



## Empirical study

Social models in the cognitive appraisal of self-efficacy information <sup>☆</sup>Hyun Seon Ahn, Mimi Bong <sup>\*</sup>, Sung-il Kim

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## ABSTRACT

The purpose of this investigation was to test (a) whether students distinguished between self-efficacy sources according to social model and (b) how predictive the self-efficacy information students received from each social model was for their self-efficacy beliefs. For this purpose, new vicarious experience and social persuasion scales were developed that independently assess the respective source of self-efficacy information conveyed by three social models, family members, teachers, and peers. As revealed by exploratory factor analysis, confirmatory factor analysis, and multitrait-multimethod analysis, the Korean high school students in Studies 1 ( $N = 395$ ) and 3 ( $N = 393$ ) and the Korean college students in Study 2 ( $N = 220$ ) clearly distinguished between the self-efficacy sources and the social models who delivered this information (family members, teachers, or peers). Student responses to vicarious experience fluctuated more by social model than did their responses to social persuasion. The correlations further suggest the possibility that the existing scale largely taps vicarious experience from teachers and peers rather than vicarious experience from family members. The predictive utility of vicarious experience and social persuasion for self-efficacy also varied according to the social model involved and by the academic domain. Social persuasion by teachers predicted student self-efficacy in mathematics, while vicarious experience from teachers predicted student self-efficacy in English as a foreign language, in addition to mastery experience and physiological state.

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## 1. Introduction

Self-efficacy is known as the “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p. 3). In this research, we were interested in academic self-efficacy, defined as students’ beliefs in their capabilities to perform given academic tasks at designated levels (Schunk, 1991). Due to its critical role in motivation, affect, self-regulation, and achievement in students across domains and age levels (Multon, Brown, & Lent, 1991; Pajares, 1996; Zimmerman, 2000), academic self-efficacy has been a topic of continued interest, particularly its sources and antecedents. This interest led to a number of assessment scales that measure the four sources of self-efficacy (Bandura, 1997) – mastery experience, vicarious experience, social persuasion, and physiological state.

Whereas these scales function reasonably well in assessing other self-efficacy sources, it remains uncertain whether they represent vicarious experience adequately (Usher, 2009). We suspect this ambiguity might owe to the collapsing of different social role models into a single scale.

The initial goal of this study, therefore, was to test whether students distinguished between sources of self-efficacy information according to social model. The second goal was to examine how predictive the self-efficacy information students received from each social model was for their self-efficacy beliefs. To achieve these goals, we developed separate scales to measure independently the vicarious experience and social persuasion that come from different social models such as a family member, a teacher, or a peer. Predictive utility of these scales as sources of self-efficacy was tested in three different groups of students across two different academic domains.

## 1.1. Assessing sources of self-efficacy information

Among the four primary sources from which individuals collect information to judge their self-efficacy (Bandura, 1997), *mastery experience*, or one’s past successes and failures on the same or similar tasks, is the most potent source of self-efficacy information

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(Britner & Pajares, 2006; Lopez & Lent, 1992; Usher & Pajares, 2008). Students also observe and compare themselves to meaningful figures in their learning environment, such as teachers and classmates, to get a sense of where they stand in the target skill and this *vicarious experience* is the next most powerful source (Bandura, 1977). *Social persuasion* from others influences appraisal of self-efficacy as well. Encouragement and positive feedback from parents, teachers, and trusted peers augment student self-efficacy, while little or negative feedback from them undermines their self-efficacy beliefs (Bandura, 1997; Schunk, 1985; Usher, 2009). *Emotional and physiological state* is the fourth source of self-efficacy information (Bandura, 1977). Anxiety and resulting physical reactions such as increased sweat production before a task signals to the student a lack of competence, which lowers self-efficacy toward that task (Joët, Usher, & Bressoux, 2011; Lopez & Lent, 1992).

A number of researchers have developed scales to measure the four sources of self-efficacy information (e.g., Britner & Pajares, 2006; Hampton, 1998; Lent, Lopez, & Bieschke, 1991; Lopez & Lent, 1992; Matsui, Matsui, & Ohnishi, 1990). The most recent addition is the Sources of Middle School Mathematics Self-Efficacy Scale by Usher and Pajares (2009), which is considered stronger than previous source scales both conceptually and psychometrically (Chen & Usher, 2013).

One possible limitation of the existing scales is the manner in which some of the items were written. We believe that the vicarious experience items such as, “Seeing adults do well in math pushes me to do better,” tap the vicarious experience along with the resultant self-efficacy beliefs. Some of the social persuasion items were written in a way that only students who are already performing well could answer positively (e.g., “My math teachers have told that I am good at learning math”). This is a valid form of social persuasion, as the presumably strong mathematics self-efficacy of these high-performing students would become even stronger as a result of this corroborating information. Nevertheless, these types of item may invite conceptual ambiguity because it is unclear to what extent the responses reflect pure social persuasion that is uncontaminated by past experiences of success or current efficacy expectations.

