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Sources of Self-Efficacy: An Investigation of Elementary School Students in France

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The purpose of this study was to assess the influence of Bandura's (1997) theorized sources of self-efficacy on the academic and self-regulatory efficacy beliefs of 3rd-grade elementary school students ($N = 395$) in France, to examine whether classroom context might explain a significant portion of the variation in self-efficacy, and to assess whether these sources differ as a function of sex. Hierarchical linear modeling revealed that mastery experience, social persuasions, and mean classroom-level self-efficacy predicted mathematics self-efficacy. Mastery experience, social persuasions, physiological state, and mean classroom-level self-efficacy predicted French self-efficacy. All 4 sources predicted self-efficacy for self-regulated learning in both subjects, with the exception of vicarious experience in French. Classroom-level variables did not predict self-efficacy for self-regulated learning in either subject. Boys outperformed girls in mathematics and reported higher mathematics self-efficacy, self-regulatory efficacy, mastery experience, social persuasions, and lower physiological arousal. In French, girls outperformed boys but reported lower self-efficacy. Findings support and refine the theoretical tenets of Bandura's social cognitive theory.

Keywords: sources of self-efficacy, self-efficacy, social cognitive theory, elementary school, hierarchical linear modeling

For the past 30 years, self-efficacy, which refers to "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391), has captured the attention of researchers interested in how self processes influence human functioning and behavior. These researchers have amply demonstrated that self-efficacy beliefs are related to motivational, affective, and behavioral outcomes in a variety of domains (Bandura, 1997). In the educational sphere, self-efficacy refers to the beliefs students hold in their capabilities to accomplish tasks required for learning. Students with high self-efficacy persevere longer, search for deeper meaning across learning tasks, report lower anxiety, and have higher achievement at school (Bandura, 1997; Multon, Brown, & Lent, 1991; Pajares & Schunk, 2005). Students' self-efficacy has been shown to predict achievement outcomes in diverse academic areas, such as mathematics, science, and writing (Klassen & Usher, 2010; Pajares, 1996; Pajares & Urdan, 2006).

Just as academic self-efficacy predicts students' success in domain-specific academic tasks, the belief students hold in their capabilities to self-regulate their own learning, referred to as *self-efficacy for self-regulated learning*, corresponds to the manner in which students are able to implement self-regulated strategies in school (Zimmerman, 2008). Self-regulatory efficacy beliefs have been shown to be related to students' academic motivation (e.g., self-concept, achievement goal orientation, anxiety), achievement, and risk of dropout (Caprara et al., 2008; Usher & Pajares, 2008a; Zimmerman, 2002).

Given the central role played by beliefs of personal efficacy as determinants of academic success, researchers have begun to focus on the mechanisms by which these beliefs are formed. Bandura (1997) hypothesized that students develop and revise their self-efficacy by interpreting information from four primary sources of information: mastery experience, vicarious experience, social persuasions, and physiological and emotional states. Research on these four informational sources has typically been conducted with North American adolescents in middle school, high school, or college (Usher & Pajares, 2008b). Our central objective in the present study was to examine the manner in which these four hypothesized sources are related to the academic and self-regulatory efficacy beliefs of elementary school students in France, where neither self-efficacy nor its sources have received much research attention.

Sources of Self-Efficacy

According to Bandura's (1986, 1997) social cognitive theory, the most potent source of self-efficacy typically comes from one's interpretations of one's own performance, or *mastery experience*.

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Actions perceived as successful typically raise self-efficacy, whereas those perceived as failures lower it. However, contextual factors related to one's performance will determine how efficacy beliefs are ultimately altered. Two students who have earned the same grade on an assignment might perceive the grade in dissimilar ways on the basis of the difficulty of the course material, the amount of help received, the subjectivity of the grade, and how much effort was required (Bandura, 1997).

Individuals also obtain information about what they can do from the *vicarious experience* of observing the actions of others, such as classmates, peers, and adults (Bandura, 1997; Schunk, 1987). Seeing a close friend succeed at a challenging academic task might convince a tentative student that he or she too can succeed. Models play a particularly important role in the development of self-efficacy when students have doubts about their skills or a weak experiential base in the academic area in question.

Social persuasions and evaluative feedback from parents, teachers, and peers can alter students' confidence. Younger students who eagerly await evaluative judgments from significant others may be most impressionable by what others tell them (Bandura, 1997). Feedback that is catered to students' skill development can be particularly helpful in building self-efficacy (Hattie & Timperley, 2007; Schunk, 1983). On the other hand, disparaging comments by trusted others can leave students with a bruised sense of efficacy (Pajares, 2006).

Individuals often interpret *their physiological and emotional states*, such as stress, anxiety, fatigue, and mood as indicators of their capabilities (Bandura, 1997). Students learn to read their own bodily arousal as evidence of their personal competence by evaluating their arousal in diverse situations. Strong emotional reactions can furnish useful information about one's eventual success or failure. For example, some students experience a debilitating level of anxiety when approaching mathematics work, which undermines their self-efficacy. Feeling extreme stress or anxiety when undertaking a particular academic task could indicate a lack of capability.

Examining the influence of these four informational sources on students' academic and self-regulatory self-efficacy has been the focus of numerous investigations in recent years (see Usher & Pajares, 2008b, for a review). Researchers have generally found that mastery experience is a consistent and powerful predictor of self-efficacy across academic domains. The relative contribution of the other hypothesized sources to the prediction of self-efficacy has been less clear, however, and may depend on contextual factors such as sex, academic domain, cultural context, age, and classroom contextual factors, which we discuss next.

Some researchers have attempted to discover whether the relationship between the sources of self-efficacy and self-efficacy differs for male and female students. In science, mathematics, and writing, researchers have found no sex differences in the strength of the relationship between the sources and self-efficacy for students from various age groups (Britner & Pajares, 2006; Lent, Lopez, & Bieschke, 1991; Pajares, Johnson, & Usher, 2007). However, Usher and Pajares (2006) found sex differences in how the sources were related to the domain-general academic self-efficacy beliefs of sixth-grade students. Girls relied primarily on social persuasions when forming their academic self-efficacy, whereas boys relied on mastery experience.

There is more evidence to suggest that sex differences in the level of self-reported efficacy-related information may be a function of the academic domain under investigation. In U.S. contexts, for example, boys report stronger mastery experiences and lower anxiety in the areas of mathematics (Lent, Lopez, Brown, & Gore, 1996) and science (Britner & Pajares, 2006), but girls report greater mastery experiences and lower anxiety in writing (Pajares et al., 2007). Girls have also reported more vicarious experiences and social persuasions in mathematics (Lopez, Lent, Brown, & Gore, 1997), writing (Pajares et al., 2007), and general academics (Usher & Pajares, 2006), which suggests that girls might be more sensitive than are boys to the social messages they receive. Whether sex differences hold for younger students is less clear. Those who have included elementary-age students did not disaggregate sex differences by student age (i.e., Pajares et al., 2007).

Investigators have also examined the relationship between the hypothesized sources of self-efficacy and students' self-efficacy for self-regulated learning, which has traditionally been measured at the domain-general level (Usher & Pajares, 2008a). For example, Hampton and Mason (2003) reported that the four sources of self-efficacy, when measured as a combined latent variable, predicted the self-regulatory efficacy beliefs of American high school students. Other researchers have found that all four hypothesized sources predicted self-efficacy for self-regulated learning among American students in Grade 6 but that boys and girls relied on different sources when judging their self-regulatory efficacy (Usher & Pajares, 2006). This evidence suggests that girls and boys may interpret experiential and social information in distinct ways. These interpretative tendencies might also differ as a function of the academic domain in which students are asked to assess their own efficacy.

