than they were ($M = 3.71$; $SD = 0.64$). They slightly disagreed that writing development and knowledge were fixed ($M = 2.60$; $SD = 0.57$).

Correlations. Five of the predictors were statistically ($p < .007$) and positively related to teacher efficacy: attitude toward writing ($r = 0.37$), attitude toward teaching writing ($r = 0.54$), students' progress as writers ($r = 0.44$), explicit instruction orientation ($r = 0.27$), and learning effort/process epistemology ($r = 0.35$). One variable, natural learning orientation, was negatively and statistically related to teacher efficacy ($r = -0.10$).

Regression analyses predicting efficacy to teach writing. Congruent with our predictions (see Table 3), the two attitude measures (attitude toward writing and attitude toward teaching writing) accounted for a statistically significant 8.5% of the variance in efficacy to teach writing when variance due to all other variables was first controlled. In addition, as expected, perceptions of student progress accounted for a

Table 3. Regression Analyses for Predicting Efficacy to Teach Writing in Taiwan, Shanghai, and the United States

	Taiwan				Shanghai				United States							
									Efficacy Overcome WD				General Teaching Efficacy			
Predictor Control Variable	*B*	*SE*	*t*	*P*	*B*	*SE*	*t*	*P*	*B*	*SE*	*T*	*p*	*B*	*SE*	*t*	*p*
Attitudes:																
Gender	−.028	.057	−.499	.618	.178	.104	1.708	.888	–	–	–	–				
Class size	−.003	.003	−1.109	.268	−.003	.003	−1.145	.253	.000	.010	.010	.992	.008	.011	.715	.476
Student writing	−.047	.037	−1.296	.195	.139	.061	2.290	.023	−.154	.087	−1.760	.080	−.120	.100	−1.198	.232
Years teaching	.007	.002	3.000	.003	.004	.003	1.214	.226	.015	.006	2.438	.016	.003	.007	.354	.723
Preparation (all)	.108	.033	3.291	.001	.084	.042	2.010	.045								
Item 1									.098	.063	1.547	.123	.047	.072	.649	.517
Item 2									−.090	.76	−1.81	.239	−.125	.087	−1.441	.151
Item 3									.161	.066	2.422	.016	.176	.076	2.315	.022
Student progress	.143	.030	4.751	.000	.231	.038	6.081	.000	.101	.112	.899	.370	.156	.129	1.209	.228
Explicit instruction	.214	.031	6.840	.000	.264	.041	6.521	.000	.229	.071	3.219	.002	.308	.082	3.777	.000
Natural learning	−.041	.024	−1.740	.082	–	–	–	–	−.003	.056	−.053	.958	.064	.065	.983	.327
Effort/Process	.088	.029	3.017	.003	.020	.043	.467	.641	.347	.104	3.351	.001	.321	.119	2.706	.007
Authority/Experts	−.031	.027	−1.157	.248	.072	.032	2.232	.026	.025	.056	.447	.656	.082	.064	1.290	.199
Fixed D/K	−.058	.034	−1.698	.090	−.007	.029	−.235	.815	–	–	–	–	–	–	–	–
Certain knowledge	–	–	–	–	–	–	–	–	.050	.062	.808	.420	.079	.071	1.112	.267
Innate/Fixed	–	–	–	–	–	–	–	–	−.057	.045	−1.258	.210	−.023	.052	−.443	.658
R^2 change	.352				.479				.352				.305			
F change	34.522***				37.203***				8.370***				6.748***			
Attitude writing	.047	.021	2.246	.025	.050	.028	1.792	.074	−.090	.055	−1.645	.101	−.054	.063	−.856	.393
Attitude teaching	.193	.023	8.367	.000	.220	.031	7.201	.000	.233	.051	4.602	.000	.182	.058	3.135	.002
R^2 change	.085				.078				.067				.034			
F change	52.891***				35.245***				10.704***				5.107**			
Student progress:																
Gender	−.028	.057	−.499	.618	.178	.104	1.708	.888	–	–	–	–				
Class size	−.003	.003	−1.109	.268	−.003	.003	−1.145	.253	.000	.010	.010	.992	.008	.011	.715	.476
Student writing	−.047	.037	−1.296	.195	.139	.061	2.290	.023	−.154	.087	−1.760	.080	−.120	.100	−1.198	.232
Years teaching	.007	.002	3.000	.003	.004	.003	1.214	.226	.015	.006	2.438	.016	.003	.007	.354	.723

Table 3. (*Continued*)

	Taiwan				Shanghai				United States							
									Efficacy Overcome WD				General Teaching Efficacy			
Predictor Control Variable	*B*	*SE*	*t*	*P*	*B*	*SE*	*t*	*P*	*B*	*SE*	*T*	*p*	*B*	*SE*	*t*	*p*
Preparation (all)	.108	.033	3.291	.001	.084	.042	2.010	.045								
Item 1									.098	.063	1.547	.123	.047	.072	.649	.517
Item 2									−.090	.76	−1.81	.239	−.125	.087	−1.441	.151
Item 3									.161	.066	2.422	.016	.176	.076	2.315	.022
Attitude writing	.193	.023	8.367	.000	.050	.028	1.792	.074	−.090	.055	−1.645	.101	−.054	.063	−.856	.393
Attitude teaching	.143	.030	4.751	.000	.220	.031	7.201	.000	.233	.051	4.602	.000	.182	.058	3.135	.002
Explicit instruction	.214	.031	6.840	.000	.264	.041	6.521	.000	.229	.071	3.219	.002	.308	.082	3.777	.000
Natural learning	−.041	.024	−1.740	.082	–	–	–	–	−.003	.056	−.053	.958	.064	.065	.983	.327
Effort/Process	.088	.029	3.017	.003	.020	.043	.467	.641	.347	.104	3.351	.001	.321	.119	2.706	.007
Authority/Experts	−.031	.027	−1.157	.248	.072	.032	2.232	.026	.025	.056	.447	.656	.082	.064	1.290	.199
Fixed D/K	−.058	.034	−1.698	.090	−.007	.029	−.235	.815	–	–	–	–	–	–	–	–
Certain knowledge	–	–	–	–	–	–	–	–	.050	.062	.808	.420	.079	.071	1.112	.267
Innate/Fixed	–	–	–	–	–	–	–	–	−.057	.045	−1.258	.210	−.023	.052	−.443	.658
R^2 change	.420				.516				.413				.334			
F change	41.985***				39.111***				10.008***				7.132***			
Student progress	.143	.030	4.751	.000	.231	.038	6.081	.000	.101	.112	.899	.370	.156	.129	1.209	.228
R^2 change	.018				.041				.002				.005			
F change	22.572***				36.976***				.807				1.463			
Epistemological beliefs:																
Gender	−.028	.057	−.499	.618	.178	.104	1.708	.888	–	–	–	–	–	–	–	–
Class size	−.003	.003	−1.109	.268	−.003	.003	−1.145	.253	.000	.010	.010	.992	.008	.011	.715	.476