Another possible limitation of the existing source scales is the questionable predictive utility and marginal reliability associated with the vicarious experience scale. According to Bandura (1997), vicarious experience conveys the second most useful information to observers, followed by their own enactive mastery experience, for estimating their self-efficacy toward the given task. However, many studies on the four sources of self-efficacy information have reported that vicarious experience, while correlating positively with other sources, fails to predict or to account for a significant amount of unique variance in student self-efficacy (Joët et al., 2011; Lent et al., 1991; Lopez & Lent, 1992; Pajares, Johnson, & Usher, 2007; Usher & Pajares, 2006). In contrast to the disappointing performance of vicarious experience, social persuasion often emerges as the second strongest predictor of self-efficacy after mastery experience (Joët et al., 2011; Lopez & Lent, 1992; Pajares et al., 2007; Phan, 2012).

Scales assessing vicarious experience also demonstrate substantially lower internal consistency compared to scales assessing the other sources. For example, the alpha coefficient obtained by Usher and Pajares (2006) for their vicarious experience scale was 0.68, while those for the mastery experience, social persuasion, and physiological state scales were 0.86, 0.82, and 0.84, respectively. Lent et al. (1991) likewise reported an internal consistency estimate of 0.56 for their vicarious experience scale but of 0.86, 0.74, and 0.90 for the other three source scales. The alpha coefficient observed by Lopez and Lent (1992) for the vicarious experience scale was 0.59; those for the remaining source scales were

markedly higher at 0.82, 0.74, and 0.90. The marginal internal consistency coefficients of vicarious experience scales are a strong indication that items on these scales represent qualitatively different phenomena for the responding students.

## 1.2. Varying impact of self-efficacy information by social model

Klassen (2004) made a distinction between what he called “self-oriented” sources and “other-oriented” sources of self-efficacy information. The former includes mastery experience and emotional and physiological state; the latter includes vicarious experience and social persuasion. The other-oriented sources necessarily involve individuals other than oneself as providers of self-efficacy information.

A close inspection of the items assessing the two other-oriented self-efficacy sources reveals that they involve various social figures. Items on the vicarious experience scale of Usher and Pajares (2009), for instance, refer to modeling by adults, a teacher, kids, another student, and the responding students themselves. Items on the social persuasion scale used in the same study also describe situations where teachers, people, adults, other students, or classmates provide the responding students with positive messages regarding the students’ abilities and performances. However, modeling and verbal messages may be evaluated differently by the receiving student when delivered by different social models.

Ahn, Usher, Butz, and Bong (2016) tested this possibility when comparing the relative predictive utility of vicarious experience and social persuasion as sources of mathematics self-efficacy among groups of adolescent students in Korea, the Philippines, and the United States. Particularly pertinent to the present research was their independent assessment of vicarious experience and social persuasion from family, teacher, and peers. A confirmatory factor analysis model with three vicarious experience and three social persuasion factors demonstrated an acceptable fit to the data, justifying separate specification of the same source by social model. Among the three vicarious experience factors, only vicarious experience from teacher was a significant predictor of student self-efficacy in all three samples. Among the three social persuasion factors, social persuasion from family was a significant predictor of student self-efficacy in all three samples, whereas social persuasion from peers was a significant predictor in only the Filipino and U.S. samples. Vicarious experience from family, vicarious experience from peers, and social persuasion from teacher was not a significant source of self-efficacy information for these adolescents. The results further justify the need to examine self-efficacy sources separately by the social model involved.

Consequences of aggregating self-efficacy information from various social models appear to be greater for vicarious experience than for social persuasion. As described earlier, internal consistency estimates of vicarious experience scales were uniformly low when modeling by different social figures was not differentiated. This was not the case for social persuasion. In fact, in the study by Ahn et al. (2016), correlation coefficients between the three vicarious experience factors ranged from 0.18 to 0.51, with vicarious experience from family and that from teacher showing the weakest correlation with each other in all three samples ( $r_s = 0.27$  in Korean, 0.18 in the Filipino, and 0.33 in the U.S. samples). Correlation coefficients between the three social persuasion factors were considerably higher, ranging from 0.57 to 0.78.

One’s past and present performances on the given task supply critical information to the others for social persuasion. Regardless of who does the persuasion, its content will thus be similar to a certain extent. The same performances also serve the foundation of one’s mastery experience as well as one’s emotional and physiological state. Because the three self-efficacy sources—mastery experience, social persuasion, and physiological state—are all

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