Investigating the sources of self-efficacy among younger students whose beliefs about their academic capabilities are just developing seems central to understanding students' academic trajectories. Self-beliefs formed in elementary school likely serve as the cornerstone on which subsequent efficacy beliefs are structured (Bandura, 1997). Few studies have examined the sources of self-efficacy among primary school students for whom efficacy beliefs are presumably most malleable (Usher & Pajares, 2008b). Pajares et al. (2007) reported that mastery experience was related to writing self-efficacy for students in Grades 3 through 12. They also found that physiological arousal was predictive of self-efficacy for the younger (elementary and middle school) but not the older (high school) students, for whom social persuasions were predictive. As we noted earlier, these relationships are also likely to depend on contextual factors, such as students' sex and the academic domain in which studies are undertaken (e.g., mathematics, language arts). More evidence is needed to draw meaningful conclusions.

Bandura (1997) also contended that "cultural values and practices affect how efficacy beliefs are developed" (p. 32). Consequently, some researchers have attempted to investigate how the sources of self-efficacy differ among learners of various cultural or ethnic backgrounds. Klassen (2004) found that only past performance and physiological arousal predicted mathematics self-efficacy for Anglo-Canadian students in Grade 7, whereas for Indo-Canadian students, all four sources were predictive. Social persuasions were strong predictors of the academic self-efficacy

beliefs of African American but not Caucasian American middle school students in a U.S. sample (Usher & Pajares, 2006).

Researchers comparing mean scores across the four sources of self-efficacy as a function of ethnicity have reported numerous differences. For example, African American students reported higher negative physiological arousal toward their academic work than did their Caucasian peers (Usher & Pajares, 2006). In mathematics, Hispanic American students in elementary, middle, and high school reported lower anxiety than did Caucasian American students (Stevens, Olivárez, & Hamman, 2006). Hispanic students also reported fewer mastery experiences and less praise but greater exposure to models than did their White counterparts. Researchers have not systematically investigated the sources of students' self-efficacy in other national contexts.

The present study focuses on the context of young learners in France, where few studies of self-efficacy and no studies of its sources have been undertaken. The goal of this work was to examine relationships that have been theorized and empirically tested in a U.S. context within a context that has largely been ignored by social cognitive theorists (Pajares, 2007). We therefore did not seek to compare and contrast French and American students. If the influence of self-efficacy and its sources on students' academic trajectories is upheld in a French context, such a study can help teachers in France better understand the factors related to school success and develop appropriate interventions.

We hypothesize several reasons why the strength of the relationship between (a) the sources of self-efficacy and self-efficacy and (b) the level at which students perceive efficacy-related information might be important to investigate in a French educational context. Most primary schools in France are composed of two classes per grade level, each comprising students of approximately the same age and with heterogeneous ability levels. In any two primary school classrooms in France, teachers' pedagogical practices can differ widely. For example, certain teachers place heavy emphasis on comparisons between students that could influence the efficacy judgments students make. Other teachers utilize scaffolding procedures and frequent formative feedback that foster students' self-efficacy through social persuasions that are grounded in students' mastery. Variations in teaching practices in this cultural context could account for classroom- and student-level differences in self-efficacy (Pajares, 2007).

Sex differences in students' self-perceptions may also be expected in the French context. Some researchers have reported that girls appear to receive less favorable treatment by teachers than do boys and report feeling a lack of esteem by their teachers (Baudoux & Noircent, 1995). French teachers have also been shown to interact with and listen to boys more often than girls (Forest, 1992). Boys are also more often encouraged to solve difficult problems independently, whereas teachers tend to intervene to help girls problem solve. Girls, on the other hand, are called on to summarize previous content rather than to handle new content (Mosconi, 2003). Girls reported feeling less competent in mathematics than did boys when taking part in a mixed-sex mathematics lesson (Lorenzi-Cioldi, 1988). These findings could be due to teachers' gendered perceptions of girls as "dependent, loyal, or affectionate" and of boys as "autonomous, hard-working, or ambitious" (Bressoux & Pansu, 2004, p. 198). Such gender stereotypes could influence teachers' feedback patterns, expectations, and teaching practices, which in turn might affect French students' self-evaluation of their academic capabilities (e.g., Désert, Croizet, & Leyens, 2002).

Regardless of cultural context, classroom contextual differences might also contribute to how students weigh and interpret efficacy-relevant information, yet no studies of the sources of self-efficacy have involved a methodological approach that could test such variation empirically. Multiple regression analyses have typically been used to investigate the relationship between the hypothesized sources and self-efficacy, which may not account for the influence of higher level factors, such as classroom and school context, that might partly inform self-efficacy judgments (Usher & Pajares, 2008b).

Purpose of the Study

We approached the present study with three goals. First, we sought to assess the sources of third-grade elementary school students' self-efficacy in mathematics and French and to examine whether these reports differ as a function of sex. Second, we aimed to examine whether classroom context might explain a significant portion of the variation in students' academic and self-regulatory efficacy beliefs. Third, our central aim was to investigate the relationship between the hypothesized sources of self-efficacy and students' academic and self-regulatory efficacy beliefs in the areas of mathematics and French.

Our study addresses several of the limitations in the literature that we introduced earlier. Little is known about how the sources of self-efficacy are related to children's self-efficacy or about how these sources operate in non-American contexts. We examined the sources of self-efficacy among elementary school students in France, a context previously unexplored. Few studies of the sources of self-efficacy have been conducted with students in elementary school (e.g., Pajares et al., 2007), and no studies have examined students' beliefs in both mathematics and language. Our decision to select elementary school students for this study was based on Bandura's (1997) suggestion that self-efficacy is rapidly evolving during the elementary school years and may have important consequences for motivation and achievement later in school. We therefore selected students in Grade 3, who have been shown to be old enough to make accurate self-appraisals (e.g., Marsh, 1989).

We selected the domains of mathematics and French because of their import and prevalence in the overall academic curriculum. We expected that students would be actively developing their self-perceptions in these two high-stakes domains. We were also interested in whether students developed their confidence similarly in these academic areas because the approach to teaching these two subjects can differ quite dramatically.

The present study also tests whether the sources hypothesized to be related to self-efficacy are also related to students' self-efficacy for self-regulated learning. Finally, we utilized hierarchical linear modeling (HLM), a new technique for research on the sources of self-efficacy, to examine whether classroom contextual factors also influence self-efficacy.

Method

Participants

Participants in the study were 395 students (200 boys, 195 girls) in Grade 3 (Cours Elémentaire 2, or CE2). Students were from 21

classes in 19 schools in towns in the vicinity of Grenoble, France. The average student age was 9.1 years (SD = 0.44). All students remained in the same classes throughout the school year. The majority of participants came from upper-middle class families, as indicated by the fact that most of their fathers were employed as business executives (n = 107) or in middle management (n = 122). The remaining students' fathers were farmers (n = 6), artisans (n = 74), white-collar employees (n = 58), or blue-collar employees (n = 30) or were from other professions (n = 47). More information about this measure of socioeconomic status is provided later.