Student writing	−.047	.037	−1.296	.195	.139	.061	2.290	.023	−.154	.087	−1.760	.080	−.120	.100	−1.198	.232
Years teaching	.007	.002	3.000	.003	.004	.003	1.214	.226	.015	.006	2.438	.016	.003	.007	.354	.723
Preparation (all)	.108	.033	3.291	.001	.084	.042	2.010	.045								
Item 1									.098	.063	1.547	.123	.047	.072	.649	.517
Item 2									−.090	.76	−1.81	.239	−.125	.087	−1.441	.151
Item 3									.161	.066	2.422	.016	.176	.076	2.315	.022
Attitude writing	.047	.021	2.246	.025	.050	.028	1.792	.074	−.090	.055	−1.645	.101	−.054	.063	−.856	.393
Attitude teaching	.193	.023	8.367	.000	.220	.031	7.201	.000	.233	.051	4.602	.000	.182	.058	3.135	.002
Student progress	.143	.030	4.751	.000	.231	.038	6.081	.000	.101	.112	.899	.370	.156	.129	1.209	.228
R^2 change		.372				.484				.319				.201		
F change		51.951***				47.680***				10.611***				5.709***		
Explicit instruction	.214	.031	6.840	.000	.264	.041	6.521	.000	.229	.071	3.219	.002	.308	.082	3.777	.000
Natural learning	−.041	.024	−1.740	.082	–	–	–	–	−.003	.056	−.053	.958	.064	.065	.983	.327
Effort/Process	.088	.029	3.017	.003	.020	.043	.467	.641	.347	.104	3.351	.001	.321	.119	2.706	.007
Authority/Experts	−.031	.027	−1.157	.248	.072	.032	2.232	.026	.025	.056	.447	.656	.082	.064	1.290	.199
Fixed D/K	−.058	.034	−1.698	.090	−.007	.029	−.235	.815	–	–	–	–	–	–	–	–
Certain knowledge	–	–	–	–	–	–	–	–	.050	.062	.808	.420	.079	.071	1.112	.267
Innate/Fixed	–	–	–	–	–	–	–	–	−.057	.045	−1.258	.210	−.023	.052	−.443	.658
R^2 change		.066				.073				.097				.138		
F change		16.421***				16.488***				5.460***				6.881***		

Note.—WD = writing difficulties; all B coefficients were from step 2 in each regression analysis once all variables were entered into the equation; the first R^2 and F change in each analysis is for the entry of the control variables and predictor variables that were not the primary focus of the analysis; the second R^2 and F change in each analysis is for the entry of the specific predictors isolated in said analysis; information on gender was not available for the US sample.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

statistically significant and additional 1.8% of the variance in efficacy to teach writing after controlling for the other variables. Finally, as anticipated, the five epistemological beliefs (explicit instruction, natural learning, effort/process, authority/experts, and fixed development/knowledge) accounted for a statistically significant and additional 6.6% of the variance in efficacy to teach writing when variance due to all other variables was first controlled. Seven individual measures each made unique, positive, and statistically significant contributions to predicting teacher efficacy scores after all other variables were first controlled: years teaching, preparation to teach writing, attitude toward writing, attitude toward teaching writing, perceived students' progress as writers, explicit instruction orientation, and learning effort/process epistemology.

Shanghai: Study 2

Factor analyses. Similar to study 1 (Taiwan), the factor analyses for efficacy to teach writing, attitude toward writing, attitude toward teaching writing, perceptions of student progress, and preparation to teach writing all resulted in unidimensional scales that were reliable (0.80–0.95; Table A1). The only exception was one item that did not load at 0.40 or higher on the student progress scale. In contrast to study 1, however, the factor analysis of epistemological beliefs about how to teach writing (Table A2) resulted in a single reliable factor (0.84): explicit instruction (six items). A second factor containing items assessing both explicit instruction and natural learning orientations did not form a coherent construct. The factor analysis for epistemology beliefs about writing (Table A3) resulted in the expected five-factor solution, but two of the factors contained just two items each, and these scales were not reliable (0.57 and 0.58). As a result, they were dropped from further consideration. The remaining three factors were reliable (0.80–0.86) and assessed: effort/process (seven items), authority/expert (four items), and fixed development/knowledge (five items). This is similar to the factor analysis conducted with teachers in Taiwan (study 1), but the items constituting each construct were not identical across locations.

Teacher beliefs. Shanghai teachers slightly agreed they were efficacious writing teachers ($M = 4.27$; $SD = 0.68$; Table 2). They held slightly positive attitudes about their writing ($M = 4.21$; $SD = 0.95$) and teaching writing ($M = 4.13$; $SD = 0.99$). They were slightly positive about students' progress as writers ($M = 4.02$; $SD = 0.72$). Teachers moderately agreed with an explicit instruction writing orientation ($M = 4.83$; $SD = 0.69$). They also moderately agreed that writing and learning to write were a consequence of effort and process ($M = 4.51$; $SD = 0.68$) and that authorities and experts were more knowledgeable about writing than they were ($M = 3.70$; $SD = 0.85$). They slightly disagreed that writing development and knowledge were fixed ($M = 2.85$; $SD = 0.95$).

Correlations

Six of the predictors were statistically ($p < .006$) and positively related to teacher efficacy: attitude toward writing ($r = 0.39$), attitude toward teaching writing ($r = 0.62$), student progress as writers ($r = 0.56$), explicit instruction orientation ($r = 0.51$), learning effort/process epistemology ($r = 0.47$), and authority/experts epistemology ($r = 0.27$).

Regression analyses predicting efficacy to teach writing. Supporting our predictions, attitudes (attitude toward writing, attitude toward teaching writing), perceived student progress, and epistemological beliefs (explicit instruction, effort/process, authority/experts, and fixed development/knowledge) each accounted for statistically significant variance in teacher efficacy scores once variance due to all other variables was controlled (see Table 3). Attitudes, student progress, and epistemological beliefs each accounted for a statistically significant and additional 7.6%, 4.1%, and 7.3% of the variance, respectively, in efficacy to teach writing. Although the amount of variance accounted for differed somewhat, similar results were found with Taiwanese teachers in study 1.