Procedure

Recruitment for the study took place over 5 months. Gwénaëlle Joët met with local school inspectors (similar to U.S. school district superintendents) to receive permission to contact schools. Schools then invited Joët to attend a faculty meeting at the start of the school year to explain the study objectives and procedures. Interested teachers and students then gave consent to participate in the study.

Two questionnaires, one focused on self-beliefs in mathematics and the other on self-beliefs in French, were administered to groups of students by Joët during students' regular classes in March of the 2005–2006 school year. The mathematics and French questionnaires were administered separately but within a 2-week interval to prevent student fatigue. The distribution of questionnaires was counterbalanced to eliminate ordering effects. All items were read aloud by the researcher, who had no prior relationship with the participants.

We followed translation protocols commonly used in cross-cultural psychology to create the French questionnaire. We used a team approach to back-translate and translate each item, a process that permitted us to conduct multiple checks on functional and cultural validity (Peña, 2007). Translators were bilingual in French and English and were experts in the research domain of academic motivation. This enabled us to make certain that translations were both linguistically accurate and valid in meaning. Necessary alterations were made to syntax and wording in the French translation to reflect cultural differences between the original and translated version of the instrument.

An initial version of the questionnaire was then piloted by Joët, who met with students from three third-grade classes (n = 65). Students were asked to think aloud as they responded to the items (Rogers, Gierl, Tardif, Lin, & Rinaldi, 2003). They were also asked to note any items or words they did not fully understand. On the basis of their feedback, minor modifications were made to the wording of several items to render the questionnaire conceptually equivalent to its English version.

Instruments

Items on the questionnaire were written as first-person statements to which students were asked to rate their level of agreement on a Likert-type scale from 1 (*not at all true*) to 4 (*completely true*). Although most items were positively worded, some were worded negatively to remain faithful, once translated, to their original meaning. Negatively worded items were reverse scored prior to statistical analysis. Measures used to assess self-efficacy for self-regulated learning and the sources of self-efficacy were adapted from previously validated measures written in English.

Self-efficacy measures. Two 15-item measures were used to assess students' self-efficacy in mathematics and French (see Appendices A and B for lists of items). Items were phrased to assess students' beliefs in their academic capabilities, which is in accordance with Bandura's (2006) guidelines for constructing self-efficacy scales and mirrors the manner in which self-efficacy has been typically measured in studies of academic motivation (see Pajares, 1996). Each scale included six items to assess students' general sense of their capabilities in each domain and nine items to assess students' task-specific self-efficacy. In mathematics, specific items targeted students' perceived skills in measurement, computation, numeracy, and geometry. In French, these specific items targeted students' sense of their capabilities in conjugation, grammar, and spelling. These skills were selected for their congruence with content on the French national examinations. Cronbach's alpha coefficients suggest good reliability for both the mathematics self-efficacy (.87; boys = .83; girls = .86) and the French self-efficacy (.83; boys = .83; girls = .82) items.

We assessed *self-efficacy for self-regulated learning,* using a measure created by Zimmerman, Bandura, and Martinez-Pons (1992; and see Bandura, 2006) that has been frequently used in studies of academic motivation. Items assess students' beliefs in their capabilities to regulate their own learning by using a variety of learning strategies (e.g., "I can do my math homework at home even when there are other interesting things to do") and have been shown to be appropriate for use with elementary school students (see Usher & Pajares, 2008a). From the original 11-item scale (Zimmerman et al., 1992, p. 688) we selected the seven items that were appropriate for our context and younger sample (i.e., Items 1–3 and 8–11) and added an eighth item, "I can complete my French homework on time." Items were then adapted for both content areas of interest (e.g., "I can motivate myself to do my French work"). Internal consistency for the self-efficacy for self-regulated learning items was .79 (boys and girls = .78) in mathematics and .72 (boys = .73; girls = .71) in French.

Sources of self-efficacy. We measured the four sources of self-efficacy theorized by Bandura (1997), using a 24-item scale developed by Lent et al. (1991) and later adapted by Usher and Pajares (2006). The scale was modified for each content area of interest. Seven items assessed mastery experience (e.g., "I have always done well on [subject area: either math or French] assignments"), eight assessed vicarious experience (e.g., "Most of my friends do well in [subject]"), nine assessed social persuasions ("People often tell me that I am a good [subject] student"), and eight assessed physiological and emotional states (e.g., "Just thinking about doing [subject] work makes me feel nervous"). For items in mathematics and French, respectively, Cronbach's alpha coefficients were .88 (boys = .83, girls = .87) and .85 (boys = .84, girls = .85) for mastery experience; .61 (boys = .63, girls = .55) and .55 (boys = .55, girls = .54) for vicarious experience; .89 (boys = .87, girls = .89) and .88 (boys and girls = .88) for social persuasions; and .83 (boys and girls = .83) and .80 (boys = .81, girls = .80) for physiological and affective states.

As did Lent et al. (1991), we obtained poor internal consistency for the eight items tapping vicarious experience, on which students rated their exposure to and assessment of potential models (e.g., "I admire people who are good in [subject]"; "Most of my classmates

do not like [subject]"). The removal of any given item would not have improved the psychometric properties of the subscale. There are several plausible explanations for why these items demonstrate poor internal consistency. First, they are conceptually somewhat dissimilar and may reflect disparate judgments of one's exposure to social models. Second, the multidimensional nature of this variable may make it difficult to assess this source of self-efficacy with only one subscale (Usher & Pajares, 2008b). Third, younger students may be less aware of certain vicarious influences than older students, or they may respond differently to peer than to adult models (Bandura, 1997). We opted to report findings related to this theorized variable, but results must be interpreted with caution. We later suggest improved measurement approaches for this particular source.

Academic achievement. At the beginning of Grade 3, students in France take a national examination (the Evaluations Nationales de début de CE2) in mathematics and French. Scores on this exam range from 0 to 100 and provide a standardized measure of student achievement that is used to assess students' academic ability level. We were granted access to students' exam scores, which were used as a control variable in our study. We later collected students' end-of-year achievement scores, but because of this article's focus on the sources, rather than the effects, of self-efficacy and because of the well-established relationship between self-efficacy and achievement (see Schunk & Pajares, 2009), we do not analyze this relationship here.

Initial achievement scores ranged from 14.3 to 96.6 in mathematics and from 26.9 to 100 in French. This standardized measure also permitted us to estimate the average student achievement level within each class to determine whether students' beliefs develop differently as a function of the mean achievement level of their class. The participating classes had heterogeneous achievement levels in both French and mathematics, and students were not placed in any group or class according to their ability levels. We were thus able to compare the self-beliefs of students as a function of their academic level at the beginning of the school year to see if the average achievement level of individual classes was a factor that may have contributed to variations in students' self-efficacy later in the year.

Social class. We controlled for students' socioeconomic level by asking teachers to provide us with information about the professions of students' parents. This method is recommended by the Institut National de la Statistique et des Etudes Economiques [French National Institute for Studies in Statistics and Economy] and is often used by education researchers (e.g., Hadji, Fernex, & Lima, 2003). Professions are assigned a code on the basis of a classification system (the *catégorie socio-professionnelle*), which serves as proxy measure for a child's social class. Class codes range from 0 to 6 (0 = *business executive,* 1 = *farmer,* 2 = *artisan,* 3 = *middle management,* 4 = *white-collar employee,* 5 = *blue-collar employee,* and 6 = *other*). The business executive category includes people occupied in upper-level business or professions for which higher education is a prerequisite, such as professor, researcher, doctor, pharmacist, engineer, and school administrator.

For the present study, teachers were able to provide us with the professional information for 383 students' fathers and 389 students' mothers, as this information is documented in teacher-kept records. We retained for our analyses only the fathers' professions because many of the mothers in our study did not work professionally outside the home. We were unable to isolate children who were part of single-parent families, but, according to teachers, relatively few children lived in single-parent homes. Father's occupation was dummy coded for all analyses, and business executive (i.e., 0) served as the reference group.

Analyses

We used *t* tests to check for mean differences in the variables of interest (i.e., sources, self-efficacy, and achievement) as a function of sex and subject area. To control for experimentwise Type I error, we used an additive (Šidàk–Bonferonni) inequality in which an alpha of .0036 was required for statistical significance at the $\alpha = .05$ level in each of the 14 tests conducted. This allowed us to ascertain whether students differed by sex on any of the variables of interest in the study. Cohen's *d* effect sizes were also reported (Cohen, 1992).

Although studies of academic self-efficacy have typically assumed that differences in self-efficacy between students are a function only of individual difference (e.g., Lucie and Marc have different self-efficacy levels solely because they have unique experiences and interpret the world through a unique personal lens), it is plausible that the learning environment may account for some variation in self-efficacy (i.e., Lucie and Marc have different self-efficacy levels in part because they are in classrooms with different teachers and peers). Numerous scholars have contended that field-based research must consider the possible effects of school context (e.g., teacher, classroom, or school characteristics) on students' psychosocial development (e.g., Pajares, 2007).

Our sample consisted of heterogeneous third-grade classes across multiple school contexts. We therefore used a multilevel statistical approach that would permit us to test the possibility that variations in self-efficacy or the sources of self-efficacy could be explained by both individual-level student characteristics and classroom-level contextual factors. HLM is the best technique for addressing such a question because it can estimate the source of variation in students' self-beliefs by partitioning the variance accounted for by individual and contextual factors (Raudenbush & Bryk, 2002). This modeling technique is appropriate in a study such as this one that includes hierarchical data composed of students (Level 1) who are members of different classes (Level 2). Data at each level are treated independently rather than in aggregate, as the latter can bias results and conclusions (Bressoux, Coustère, & Leroy-Audouin, 1997).

Multilevel models are an improved case of the ordinary least squares regression model because they allow estimations of the constant and slope to vary from one group (e.g., classroom) to another, permitting researchers to examine random group effects. Such a model offers a benefit over the ordinary least squares regression method typically used in studies of self-efficacy by permitting researchers to estimate the variation in self-efficacy explained by students' learning environment and therefore to determine whether self-efficacy develops in part as a function of students' membership in a given classroom. To our knowledge, this question has not been previously addressed with proper statistical models.

In the present study, we tested four HLM models, using a random coefficients design (Raudenbush & Bryk, 2002). We first

conducted diagnostics tests, including a check for normality of residuals (verified by Q-Q plots, which are not included here because of space limitations). In the first model, we examined the independent contribution made by the four hypothesized sources to the prediction of mathematics self-efficacy. We regressed mathematics self-efficacy on the following Level 1 predictors: gender (0 = *male,* 1 = *female*), social class (as described earlier), prior achievement in mathematics, and the four sources of self-efficacy. We sought to model the influence of classroom context at Level 2 by regressing the aggregated mean mathematics achievement and mean mathematics self-efficacy scores on these same predictors. These means were calculated as the average score obtained by all students in the same class. The second HLM model was similar to the first except that the sources and self-efficacy variables were assessed in the domain of French.

In the third HLM model, we examined the independent contribution made by the four hypothesized sources to the prediction of self-efficacy for self-regulated learning in mathematics while once again controlling for the effects of social class, gender, and achievement. Because of the number of tests run, we opted not to test for interactions between the sources and these statistical controls. The fourth model was identical to the third but in the domain of French.

In each regression model, we ran a fully unconditional, or empty, model to determine the proportion of the variation in each self-efficacy outcome that was attributable to group-level (i.e., classroom) factors over that attributable to individual-level factors. We calculated the intraclass correlation coefficient (ICC) for each model, which represents the variance between classrooms (τ_{00}) divided by the sum of the variance between classrooms (τ_{00}) and the variance within students (σ^2): ICC = $(\tau_{00})/(\tau_{00}) + (\sigma^2)$.

In each model, we used a likelihood ratio test to compare the deviance (or -2 log likelihood) of two models of varying complexity. This permitted us to estimate the quality of a more restricted model to that of a less restricted one. A significant change in deviance indicated that the model with more parameters to be estimated should be retained. Pseudo R^2 values, which represent the percentage of variance in the dependent variable explained by the independent variables, are also reported for each model. We also report the Akaike and Bayesian information criteria, which served as additional measures of the goodness of fit of the estimated models. We examined the variance inflation factor in each of the models tested and found no evidence of multicollinearity among the variables (i.e., no variance inflation factor value exceeded 3.73, which is within the acceptable range as noted by Kutner, Nachtsheim, & Neter, 2004).

Results

Descriptive Statistics and Mean Differences

Zero-order correlations for the variables in the study are reported by content area (i.e., mathematics and French) in Table 1. The correlations observed in both mathematics and French largely reflect the theorized relationship between the sources and self-efficacy posited by Bandura (1997) and observed in empirical studies of the sources (Usher & Pajares, 2008b). With the exception of vicarious experience, the sources were significantly related to self-efficacy and with achievement in both subject areas. Likewise, the sources were each correlated with self-efficacy for self-regulated learning. We also found that, as expected, the sources were significantly correlated among themselves in both subject areas. The highest correlation was between mastery experience and social persuasions (r = .79 in mathematics and .76 in French), which is in keeping with findings reported in other domains and with other age groups (Usher & Pajares, 2008b). In mathematics, vicarious experience was weakly but significantly correlated with each other source and with both self-efficacy measures. In French, however, vicarious experience was related only to social persuasions and to self-efficacy for self-regulated learning. These mixed results are similar to those obtained by Lent et al. (1996) who also observed that vicarious experience was either minimally or not at all related to the other sources.

In the area of mathematics, girls' achievement at the beginning of Grade 3 and their subsequent self-efficacy were significantly lower than boys' achievement and self-efficacy (Cohen's d = .43 and .74, respectively; see Table 2). Girls also reported lower self-efficacy for self-regulated learning in mathematics. As regards the four sources of self-efficacy, girls rated both their mastery experiences and social persuasions lower than did boys in mathematics (d = .80 and .52, respectively). Girls also reported greater negative physiological and emotional arousal toward mathematics (d = .38). No gender differences were observed for vicarious experiences in mathematics.

In the domain of French, girls significantly outscored boys on the standardized achievement test at the beginning of Grade 3.

Table 1
Zero-Order Correlations for Variables in Mathematics and French (N = 395)

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. Mastery experience	2.92	0.63	—	.08	.76**	−.47**	.60**	.54**	.36**
2. Vicarious experience	2.93	0.45	.10*	—	.24**	−.10	−.01	.13*	−.07
3. Social persuasions	2.82	0.64	.79**	.34**	—	−.32**	.52**	.56**	.25**
4. Physiological state	2.02	0.55	−.51**	−.15*	−.45**	—	−.35**	−.35**	−.35**
5. Self-efficacy	3.21	0.44	.62**	.17*	.60**	−.35**	—	.59**	.34**
6. Self-efficacy for self-regulated learning	3.35	0.45	.55**	.23**	.57**	−.47**	.57**	—	.23**
7. Achievement (Time 1)	73.63	13.58	.42**	−.05	.26**	−.27**	.36**	.25**	—

Note. Correlations for mathematics are below the diagonal; correlations for French are above the diagonal. Means for sources and self-efficacy measures reflect a 4-point scale.
* $p < .05$. ** $p < .001$.