Five individual measures made unique, positive, and statistically significant contributions to predicting teacher efficacy: students' writing (teacher estimate), preparation to teach writing, attitude toward teaching writing, perceived students' progress as writers, and explicit instruction orientation. All of these variables except students' writing were also statistically significant and unique predictors in study 1. The belief that writing knowledge resides in authorities/experts was uniquely, negatively, and statistically related to efficacy. This was not the case in study 1.

United States: Study 3

Factor analyses. Contrary to expectations, the factor analysis for efficacy to teach writing (Table A1) resulted in two reliable factors (0.85 and 0.78, respectively): efficacy to overcome writing difficulties (five items) and general efficacy to teach writing (three items). As expected, factor analyses of attitude toward writing, attitude toward teaching writing, and student progress all resulted in unidimensional scales that were reliable (0.81–0.97). Preparation to teach writing did not result in a reliable scale (0.44). This differed from studies 1 and 2.

As anticipated, the factor analysis of epistemological beliefs about how to teach writing (Table A2) resulted in two reliable factors (0.85 and 0.79, respectively): explicit instruction (seven items) and natural learning orientation (two items). This was consistent with study 1 (Taiwan) but not study 2 (Shanghai). Also consistent with expectations, the factor analysis for epistemology beliefs about writing (Table A3) resulted in an expected five-factor solution, but one of the factors included just two items, and it was not reliable (0.40). This factor was dropped from further consideration. The remaining four factors were reliable (0.76–0.79) and assessed: effort/process (four items), authority/expert (four items), certain knowledge (three items), and innate/fixed learning (two items). Although effort/process and authority/expert were reliable constructs in studies 1 and 2, innate/fixed learning was not, and certain knowledge was not an identified factor in the studies conducted in Taiwan and Shanghai.

Teacher beliefs. Teachers slightly agreed they were efficacious in overcoming writing difficulties ($M = 4.40$; $SD = 0.86$) and teaching writing generally ($M = 4.00$; $SD = 0.92$). They held slightly positive attitudes about their own writing ($M = 4.44$; $SD = 1.13$) and teaching writing ($M = 4.22$; $SD = 1.30$) but slightly disagreed that students were making adequate writing progress ($M = 3.34$; $SD = 0.47$). Teachers slightly agreed with an explicit instruction writing orientation ($M = 4.02$; $SD = 0.76$) but strongly disagreed with a natural learning orientation ($M = 1.91$; $SD = 0.96$). They slightly agreed that writing and learning to write were due to effort

and process ($M = 4.08$; $SD = 0.51$). However, they slightly agreed with an innate or fixed view of learning to write ($M = 3.54$; $SD = 1.14$) or that knowledge about writing came from authorities and experts ($M = 3.56$; $SD = 0.99$). They moderately disagreed that knowledge about writing was fixed ($M = 2.35$; $SD = 0.91$).

Correlations

Efficacy for overcoming writing difficulties and general efficacy for writing were moderately correlated ($r = 0.53$). Five predictors were statistically ($p < .005$) and positively related to efficacy for overcoming writing difficulties: attitude toward writing ($r = 0.25$), attitude toward teaching writing ($r = 0.51$), students' progress as writers ($r = 0.22$), explicit instruction orientation ($r = 0.32$), and learning effort/process epistemology ($r = 0.34$). Seven predictors were statistically and positively related to general efficacy: attitude toward writing ($r = 0.22$), attitude toward teaching writing ($r = 0.391$), students' progress as writers ($r = 0.25$), explicit instruction orientation ($r = 0.39$), learning effort/process ($r = 0.32$), authority/experts ($r = 0.25$), and certain knowledge ($r = 0.20$).

Regression analyses predicting efficacy to teach writing. Consistent with predictions, attitudes (attitude toward writing and teaching writing) and epistemological beliefs (explicit instruction, natural learning, effort/process, authority/experts, certain knowledge, and innate/fixed learning) both accounted for statistically significant variance in efficacy for overcoming writing difficulties as well as general efficacy for teaching writing once variance due to all other variables was controlled (see Table 3). Attitudes accounted for a statistically significant and additional 6.7% and 3.4% of the variance, respectively, in efficacy for overcoming writing difficulties and general efficacy for teaching writing. Epistemological beliefs accounted for an additional and statistically significant 9.7% and 13.8% of the variance, respectively, in efficacy for overcoming writing difficulties and general efficacy for teaching writing. Both attitudes and epistemological beliefs accounted for unique variance in efficacy to teach writing in studies 1 and 2.

Contrary to predictions and in opposition with findings from studies 1 and 2, teachers' perceptions of students' progress as writers did not predict efficacy for overcoming writing difficulties or general efficacy for teaching writing (Table 3). For both efficacy measures, attitude toward teaching writing, explicit instruction orientation, effort/process, and adequacy of preparation due to personal efforts were each statistically significant unique and positive predictors, as was years teaching for efficacy in overcoming writing difficulties. Only two of these measures (attitude toward teaching writing and explicit instruction orientation) were unique and statistically significant predictors in studies 1 and 2.

General Discussion

It is important to identify factors that account for variability in teachers' efficacy, especially malleable factors, to better understand how teacher efficacy operates and to ultimately devise and test strategies for enhancing teaching efficacy. The studies presented in this article examined if potentially malleable teacher beliefs accounted for unique variance in primary grade teachers' efficacy to teach writing. This included

teachers' attitudes toward writing, perceptions of student progress, and epistemological beliefs about writing instruction, writing development, and writing knowledge. To determine the generalizability of the predictive power of these three sets of beliefs, we examined these relationships in three different locations.

Teacher Beliefs about Writing Predict Efficacy to Teach Writing

Based on the WWC model of writing (Graham, 2018a, 2018b; Graham & Harris, 2018), we expected that the three sets of teacher beliefs examined would each account for unique variance in teachers' beliefs about their efficacy to teach writing. According to this model, teachers' beliefs about writing influence each other. For example, teachers who hold positive attitudes about writing and teaching writing are likely to be motivated teachers, leading to greater confidence in their capabilities to teach writing. Teachers who believe that their students are making strong progress are also likely to be more efficacious writing teachers as such judgments inform them about their teaching success. Moreover, teachers' epistemological beliefs about writing instruction, development, and knowledge serve as filters for interpreting information about their competence as teachers.