Table 2
Mean Differences in the Study Variables by Gender

Variable	Girls (n = 195)		Boys (n = 200)			95% CI		
	M	*SD*	*M*	*SD*	*t*	Lower limit	Upper limit	Cohen's *d*
Mathematics								
Mastery experience	2.77	0.67	3.27	0.55	−7.95***	−0.61	−0.37	.80
Vicarious experience	2.95	0.44	3.01	0.50	−1.21	−0.15	0.03	.13
Social persuasions	2.75	0.67	3.10	0.63	−5.20***	−0.47	−0.21	.52
Physiological state	2.04	0.56	1.83	0.54	4.55*	0.17	0.43	.38
Mathematics self-efficacy	3.21	0.48	3.53	0.38	−7.37***	−0.41	−0.24	.74
Self-efficacy for self-regulated learning	3.29	0.50	3.46	0.46	−3.56*	−0.27	−0.08	.36
Prior mathematics achievement	67.96	15.65	74.63	15.10	−4.31**	−3.63	−9.71	.43
French								
Mastery experience	2.87	0.63	2.96	0.62	−1.52	−0.22	−0.03	.15
Vicarious experience	2.94	0.43	2.92	0.46	0.32	−0.07	0.10	.03
Social persuasions	2.80	0.64	2.82	0.64	−0.34	−0.15	0.10	.03
Physiological state	2.01	0.53	2.03	0.56	−0.13	−0.13	0.11	.03
French self-efficacy	3.13	0.43	3.29	0.42	−3.77*	−0.25	−0.08	.25
Self-efficacy for self-regulated learning	3.35	0.43	3.35	0.46	−0.09	−0.09	−0.08	.01
Prior French achievement	75.85	12.67	71.47	14.11	3.24*	1.71	7.02	.33

Note. Initial testwise statistical significance was set at the $\alpha = .0036$ level according to the Šidàk–Bonferonni correction for conducting multiple independent tests. Degrees of freedom for all tests = 393.
* $p < .05$. ** $p < .001$. *** $p < .0001$.

Despite this advantage, girls reported significantly lower self-efficacy in French than did boys ($d = .25$). We found no gender differences in students' self-regulatory efficacy beliefs in French or in their reports about the four hypothesized sources of self-efficacy.

Relationships Between the Sources and Self-Efficacy

Multilevel modeling techniques were used to examine predictors of academic self-efficacy and self-efficacy for self-regulated learning in each subject area. We first constructed an empty model to determine the degree to which students' self-efficacy in mathematics and French was affected by variations in individual-level (Level 1) or group-level (Level 2) predictors. Results indicated that variations in self-efficacy could be accounted for by both individual- and group-level differences (see Table 3).

In the regression analysis predicting mathematics self-efficacy, we obtained an ICC of 0.047. This finding newly confirms that at least some portion, albeit modest (4.7%), of elementary students' self-efficacy ratings can be explained by variations across classrooms. Most of the variance in self-efficacy (95.3%) was explained by individual-level factors among students within the same class. In the area of French, the ICC was 0.10, indicating that 10% of students' beliefs in their capabilities in French varied among classes, which was more than was the case in mathematics. Still, the largest proportion of the variance in self-efficacy (90%) was accounted for by individual-level differences.

We next sought to examine the independent contribution made by the hypothesized sources of self-efficacy to the prediction of self-efficacy when sex, social class, and prior achievement were controlled. In the area of mathematics, this full model helped to explain half of the 95.3% intraclass (between-student) variance in self-efficacy and 60% of the 4.7% interclass (between-classrooms) variance that we observed in the empty model. Mastery experience was the most influential source of students' mathematics self-efficacy, accounting for a significant portion of the variance above and beyond the influence of prior achievement, which was included as a control. Social persuasions also predicted mathematics self-efficacy, as did the mean classroom-level self-efficacy score. That is, students' self-efficacy increased to the extent that students received favorable messages about their mathematics skills and belonged to a class with a high mean self-efficacy level.

In the area of French, the full regression model explained almost half (47%) of the 90% intraclass (between-student) variance in self-efficacy and over half (60%) of the 10% interclass (between-classrooms) variance that we observed in the empty model. As in mathematics, mastery experience and social persuasions were strong predictors of French self-efficacy. Physiological arousal was negatively related to self-efficacy, although the magnitude of this effect was low. As was the case in mathematics, average self-efficacy level in the class also predicted students' self-efficacy in French.

Relationship Between the Sources and Self-Efficacy for Self-Regulated Learning

We also aimed to examine whether Bandura's (1997) hypothesized sources were related to the self-regulatory efficacy beliefs of elementary school students in France. The empty models revealed no significant between-class variation; all of the variance was accounted for by individual student-level differences (see Table 4). For this reason, only the Level 1 predictors described earlier (i.e., sex, social class, prior achievement, and sources of self-efficacy) were included in the two regression analyses predicting self-efficacy for self-regulated learning in mathematics and French.

In mathematics, all four of the hypothesized sources predicted students' self-efficacy for self-regulated learning, which is consistent with findings reported in previous studies (Usher & Pajares, 2006). Unlike its relationship with mathematics self-efficacy, prior mathematics achievement was unrelated to self-efficacy for self-

Table 3
Hierarchical Linear Modeling Results for the Prediction of Self-Efficacy in Mathematics and French (N = 395)

	Mathematics					French				
	Empty model		Full model			Empty model		Full model		
Parameter	*B*	*SE*	*B*	*SE*	β	*B*	*SE*	*B*	*SE*	β
Fixed effects										
Constant	3.38**	0.31	1.09*	0.47		3.21**	0.04	0.52	0.77	
Level 1 variables										
Gender (female)			−0.13**	0.03	−0.14			−0.15**	0.03	−0.17
Father's occupation										
Farmer			−0.01	0.13	−0.01			−0.21	0.13	−0.06
Artisan			0.04	0.05	0.03			0.02	0.05	0.02
Middle management			−0.04	0.04	−0.04			−0.01	0.04	−0.01
White-collar employee			−0.03	0.06	−0.02			−0.06	0.05	−0.05
Blue-collar employee			−0.16	0.08	−0.08			−0.14*	0.07	−0.08
Other			0.03	0.07	0.01			−0.02	0.06	−0.01
Prior achievement			0.003*	0.01	0.10			0.004**	0.00	0.12
Mastery experience			0.21**	0.04	0.30			0.24**	0.04	0.35
Vicarious experience			0.05	0.04	0.05			−0.04	0.04	−0.04
Social persuasions			0.18**	0.04	0.26			0.13**	0.04	0.19
Physiological/affective states			−0.02	0.03	−0.02			−0.07*	0.03	−0.04
Level 2 variables										
Mean achievement level			−0.01	0.01	−0.01			0.01	0.01	0.08
Mean self-efficacy level			0.38*	0.15	0.14			0.35*	0.18	0.11
Random effects										
Variance between classrooms (τ_{00})	0.01*	0.01	0.004	0.003		0.02*	0.01	0.01*	0.004	
Variance between students (σ^2)	0.20**	0.01	0.10**	0.01		0.17**	0.01	0.09**	0.01	
Deviance (−2 log likelihood)	511.1		246.4			446.2		206.4		
Akaike information criterion	517.1		280.0			452.2		240.4		
Bayesian information criterion	520.3		298.2			455.4		258.2		

Note. For mathematics, Level 1 pseudo-R^2 = .50; Level 2 pseudo-R^2 = .60. For French, Level 1 pseudo-R^2 = .47; Level 2 pseudo-R^2 = .50.
* $p < .05$. ** $p < .01$.

regulated learning in mathematics. Three of the four sources predicted self-efficacy for self-regulated learning in the domain of French: mastery experience, social persuasions, and physiological and affective states. Prior achievement was not related to self-regulatory efficacy beliefs, which suggests that students rely on factors other than their achievement-related performances when evaluating their self-regulatory capabilities. The largest standardized regression coefficient in both models reflected a strong relationship between social persuasions and students' beliefs in their self-regulatory capabilities (β = .26 in mathematics and β = .35 in French).