We further anticipated that the predictive relationships tested in our three studies would not be identical. Again, this prediction was based on the WWC model of writing (Graham, 2018a), which contends that a teacher's writing beliefs and practices are shaped by macro factors that operate beyond the classroom level. This includes institutional, historical, social, cultural, and political factors. Thus, we anticipated that the predictive relationships tested in Taiwan, Shanghai, and the United States would not be identical. It was not clear, however, if these differences would reflect structural discrepancies (e.g., attitudes accounted for unique variance in one study but not another), disparities in intensity of relationships (e.g., attitudes accounted for unique variance in all studies, but the amount of variance differed across studies), or both.

Attitudes. As predicted, teachers' attitudes toward their writing and teaching writing collectively accounted for statistically significant unique variance in primary grade teachers' efficacy scores in Taiwan, Shanghai, and the United States after first accounting for variance due to teachers' beliefs about student progress, epistemological beliefs about writing, and personal and contextual variables. In Taiwan and Shanghai, attitudes accounted for a similar amount of unique variance in teacher efficacy scores (8.5% and 7.6%, respectively), with smaller levels of unique variance accounted for in the US study (6.3% for efficacy to overcome writing difficulties and 3.4% for general efficacy). Separately, teachers' attitudes about teaching writing accounted for unique variance above and beyond all other variables at all three locations. Teachers' attitudes about their own writing, though, did not make a unique contribution by themselves to predicting teacher efficacy at any of the three locations.

Our findings show that the relationships between attitudes and teacher efficacy, at least for the two attitudes measured here, were generally similar across locations, even though we included Eastern and Western locations that shared some similarities but differed in important ways as well (e.g., culturally and politically). On average, teachers in all three locations indicated they were slightly positive about their own writing and teaching writing (variability in teacher scores across locations was moderate).

These findings extend prior research showing that teacher attitudes toward writing and teaching writing predict teacher efficacy (Hsiang et al., 2020) as they provided a more stringent test of these relationships than was available in previous studies. They also demonstrated that the relationships obtained between attitudes and teacher efficacy were structurally similar across all three regions, even though there was some variation between the two Eastern locations and the Western one in terms of magnitude of associations. It is possible that attitudes toward writing accounted for relatively less unique variance in teacher efficacy in the United States compared with Taiwan and Shanghai as teacher efficacy was best represented as a unidimensional instrument in the two Eastern locations and as a multidimensional scale in the United States (i.e., efficacy to overcome writing difficulties and general efficacy). In essence, primary grade teachers in the Greater China region and the United States hold different conceptualizations of efficacy, and this difference may have affected the magnitude of predictive value of teachers' attitudes. In any event, the outcomes from these three studies provide evidence for the generalizability of the finding that teachers' attitudes predicted efficacy to teach writing.

Students' progress. Our hypothesis that teachers' beliefs about their students' writing progress would predict their efficacy to teach writing was only partially supported. When variability due to attitudes, epistemological beliefs, and personal and contextual variables was first controlled, teachers' beliefs about student progress only accounted for statistically significant and unique variance in teacher efficacy in the two locations in the Greater China region. Taiwanese teachers' beliefs about student progress accounted for 1.8% unique variance in teacher efficacy scores, whereas it accounted for 4.1% unique variance in Shanghai teachers' efficacy scores. Teachers in both of these locations slightly agreed that their students were making adequate progress as writers. These findings extend prior research conducted with primary grade teachers in the Greater China region (Hsiang et al., 2020) by showing that judgments about student progress as writers predict efficacy for teaching writing even when variance related to other teacher beliefs, as well as personal and contextual variables, is first controlled. They also demonstrated that the relationship between Taiwanese and Shanghai teachers' beliefs about student progress and teacher efficacy was structurally similar and accounted for a similar amount of variance, providing evidence for the generalizability of the findings to these two Eastern locations.

There are several possible explanations for why teachers' beliefs about student progress did not make a unique contribution to predicting teacher efficacy in the US study. First, as noted earlier, US teachers conceptualized teacher efficacy as a multidimensional construct, but teachers in the Greater China region viewed it as a single construct. This may have differentially affected the predictive value of teachers' beliefs about student progress in the Western and Eastern locations studied here.

Second, US teachers were slightly negative about student progress, whereas teachers in Taiwan and Shanghai were slightly positive about it. It is possible that teachers weigh slightly negative and slightly positive views about student progress differently. Teachers may protect their sense of efficacy when they are slightly negative about student progress, blaming less than adequate progress on factors not under their control. In contrast, they may be especially sensitive and biased to positive indications of students' progress, including their own judgments, using such feedback to reinforce or bolster their sense of efficacy. This differential weighting may influence the predictive

relationship between teacher efficacy and perceived progress (the simple correlations between these two variables were much smaller with the US sample [0.22; 0.25] than the Taiwan [0.44] and Shanghai samples [0.56]).

Third, there may have been contextual or personal variables that attenuated the predictive value of teachers' beliefs about student progress. For example, teachers in Taiwan and Shanghai were more likely than US teachers to describe their students as average writers, whereas US teachers were two to three times more likely, respectively, to indicate their students were poor writers. Consequently, teachers in the United States may have felt their students were less capable of making writing progress, attenuating the relationship between teachers' beliefs about progress and their sense of efficacy. Teachers in Taiwan and Shanghai, in contrast, may have believed their students were likely to progress as writers, increasing the likelihood they would form positive judgments about students' progress, leading to a stronger sense of efficacy.

Epistemology beliefs about writing. As expected, teachers' epistemological beliefs about writing instruction, development, and knowledge accounted for statistically significant unique variance in their efficacy scores in all three locations after first considering variance due to teachers' attitudes and beliefs about student progress, as well as personal and contextual variables. In Taiwan and Shanghai, epistemological beliefs collectively accounted for a similar amount of unique variance in teacher efficacy (6.6%–7.3%). Epistemological beliefs constituted a larger amount of variance in the US study (13.8% for general efficacy and 9.7% for efficacy to overcome writing difficulties). In terms of the unique contributions of specific epistemological variables, teachers who valued explicit instruction had a more pronounced sense of efficacy to teach writing in all three locations. Teachers in Shanghai and the United States who more strongly believed that knowledge about writing mostly came from authorities and experts also had a more pronounced sense of efficacy. Finally, teachers in Taiwan who more strongly believed that learning to write was a consequence of effort and process were more efficacious writing teachers, whereas teachers who more strongly believed that writing development and knowledge were fixed were less efficacious. Consequently, teachers' epistemological beliefs uniquely predicted their efficacy in the two Eastern and one Western locations.

These findings extend previous writing research showing that epistemological beliefs predict teacher efficacy (Hsiang et al., 2020) because they provide a more stringent test of these relationships by controlling for other teacher beliefs, as well as personal and contextual variables. They also demonstrate that the relationships between teachers' epistemological beliefs and teacher efficacy are somewhat structurally similar and generalized at least partially across the three locations. Collectively, these epistemological beliefs account for unique variability in teacher efficacy scores at each location, as does the specific belief about the value of explicit instruction.

There were, however, structural differences in the observed relationships as well as their magnitude. Structural discrepancies included differences in the unique contribution of specific epistemological variables at each location. They were also reflected in differences in the obtained factorial structures underlying the epistemological measures at each location. For instance, the natural learning orientation was not a reliable construct in the study conducted in Shanghai, but it was in the studies in Taiwan and the United States. Similarly, in the US study, there were separate constructs

for writing being innate/fixed and writing knowledge being certain, but these two constructs formed a single factor in the Taiwan and Shanghai studies. Whereas the epistemological measures accounted for about 7% unique variance in the Taiwan and Shanghai studies, these measures constituted almost twice as much variance in general teaching efficacy in the United States. It is possible that these discrepant outcomes reflect, at least in part, differences in the underlying structure of the epistemological and teacher efficacy measures in the United States and the two Eastern locations.

Last, there were similarities and differences in the scores for specific epistemological measures across the three locations. In terms of beliefs about writing instruction, primary grade teachers in the Taiwan and the United States slightly agreed that explicit instruction was valuable and writing occurred as a consequence of effort and process, whereas teachers in Shanghai moderately agreed with both of these contentions. Taiwan teachers slightly agreed that the natural learning approach to writing was not valuable, whereas US teachers moderately agreed that the natural learning approach was not valuable even though they slightly agreed that learning to write was an innate or fixed process. Teachers at all three locations, however, slightly agreed that knowledge about writing mostly came from authorities and experts. Teachers in Taiwan and Shanghai slightly disagreed that writing development and knowledge were certain.

Personal and contextual variables. Several of the control variables made unique and statistically significant contributions to predicting efficacy to teach writing. Teachers reported that preparation to teach writing predicted teacher efficacy scores at all three locations once all other variables were first controlled. In effect, teachers who were more positive about their preparation expressed greater confidence in their capabilities to teach writing. It is interesting that teachers in Taiwan and Shanghai viewed their preparation to teach writing as inadequate but overwhelmingly (76% and 84%, respectively) indicated most of their students were average writers making acceptable progress in learning to write. Teachers in the United States expressed a different opinion, indicating their preparation to teach writing was mostly adequate, but they were more likely than teachers in Taiwan and Shanghai to view their students as poor writers and were less positive about students' progress as writers.

One possible reason for these differing results is that many students in the Greater China region receive tutoring after school (Paris et al., 2012), and this may bolster their writing achievement and progress. Such tutoring is not as common in the United States. It is also possible that teachers in Taiwan and Shanghai evaluate writing achievement and performance differently than US teachers, making it difficult to accurately compare their judgments on students' writing. Moreover, the differences between learning Chinese writing and English writing and the various genres taught in primary grades in Chinese societies in Asia and the United States may cause Chinese language teachers to view their students' writing progress differently than US English teachers (Ministry of Education of the People's Republic of China, 2012; Olinghouse & Wilson, 2013; Wang & Chen, 2013; Zhu, 2005).

After controlling for variance from all other variables, we also found that teachers in Taiwan with greater teaching experience and teachers in Shanghai with stronger writers in their classrooms were more efficacious regarding their capabilities to teach writing. Neither of these control variables accounted for unique variance in

the other two locations, suggesting that their predictive value may best be described as situational.

Theoretical Implications

The findings from the three investigations reported here provided support for two premises underlying the WWC model of writing (Graham, 2018a, 2018b). The model proposes that teachers hold multiple beliefs about writing and that these beliefs interact to influence teachers' actions. Although we did not examine if teacher beliefs influenced their actions, we did examine if multiple beliefs about writing uniquely predicted one specific belief: efficacy to teach writing. We found that primary grade teachers' attitudes about writing, beliefs about their students' progress, and epistemological beliefs about writing instruction and the nature of writing each uniquely predicted their efficacy as writing teachers. These data suggest that teachers hold multiple beliefs that are interrelated, consistent with the premise proposed in the WWC model. It is important to remember, however, that our studies were limited because they only examined how multiple beliefs about writing were related to a single belief: teacher efficacy.

Our findings also provided support for another premise in this model. Writing, the teaching of writing, and those who teach it are simultaneously and interactively shaped by the community in which this occurs, the capabilities and resources of the community members, and the unique historical, political, institutional, social, and cultural milieu in which it operates (Graham, 2018b). As a result, teacher beliefs and the relationships between them should demonstrate variability across and within multiple locations. The findings from our studies with teachers in Taiwan, Shanghai, and the United States are generally consistent with this proposition. First, there was moderate variability in teachers' scores on all teacher belief measures, including teacher efficacy, at each location. Second, there were notable differences in teachers' mean scores on the majority of the belief measures across locations. Third, factor analyses of teacher efficacy and the measures of epistemological beliefs revealed several differences in how these constructs were conceptualized across locations. Fourth, there were differences in the amount of unique variability that specific teachers' beliefs accounted for in teacher efficacy scores in one or more locations. Finally, teachers' beliefs about student progress did not uniquely predict efficacy in the United States, even though they did in Taiwan and Shanghai.

Despite the expected variability and differences in teachers' beliefs within and across the three locations, there was a similar pattern of associations between teachers' beliefs and their efficacy to teach writing. With the exception of beliefs about student progress, teacher attitudes and epistemological beliefs about writing instruction, development, and knowledge all uniquely predicted teacher efficacy scores in Taiwan, Shanghai, and the United States. Similar findings were reported in two prior studies conducted in the Greater Chins region. In these two studies (Hsiang & Graham, 2016; Hsiang et al., 2018), there was variability in teachers' reported writing practices across and within locations, but differences were more a matter of magnitude, with the same writing practices used more or less often. This is not inconsistent with the tenets of the WWC model, though, as it proposes numerous organizing

structures that allow for variability in context and participants and can also foster similar patterns of actions and beliefs.