Discussion

The purpose of this study was threefold. We first sought to assess how French elementary school students responded to measures of the four hypothesized sources of self-efficacy in mathematics and French and to examine whether their reports differ as a function of sex. Second, we sought to examine whether membership in a given classroom might explain a significant portion of the variation in students' self-efficacy over and above that explained by individual differences. Our final and primary aim was to investigate the relationship between the hypothesized sources of self-efficacy and students' academic and self-regulatory efficacy beliefs in the areas of mathematics and French with a younger age group and in a national context in which these questions have not yet been studied. We discuss our findings related to these goals in turn and acknowledge limitations in the present study. We then present several educational implications of our findings and offer suggestions for future research.

The interpretations that girls and boys in this study made of efficacy-related information helps explain origins of the gender gap in mathematics self-efficacy that has been reported elsewhere (Hackett & Betz, 1989; Pajares, 2005; Pintrich & De Groot, 1990). Girls perceived fewer mastery experiences in mathematics than did boys. This is particularly troubling given that researchers who have investigated the sources of self-efficacy among older students have not found sex differences in mastery experience with regard to mathematics (e.g., Klassen, 2004; Lopez et al., 1997). Girls in our study also reported receiving fewer positive social messages about their mathematics performance than did boys, and they reported greater feelings of anxiety when approaching mathematics. This echoes reports that school-age boys in France are more likely to receive positive feedback and encouragement for their ability in mathematics than are girls, particularly given that mathematics is a historically masculine domain (Duru-Bellat, 1995). Researchers in U.S. contexts have found that girls attend more closely to the persuasive messages from others when forming their self-efficacy (Usher & Pajares, 2006). If this is, indeed, the case, messages from parents, teachers, and the larger culture carry added significance.

Table 4
Hierarchical Linear Modeling Results for the Prediction of Self-Efficacy for Self-Regulated Learning in Mathematics and French (N = 395)

	Mathematics					French				
	Empty model		Full model			Empty model		Full model		
Parameter	*B*	*SE*	*B*	*SE*	β	*B*	*SE*	*B*	*SE*	β
Fixed effects										
Constant	3.38**	0.02	2.30**	0.23		3.35**	0.02	2.33**	0.22	
Level 1 variables										
Gender (female)			0.03	0.04	0.41			0.01	0.03	0.01
Father's occupation										
Farmer			−0.14	0.16	−0.03			−0.37*	0.15	−0.10
Artisan			0.06	0.06	0.04			0.15	0.05	0.12
Middle management			−0.04	0.05	−0.03			0.02	0.05	0.02
White-collar employee			0.06	0.06	0.04			0.04	0.06	0.03
Blue-collar employee			−0.07	0.09	−0.03			−0.08	0.08	−0.04
Other			0.02	0.07	0.01			0.02	0.07	0.01
Prior achievement			0.001	0.001	0.03			0.001	0.001	0.02
Mastery experience			0.16**	0.05	0.21			0.14**	0.05	0.19
Vicarious experience			0.10*	0.04	0.09			0.01	0.04	0.01
Social persuasions			0.19**	0.05	0.26			0.25**	0.04	0.35
Physiological/affective states			−0.20**	0.04	−0.23			−0.10*	0.04	−0.12
Random effects										
Variance between classrooms (τ_{00})										
Variance between students (σ^2)	0.24**	0.02	0.14**	0.01		0.19**	0.01	0.12**	0.01**	
Deviance (−2 log likelihood)	564.6		347.6			489.0		292.0		
Akaike information criterion	568.7		375.6			495.0		320.0		
Bayesian information criterion	570.7		390.3			498.2		334.6		

Note. For mathematics, Level 2 pseudo-R^2 = .42. For French, Level 2 pseudo-R^2 = .37.
* $p < .05$. ** $p < .01$.

Girls reported lower self-efficacy than did boys in mathematics. Although this finding may give cause for concern, it is not surprising given past research. Girls also reported lower confidence in their ability to self-regulate their mathematics learning. Researchers in other contexts have reported that girls express higher self-regulatory efficacy beliefs than do boys (see Pajares, 2002). This inconsistency may be attributable to the domain-specificity of the self-efficacy for self-regulatory learning items we used in our study. In other words, girls may doubt their self-regulatory capabilities when asked to think about a particular school subject (i.e., mathematics) but not when asked to think of their general capability to manage their learning. Achievement differences in mathematics also favored boys, although we note that these differences reflect standardized test scores and not school grades, which are less likely to reflect gender differences (Beal, 1999).

Factors such as socialization practices in France may account for why girls lag behind boys in both mathematics confidence and achievement. For example, differential parental expectations have been shown to be related to middle school students' mathematics achievement in a context similar to this one (Neuenschwander, Vida, Garrett, & Eccles, 2007). As noted earlier, teacher expectations may also account for sex differences in self-beliefs and achievement.

In the subject of French, we found no difference in girls' and boys' reports of the sources of their self-efficacy. Nevertheless, girls reported significantly lower self-efficacy than did boys despite the fact that girls outperformed boys on the French achievement test. Researchers in American contexts have suggested a response bias as an explanation for why girls report weaker beliefs about their own capabilities than boys do, despite their equal performance (Pajares, 2003). They have shown that girls tend to be more reserved in their efficacy judgments than are boys, but this modesty is not typically reported until the middle school years (Pajares & Schunk, 2005; Wigfield, Eccles, & Pintrich, 1996). Girls and boys in our study reported similar self-efficacy for self-regulated learning in French. This too differs from findings in U.S. contexts, where girls report more confidence in their self-regulatory competence, particularly when it comes to language skills (Pajares, 2002; Pajares, Miller, & Johnson, 1999).

We next addressed the question of whether variance in self-efficacy could be explained by students' membership in a particular classroom. Classroom-level factors explained a significant but modest proportion of the variance in students' mathematics and French self-efficacy, which suggests that the school context in which children are placed does bear some influence on how capable children perceive themselves to be in these two critical academic areas. That is, certain contextual characteristics, above and beyond those attributable to individual students, affect the development of self-efficacy. The amount of variance in students' self-efficacy for self-regulated learning attributable to classroom context was nonsignificant, however, which suggests that individual-level, not classroom-level, factors best explain how capable students feel of managing and organizing their work in mathematics and French.