Practical Implications

Although the central purpose of this study focused on validating and extending several assumptions underlying the WWC model (Graham, 2018a, 2018b), and the data are correlational and not causal, our findings also have important implications for teachers, teacher preparation, and researchers. They demonstrate that there are meaningful relationships between teacher efficacy and teachers' attitudes toward writing, beliefs about student progress, and epistemological beliefs about writing. Making teachers aware of these connections can help them better understand the complexity of their beliefs about writing and how specific beliefs like teacher efficacy are connected to other beliefs they hold about themselves, their students, and learning to write. Understanding such teacher beliefs is not a trivial matter, as Cochran-Smith and Zeichner (2005) noted: "Teachers are among the most, if not the most, significant factors in children's learning" (p. 1). If we are to promote better writing instruction, it is imperative that we have a better understanding of what teachers believe.

The current studies also demonstrated that beliefs about efficacy, attitudes toward writing, beliefs about student progress, and epistemological beliefs about writing instruction and the nature of writing can be reliably measured across different locations and cultures. Although there was some variation in the observed structure of several of these measures across the three investigations, the instruments tested and applied here provide teachers, teacher educators, and researchers with tools for examining what teachers think about writing. Teachers can use these tools to think reflectively about their own beliefs and how they interact to influence their classroom practices and students' writing. Teacher educators can use these measures to gauge what preservice and in-service teachers think about writing, adjusting the discussion and instruction they provide accordingly. Last, writing researchers have devoted little attention to the role of teachers' beliefs in students' writing or teachers' classroom practices. We are hopeful that the scales applied in our studies will be more commonly used in future research.

Limitations

As with all studies, the present investigations had multiple limitations. The return rate of surveys for Taiwan and Shanghai were quite high (88% and 87%, respectively), but it was low in the United States (16%). The US return rate is consistent with a trend we have noted in survey research on writing in the United States during the last 20 years. It has become increasingly lower over the years (e.g., compare Graham et al., 2003 to Brindle et al., 2016). This means that less confidence can be placed in the findings from the US sample than the Taiwan and Shanghai samples. In the US study, the sampling error was two times higher than in the Taiwan and 43% higher than in the Shanghai studies. However, sampling error was not high in any of the studies as it was plus or minus 2.4%, 3.5%, and 5.0% in Taiwan, Shanghai, and the United States, respectively. Nonetheless, findings from the US sample must be tempered by the low response rate.

A second limitation concerns the reliability of some measures. The epistemological measures were not as reliable (in terms of coefficient alphas) as we would have liked. In several cases, reliability was so low that we decided not to use a scale in our analyses. This was especially problematic for the construct that writing development is innate/fixed. In addition, none of reliabilities for the epistemological measures exceeded 0.86, and in a few instances, they were in the 0.60–0.69 range. As a result, the epistemological measures would benefit from additional scale development, including the creation of new items and the elimination of items that do not advance the overall reliability and validity of their respective scales.

A third limitation of the study is that teachers may have responded in socially desirable ways when completing the questionnaire. This may have inflated scores for measures such as teacher self-efficacy, attitudes, student progress, and some of the scales measuring epistemology for writing. We recommend that future studies administer a social desirability scale as part of the investigation to determine the association between how likely teachers are to respond in socially desirable ways and their scores on the various beliefs about writing assessed in this study.

A fourth limitation of the current study is that it focused solely on teacher beliefs. It did not examine if such beliefs predict students' writing or if changing these beliefs in a positive way had a positive impact on students' writing and beliefs. Although it was impossible for us to collect such information, this does not mean that examining such connections is unimportant.

Last, the studies presented in this article are based on the assumption that teachers can accurately answer questions about their beliefs. This assumption is supported by previous studies demonstrating that teachers' beliefs about their writing practices are consistent with observations of their writing practices (e.g., Bridge & Hiebert, 1985; DeFord, 1985). Nevertheless, other researchers have shown that teacher self-perceptions can be unreliable as they can overestimate teachers' competence (Cunningham et al., 2004). Because the studies presented here are based solely on self-report data, this must be taken into account when interpreting the findings.

Future Research

Additional research is needed to replicate our findings with teachers in Taiwan, Shanghai, and the United States as well as to determine if similar findings would be obtained in other locations and at different grade levels. Future studies should examine the predictive value of additional teacher beliefs (e.g., attitudes about the value and purposes of writing and writing instruction). Longitudinal investigations are needed to evaluate if the observed relationships in our study and subsequent studies are maintained over time. In addition, researchers who replicate or extend the findings from the current study might consider using modern (e.g., Item Response Theory, generalizability theory) versus classical approaches to establishing the psychometric properties of the measures.

A potentially fruitful area for future studies involves how teachers from different cultures conceptualize efficacy for teaching writing. The measure used in our studies was unidimensional in the Taiwan and Shanghai settings but included two dimensions in the US location. One of the dimensions in the US study focused on efficacy to overcome writing difficulties. It is possible that differences in the structure of the scale in the

United States and the two Eastern locations are a consequence of how teachers view their students. Teachers in the United States were more likely than teachers in Taiwan and Shanghai to view students as weaker writers and indicate they were not making adequate progress. This may have influenced how teachers in the United States responded to the self-efficacy measure, resulting in an added emphasis on teaching efficacy for students with writing difficulties. Teachers in Taiwan and Shanghai, in contrast, may have placed no special emphasis on efficacy to teach writing to these children.

If replicated in future studies, it is important to determine why teachers in Taiwan and Shanghai indicated their students were mostly average writers making suitable progress when they also reported their own preparation to teach writing was not adequate. Future research must examine in-school writing instruction as well as out-of-school writing practices. This may provide greater insight into the paradox presented by these conflicting beliefs, as may future investigations studying how teachers in different cultures define adequate writing progress.

Although the current findings did not establish a causal link demonstrating that teacher beliefs shaped efficacy to teach writing, as efficacy could just as easily have shaped teachers' beliefs, they provided initial support for scientifically testing whether instructional efforts to improve the types of teacher beliefs tested here can also enhance teachers' efficacy. For example, does professional development (PD) aimed at promoting the use of explicit writing instruction result in changes in how writing is taught and efficacy for teaching it? Similarly, does PD with an added component designed to enhance attitudes about teaching writing versus the same PD without such an extra component improve attitudes to teach writing and toward teaching efficacy?

It is also important to test other avenues of promoting positive changes in teachers' beliefs. This includes testing if the combination of teaching experience and planned reflection on writing practices, students' progress, and specific beliefs enhances efficacy, attitudes, and epistemological beliefs about writing. Furthermore, the power of deliberate teacher agency in changing teachers' beliefs about writing must be investigated.

Perhaps even more importantly, future research must examine relationships between teacher efficacy to teach writing and students' writing behaviors, performance, and beliefs. The establishment of such connections in the area of writing has been limited to a relatively small number of investigations (e.g., De Smedt et al., 2016; Parker et al., 2006; Tschannen-Moran & Barr, 2004). Moreover, future studies examining methods for enhancing teacher efficacy for teaching writing should also examine if such efforts result in improved writing. These same principles apply to the other teacher beliefs about writing investigated in this study.

Conclusion

Across three different locations (Taiwan, Shanghai, and the United States), the teachers participating in this study slightly agreed that they were competent writing teachers. Moreover, the confidence teachers in these locations placed in their ability to teach writing was related to their attitudes about their own writing and teaching writing, perceptions of students' progress as writers, and their epistemological beliefs about teaching writing, writing development, and writing knowledge. The only exception involved US teachers' perceptions about student progress as these beliefs did not uniquely predict teachers' efficacy for teaching writing.

The findings from these studies supported two assumptions underlying the WWC model (Graham, 2018b). First, our finding that a variety of different beliefs about writing accounted for statistically unique variance in teacher efficacy is consistent with the premise in the WWC model that teachers hold multiple beliefs about writing and these beliefs are interactive. Second, our finding that there was variability in the psychometric characteristics of the writing beliefs assessed in this study by location, variability in teachers' scores on these measures within and across locations, and variability in the amount of variance in teacher efficacy accounted for by predictors is consistent with the assumption in the WWC that context influences teachers' beliefs about writing and the relationships between such beliefs. In both cases, however, our findings indicated that greater nuance is needed when considering these two assumptions. The WWC model does not directly specify how teachers' beliefs are related. The findings from the current studies provide some insight into this for the teacher beliefs measured. In addition, predicting teacher efficacy in the three locations resulted in a generally similar patterns of association, differing more in degree than substance. This raises a question about how extensive the effects of context are on teachers' beliefs about writing.

Finally, because teacher efficacy is a malleable belief and has been shown to improve the quality of classroom instruction and student achievement (Zee & Koomen, 2016), the current study provides possible avenues for increasing teachers' efficacy to teach writing by enhancing other malleable teacher beliefs about writing. Such research should focus on how such changes affect students' writing, behavior, and beliefs.

Appendix

Factor Analyses

Table A1. Factor Analyses for Teacher Efficacy, Attitude toward Writing, Attitude toward Teaching Writing, Perceived Student Progress, and Preparation

	Taiwan		Shanghai		United States		
Item	Commonalities	Loadings Factor 1	Commonalities	Loadings Factor 1	Commonalities	Loadings Factor 1[a]	Loadings Factor 2[b]
Teacher efficacy:							
Eff1	.384	**.620**	.404	**.635**	.533	**.714**	.027
Eff2	.561	**.749**	.502	**.709**	.538	**.601**	.198
Eff3	.524	**.724**	.545	**.738**	.535	**.804**	−.141
Eff4	.479	**.692**	.509	**.713**	.394	**.532**	.147
Eff5	.441	**.664**	.511	**.715**	.631	.086	**.742**
Eff6	.582	**.763**	.507	**.712**	.596	−.088	**.819**
Eff7	.493	**.702**	.495	**.704**	.344	.152	**.485**
Eff8	.539	**.734**	.472	**.687**	.571	**.739**	.029
Eigenvalue		4.004		4.449		3.91	1.15
%Variance		50		56		49	14
Omega		.84		.91		.85	.78
Attitude writing:							
AW1	.804	**.896**	.661	**.813**	.913	**.955**	
AW2	.834	**.913**	.946	**.972**	.578	**.760**	
AW3	.773	**.879**	.460	**.695**	.473	**.686**	
Eigenvalue		2.410		2.359		2.274	
%Variance		80		77		76	

Table A1. (*Continued*)

	Taiwan		Shanghai		United States		
Item	Commonalities	Loadings Factor 1	Commonalities	Loadings Factor 1	Commonalities	Loadings Factor 1[a]	Loadings Factor 2[b]
Omega		.91		.90		.88	
Attitude teaching writing:							
ATW1	.858	**.926**	.822	**.907**	.822	**.906**	
ATW2	.872	**.934**	.847	**.920**	.941	**.970**	
ATW3	.899	**.948**	.877	**.936**	.869	**.932**	
ATW4	.818	**.904**	.559	**.748**	.773	**.879**	
Eigenvalue		3.447		3.331		3.550	
%Variance		86		83		89	
Omega		.98		.95		.97	
Student progress:							
SP1	.578	**.760**	–[c]	–	.515	**−.717**	
SP2	.578	**.760**	.231	**.464**	.356	**.597**	
SP3	.588	**.767**	.513	**.971**	.461	**.679**	
SP4	.600	**.774**	.433	**.656**	.509	**.713**	
SP5	.558	**.747**	.248	**.478**	.507	**−.712**	
Eigenvalue		2.900		2.056		2.873	
%Variance		58		51		57	
Omega		.86		.90		.81	
Preparation to teach:							
P1	.579	**.761**	.472	**.687**	.206	**.454**	
P2	.733	**.856**	.620	**.788**	.176	**.419**	
P3	.590	**.768**	.374	**.611**	.127	.357	
Eigenvalue		1.903		1.963		1.335	
%Variance		63		65		16	
Omega		.80		.80		.44[d]	

Note.—The specific items for each measure are available from the first author; items loading on a factor at 0.40 or greater are bolded.

[a] Efficacy for overcoming writing difficulties.

[b] General teaching efficacy.

[c] Item commonality less than 0.20, so the item was dropped from analysis.

[d] Reliability was below 0.60, so these items were entered individually in regression analyses conducted with the US sample.