We found that students who belong to a class with a higher average self-efficacy level report feeling more capable themselves in these areas. At its most basic, this finding seems to suggest a positive contagion effect in the elementary school setting—that raising the efficacy beliefs of one student might also raise the efficacy beliefs of others. This might be particularly important for struggling students for whom a self-efficacy boost from the environment can mean the difference between failing or passing in school. An alternative possibility is that the measures of classroom context used in our study served as a proxy for vicarious influences. In other words, a student who belongs to a class with relatively high self-efficacy may reap a vicarious benefit. Such a hypothesis is, of course, inconclusive until researchers examine whether students' perceptions of their classmates' self-efficacy mirror these mean levels.

Our third and primary aim in this study was to assess the predictive relationship between the hypothesized sources of self-efficacy and the academic and self-regulatory efficacy beliefs held by elementary school students in mathematics and French. The sources accounted for over half of the variance in academic self-efficacy in both subject areas. Our findings support Bandura's (1997) theorizing and empirical reports by other researchers showing that perceived mastery experience is a powerful source of self-efficacy across academic domains (Usher & Pajares, 2008b). In fact, for these third-grade students, mastery experience was predictive of achievement even when children's standardized mathematics and French achievement scores were included in the model. This confirms that what is important in the construction of self-efficacy is the phenomenological manner in which students perceive their experiences. As Bandura (1997) contended, "the same level of performance success may raise, leave unaffected, or lower perceived self-efficacy depending on how various personal and situational contributions are interpreted and weighted" (p. 81). How these young student individuals interpret, weigh, and judge their past experiences is a better predictor of their efficacy beliefs than are objective indicators of their performance, such as standardized test scores or grades (see Lopez et al., 1997, for similar findings with older students).

In addition to mastery experience, social persuasions were predictive of students' mathematics self-efficacy. Younger students are particularly apt to rely on persuasions from others because they are novices, unskilled at making independent judgments of task demands (Bandura, 1997). It also bears noting that French students are socialized from a young age to be keenly aware of others' perceptions of their capabilities, particularly in scientific disciplines, such as mathematics and physics, which are classified as the *filière d'élite* or elite line of academic studies. Adults are quick to attach the *gifted* label to youngsters who excel in mathematics-related disciplines, often leaving those who do not excel feeling less capable. When students become aware of labels in their social environment that convey ability in mathematics as a fixed or inborn quality, they may be particularly susceptible to lowering their own efficacy beliefs when they encounter difficulty (Dweck & Molden, 2005; Usher, 2009). Convincing young students that their abilities can be developed will likely serve to bolster self-efficacy.

Both social persuasions and physiological and emotional states joined mastery experience in predicting French self-efficacy. Researchers who have investigated the sources of students' English self-efficacy also reported that these three sources predicted students' writing self-efficacy, although only mastery experience and physiological arousal predicted writing self-efficacy for elementary-age students in the United States (Pajares et al., 2007). Neither the present study nor Pajares et al. (2007) found that vicarious experience predicted self-efficacy; however, both reported low reliability for vicarious experience items. It is, of course, possible that students rely less on social models as they go about their language learning work than as they engage in other academic tasks, but this conclusion must be verified by further research.

We also examined whether the hypothesized sources of self-efficacy predict self-efficacy for self-regulated learning. In mathematics, all four of the sources influenced variations in self-efficacy for self-regulated learning. In French, three sources (all but vicarious experience) served to explain the variance in self-efficacy for self-regulated learning. These results are consistent with previous research studies in which Bandura's (1997) four hypothesized sources predicted students' beliefs in their capabilities to regulate their academic work in middle school (Usher & Pajares, 2006). That the sources underlying academic self-efficacy also underlie self-efficacy for self-regulation is not surprising given that these two types of efficacy beliefs are close cousins. To be successful in mathematics and French, students need to believe not only in their capability to carry out academic tasks but also in their capability to implement adaptive learning strategies. Our study offers new evidence that this is also the case at the elementary school level and with regard to domain-specific academic subjects.

Limitations

Bandura (1986, 1997) has frequently written about the importance of social models in altering the beliefs and actions of others. In our study, vicarious experience was predictive of students' self-efficacy only for self-regulated learning in mathematics. This finding could suggest that students who are exposed to model individuals whom they perceive as capable at mathematics feel more capable of self-regulating their own work. However, the poor psychometric quality of the vicarious experience subscale used in this study leads us to cautious conclusions about this hypothesized source of self-efficacy. Indeed, many researchers have experienced difficulty in assessing vicarious experiences quantitatively (see Usher & Pajares, 2008b). Nevertheless, researchers remain convinced that social models, particularly those in one's immediate classroom environment, do play an important role in raising or lowering observers' self-beliefs (e.g., Marsh et al., 2008). In the present study, we may have underestimated the influence of classroom vicarious experiences. Researchers should continue their work to design a measure that can accurately assess this source of self-efficacy among elementary students.

The self-report measures used in this study were collected at one point in time. A number of researchers have noted the limitation of cross-sectional, correlational findings that do not take into account developmental changes. We agree that it is important to take into account the evolving nature of students' self-perceptions and the relationship these perceptions have with other variables relevant to children's development. Modeling this evolution over time and with a larger number of classrooms would allow a deeper under-

standing of self-efficacy and its sources as well as the role that they play in students' learning and academic achievement. Investigating the development of self-efficacy early in the schooling process and considering its evolution would permit researchers to maximize their understanding of the factors that account for fluctuations in students' academic self-efficacy throughout their scholastic trajectory.

Finally, we are encouraged by our findings that both personal and classroom-level variables are related to students' academic self-efficacy beliefs, but we also recognize two important limitations. First, a significant proportion of the variation in students' self-efficacy remains unexplained by our models. This could be due to the relatively small number of classrooms in the present study and to the lack of precision in some of the measures used. Second, contextual effects other than those measured could explain covariation in students' self-efficacy and achievement. Researchers interested in fully understanding the sources of self-efficacy in mathematics and French should consider additional variables at the individual, classroom, and school levels that may affect students' judgments of their academic capabilities.

Educational Implications

Our tests of mean differences revealed that the third-grade girls in our study believed themselves to be less capable in mathematics and in French than did boys. In fact, girls appear to underestimate their capabilities in French, where they perform equally to boys despite their lower confidence. Beliefs held become rules for future actions, which may have implications for girls' academic trajectory and, ultimately, the careers they pursue (Zeldin & Pajares, 2000). Helping girls interpret information from the four sources of self-efficacy in adaptive ways, particularly with regard to their own skill mastery, could help them view their capabilities more favorably. Educators and parents should also pay close attention to implicit and explicit messages that convey gendered stereotypes that girls are less capable academically.

In this study, we expanded research on the sources of self-efficacy to a younger age group and a new national context. Our findings mirror theoretical and empirical reports from social cognitive researchers that the four sources of efficacy information are important indicators of students' academic self-efficacy. Therefore, interventions aimed at raising students' self-efficacy should target these very sources. Teachers who provide routine opportunities for success and work to ensure that success is attainable for all have students with higher self-efficacy (Pajares, 2006). Similarly, teachers and parents who anchor verbal feedback in students' actual performances, while helping students to understand how they performed, may boost students' self-efficacy more than would those who dole out general inspirational praise without regard for students' specific efforts. Praise that is sincere, that focuses on effort rather than ability, and that conveys information related to a student's competence is most likely to boost self-efficacy (Henderlong & Lepper, 2002). Educational approaches that reduce negative affect when they approach difficult learning tasks would help redirect youngsters' cognitive resources to skill building rather than self-doubt. Teachers who are able to create a pleasant affective learning environment and who lower students' anxieties might facilitate a healthier climate in which efficacy beliefs can grow. Such an approach may have particular influence in France, where students are under immense pressure to perform well on high-stakes national tests.