Table A2. Factor Analysis of Epistemological Beliefs about How to Teach Writing

	Taiwan			Shanghai			United States		
Item	Com	Loadings Factor 1	Loadings Factor 2	Com	Loadings Factor 1	Loadings Factor 2	Com	Loadings Factor 1	Loadings Factor 2
1	.215	**.504**	−.043	.265	**.479**	.072	.308	**.506**	.195
2	.413	.008	**.838**	.506	−.263	**.536**	.528	−.010	**.727**
3	.287	**.563**	−.214	.241	**.492**	.191	.253	**.503**	.004
4	.404	**.694**	−.102	.518	**.727**	−.053	.337	**.542**	.173
5	—[a]	—	—	.588	**.699**	−.169	.275	—	—
6	.414	**.485**	.255	.346	.106	**.596**	.356	**.483**	−.239
7	.637	**.604**	.337	.740	**.581**	−.250	.273	**.436**	.378
8	—[a]	—	—	—	—	—	.273	—	—
9	—[b]	—	—	.540	−.206	**.572**	.374	**.522**	−.065
10	.252	**.620**	.088	—	—	—	.374	**.600**	.086
11	.679	.005	**.873**	.707	**.580**	−.107	.662	.014	**.813**
12	.312	**.421**	−.296	.383	.076	**.728**	.168	.370	−.204
			Nat						Nat
Construct		Exp Instr	Learning		Exp Instr	[c]		Exp Instr	Learning
Eigenvalue		2.525	2.125		3.474	1.782		2.891	1.893
%Variance		23	19		35	18		28	18.933
Omega		.68	.69[d]		.84	—		.085	.79[d]

Note.—The specific items for each measure are available from the first author; items loading on a factor at 0.40 or greater are bolded.

[a] Item commonality less than 0.20, so the item was dropped from the analysis.

[b] Item did not load on any factor at 0.40 or higher.

[c] The four items on this scale did not form a cohesive construct (included both explicit instruction and natural learning items), so it was dropped from further analyses.

[d] Ordinal coefficient alpha; Com = commonality; Exp Inst = explicit instruction approach; Nat Learning = natural learning approach.

Table A3. Factor Analyses for Epistemological Beliefs about Writing

	Taiwan				Shanghai					United States				
Item	E/P	A/E	Fix D/K	I/F[a]	E/P	A/E	Fix D/K	[b]	I/F[a]	E/P	A/E	[b]	CK	I/F
1	−.099	.081	−.218	**.604**	−.076	−.004	.101	.034	**.686**	−.175	.006	.012	.126	**.650**
2	**.507**	.036	.019	.050	**.510**	−.100	−.160	.114	−.088	–	–	–	–	–
3	−.095	.717	−.042	.034	−.021	**−.700**	−.058	.106	.068	.182	**−.488**	.092	.092	.079
4	.035	**.501**	−.059	−.007	.073	**−.575**	.094	−.095	.022	–	–	–	–	–
5	**.449**	−.020	.052	.003	**.543**	−.117	−.039	−.014	.032	**.462**	.022	.064	−.186	−.009
6	–	–	–	–	−.014	−.106	**.643**	−.019	.109	–	–	–	–	–
7	–	–	–	–	**.470**	−.120	−.102	−.199	.031	.157	−.039	**.549**	−1.23	−.020
8	−.001	**.772**	−.026	−.032	−.032	**.682**	.128	.122	−.002	.092	**−.744**	.173	.008	.146
9	.218	.096	**−.486**	−.003	–	–	–	–	–	−.099	−.029	.114	**.403**	.052
10	**.516**	.029	−.281	.006	**.502**	−.072	.036	.128	.085	–	–	–	–	–
11	.139	.010	**−.675**	−.108	.129	.001	**.756**	.019	−.109	.130	.054	−.046	**.953**	−.091
12	**.516**	.090	−.118	−.229	**.642**	.119	.333	.106	−.100	**.503**	−.105	−.004	.177	−.014
13	.139	**.654**	.085	−.006	.199	**−.536**	.113	.042	−.123	.066	**−.471**	.101	.122	.086
14	**.667**	.060	**−.616**	.108	−.102	.108	**.608**	.059	.157	–	–	–	–	–
15	–	–	–	–	–	–	–	–	–	–	–	–	–	–
16	.094	−.070	.012	**.684**	.205	.013	−.039	.034	**.645**	.076	.004	−.025	−.086	**.688**
17	**.614**	.032	.070	.076	**.444**	−.032	−.070	.329	.093	**.878**	−.010	−.164	−.038	.047
18	–	–	–	–	–	–	–	–	–	−.108	**−.537**	−.108	−.062	−.121
19	.059	.032	**−.596**	−.012	.200	−.032	**.696**	.066	−.076	−.013	−.129	−.059	**.697**	.119

20	–	–	–	–	–	–	–	–	–	–.200	–.044	**.531**	.184	.064
21	–.239	–.011	**–.654**	.203	–.271	–.149	**.600**	.039	.136	–	–	–	–	–
22	**.427**	.050	.166	.234	–	–	–	–	–	**.513**	.048	.209	.045	–.084
23	–	–	–	–	–	–	–	–	–	–	–	–	–	–
24	–	–	–	–	–	–	–	–	–	–	–	–	–	–
25	–	–	–	–	**.537**	–.045	–.106	.072	.151	–	–	–	–	–
26	–.096	.050	**–.501**	–.006	–	–	–	–	–	–	–	–	–	–
27	–	–	–	–	.044	.006	.036	**.504**	.017	–	–	–	–	–
28	.035	.220	**–.418**	–.042	–.057	–.255	.058	**.585**	–.072	–	–	–	–	–
29	–	–	–	–	–	–	–	–	–	–	–	–	–	–
30	.158	.171	.208	–	–	–	–	–	–	–	–	–	–	–
Eigenvalue	1.306	4.005	3.042	1.697	3.219	1.228	4.553	1.075	1.613	2.408	1.270	1.104	3.200	1.366
%Variance	6	20	15	8	16	6	23	5	8	16	8	7	21	9
Omega	.73	.80	.81	.58[c]	.80	.80	.86	.057[c]	.056[c]	.78	.76	.40[c]	.79	.60[c]

Note.—The specific items for each measure are available from the first author. – indicates that the items did not load on any factor at 0.40 or greater on an initial factor analysis; E/P = learning effort and process; A/E = authority and experts; Fix K = fixed development and knowledge; I/F = innate/fixed; CK = certain knowledge.

[a] Not included in regression analyses because reliability less than 0.60.

[b] Not included in regression analysis because reliability was less than 0.60 and the items did not form a cohesive construct.

[c] Ordinal coefficient alpha; items loading on a factor at 0.40 or greater are bolded.

Note

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