In the French educational system, grades remain the gold standard for evaluating students' academic capabilities. Despite this emphasis on grades, our findings confirm Bandura's (1997) claim that students' perceptions and interpretations of their mastery, not their past standardized test scores, contribute to most of the variation in their academic self-efficacy. Consequently, teachers and parents not only must provide students with ample opportunity for success but also must assist students in making adaptive interpretations of their accomplishments in mathematics and French and must help them to frame less-than-optimal performance as an opportunity for growth rather than as an indication that they lack ability (Dweck, 2006). Guiding young students to make healthy evaluations of their efforts will minimize their risk of prematurely foreclosing on their own academic potential. This finding also suggests that researchers interested in investigating the sources of self-efficacy need not include a measure of prior achievement, as assessing students' perceptions of past performance will suffice.

Suggestions for Future Research

Findings from this study point to the need for additional research to be conducted in this area. Investigating the relative contribution of the sources of efficacy information to the prediction of self-efficacy as a function of sex could provide additional information about the differential weight that girls and boys in this context might place on each informational source as they form their beliefs about what they can do. Such information could direct interventions through the most effective channels.

Our findings suggest that a domain-specific measure of self-efficacy for self-regulated learning provides more sensitive information about the differences in students' beliefs. Researchers have typically assessed self-regulatory self-efficacy in a domain-general way, which may mask what is known about its predictive power (Usher & Pajares, 2008a). We recommend that researchers continue to investigate the domain specificity of beliefs related to academic self-regulation. Students may approach different subject areas (e.g., reading and mathematics) with quite different views on how well they can manage their work (Schunk & Usher, in press).

Social cognitive theory accords a primary role to students' learning environment as a determinant of individual self-efficacy (Pajares & Usher, 2008), but Bandura (1997) has argued that the influence of the learning environment on self-efficacy is relative, not absolute. The effect of classroom-level variables on self-efficacy likely varies as a function of complex contextual factors (e.g., age of participants, subject area). In our study, classroom effects were modest and revealed that the mean level of self-efficacy of students in the class is related to individual-level self-efficacy. More information is needed about how such an influence is perceived by individuals. Future efforts should be aimed at examining the mechanisms by which classroom- or school-level factors affect students' efficacy beliefs.

It is also necessary to consider other environmental and contextual variables that researchers feel certain influence the development of students' academic self-efficacy that were not taken into account here. One interesting avenue would be to explore how the beliefs French teachers hold in their efficacy to carry out their professional duties (e.g., instructional self-efficacy) are linked to

the beliefs their students report. For example, researchers in France have proposed a model in which teachers' judgments about what their students can do account for variations in students' self-perceptions (Bressoux & Pansu, 2003). Similarly, evaluating the relationship between teacher self-efficacy and student self-efficacy and achievement, as has been done in U.S. contexts (e.g., Midgley, Feldhaufer, & Eccles, 1989), would offer a clearer picture of the influence of the psychosocial environment on children's self-beliefs and academic functioning.

This study contributes to the literature on the sources of self-efficacy by expanding findings to a new national context, a younger age group, and an additional academic area (e.g., French). In general, our findings are consistent with those reported in U.S. academic contexts and with older students. Results from this study confirm the importance of research and interventions related to Bandura's (1997) hypothesized sources of self-efficacy.

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(*Appendices follow*)

Appendix A

Mathematics Self-Efficacy Items

Original items	Translated items
1. Je suis capable de résoudre des exercices de mathématiques.	1. I am capable of solving math problems.
2. Je peux résoudre des problèmes de géométrie.	2. I can solve geometry problems.
3. Je suis capable d'avoir de bons résultats en mathématiques.	3. I am capable of getting good grades in math.
4. Je peux résoudre des exercices de calcul.	4. I can solve calculation problems.
5. Je suis capable de faire des exercices de mesure.	5. I can do measurement problems.
6. Je peux faire des exercices de numération.	6. I can solve numeration problems.
7. Dans un nombre, je sais dire quelles sont les centaines, les dizaines et les unités. (numération)	7. I can identify a number's place value. (numeration)
8. Je sais écrire en lettres des nombres écrits en chiffres. (numération)	8. I know how to write numbers with digits and in words. (numeration)
9. Je sais calculer l'aire d'un rectangle. (géométrie)	9. I know how to compute the area of a rectangle. (geometry)
10. Je suis capable de mesurer les côtés et les diagonales d'un rectangle. (géométrie)	10. I am capable of measuring the sides and diagonals of a rectangle. (geometry)
11. Je sais additionner des mètres et des centimètres. (mesure)	11. I know how to add meters and centimeters. (measurement)
12. J'arrive à convertir des centimètres en mètres. (mesure)	12. I can convert centimeters into meters. (measurement)
13. Je sais résoudre une multiplication de deux nombres à deux chiffres. (opération)	13. I know how to solve two-digit multiplication problems. (operations)
14. Je suis capable de faire une division. (opération)	14. I am capable of doing division problems. (operations)
15. Je peux résoudre une addition de deux nombres de trois chiffres. (opération)	15. I can add two three-digit numbers. (operations)

Note. Students responded on a scale from 1 (*not at all true*) to 4 (*completely true*).

(*Appendices continue*)

Appendix B

French Self-Efficacy Items

Original items	Translated items
1. Je peux résoudre des exercices de français.	1. I can solve French exercises.
2. Je peux résoudre des exercices de grammaire.	2. I can solve grammar exercises.
3. Je ne suis pas capable d'avoir de bons résultats en français.[a]	3. I am not capable of succeeding in French.[a]
4. Je peux résoudre des exercices de conjugaison.	4. I can solve conjugation exercises.
5. Je suis capable de faire des exercices d'orthographe.	5. I am capable of doing spelling exercises.
6. Je peux faire des dictées sans fautes.	6. I can do dictation without mistakes.
7. Je peux reconnaître dans une phrase le groupe nominal. (grammaire)	7. I can recognize the subject of a sentence. (grammar)
8. Je suis capable de donner le préfixe des mots. (lettre et mots)	8. I am capable of identifying a word's prefix. (letters and words)
9. Je peux écrire une phrase au présent. (conjugaison)	9. I can write a sentence in the present tense. (conjugation)
10. Je suis capable de construire une phrase négative à partir d'une phrase affirmative. (grammaire)	10. I am capable of constructing a negatively worded sentence from a positively worded one. (grammar)
11. Je suis capable d'écrire une phrase au futur. (conjugaison)	11. I am capable of writing a sentence in the future tense. (conjugation)
12. Je peux reconnaître dans une phrase un complément d'objet indirect. (grammaire)	12. I can identify the direct object of a predicate. (grammar)
13. Je suis capable de remplacer des mots par leurs synonymes. (lettre et mots)	13. I am capable of replacing words with their synonyms. (letters and words)
14. J'arrive à écrire une phrase au conditionnel. (conjugaison)	14. I can write a sentence in the conditional tense. (conjugation)
15. Je peux mettre un article masculin ou féminin devant un nom masculin ou féminin. (lettre et mots)	15. I can put a masculine or feminine article before a masculine or feminine noun. (letters and words)

Note. Students responded on a scale from 1 (*not at all true*) to 4 (*completely true*).
[a] Item was reverse coded.

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