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ABSTRACT

The degree of and the cognitive basis for the generalizability of academic self-efficacy were examined among 588 high school students from the greater Los Angeles (California) area. Students' self-efficacy perceptions clearly generalized beyond boundaries of specific tasks and also of specific school subjects, albeit to a lesser degree. There was greater generalizability of academic self-efficacy among math and science subjects than among verbal ones. The degree of academic self-efficacy generalization partly depended upon the degree of perceived similarity among tasks. Students reported more comparable levels of self-efficacy as they perceived greater similarity in the set of problems presented. Subject-specific and more global measures of academic self-efficacy (i.e., verbal and quantitative) preserved the strong predictive utility for students' effort expenditure and academic achievement. (Contains 1 table, 3 figures, and 15 references.) (Author)

Running Head: GENERALIZABILITY OF ACADEMIC SELF-EFFICACY

Perceived Similarity Among Tasks and Generalizability of Academic Self-Efficacy

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Abstract

The degree of and the cognitive basis for the generalizability of academic self-efficacy were examined among 588 high school students from the greater Los Angeles area. Students' self-efficacy perceptions clearly generalized beyond boundaries of specific tasks and also of specific school subjects, albeit to a lesser degree. There was greater generalizability of academic self-efficacy among math and science subjects than among verbal ones. The degree of academic self-efficacy generalization partly depended upon the degree of perceived similarity among tasks. Students reported more comparable levels of self-efficacy as they perceived greater similarity in the set of problems presented. Subject-specific and more global measures of academic self-efficacy (i.e., verbal and quantitative) preserved the strong predictive utility for students' effort expenditure and academic achievement.

Self-efficacy has often been discussed in the literature as a domain-specific construct. However, several researchers suspected some generalizability of efficacy perception beyond a specific domain (Bandura, 1977; Schunk, 1991). The issue of what constitutes the basis for such generalization has not been systematically addressed yet. Considering that efficacy formation is mainly influenced by one's cognitive appraisal of events, it is plausible to expect generalized perceptions of efficacy across tasks or contexts depending on people's subjective beliefs toward them. Specifically, perceived similarities of current tasks or contexts to those previously experienced are presumed to form a cognitive basis for self-efficacy transfer.

Variations in the magnitude of self-efficacy before and after transfer appear to depend on the degree of perceived similarities between tasks. As Gick and Holyoak (1987) pointed out, perceived similarities between an original learning and a transfer task are heavily influenced by people's knowledge of the two tasks. There can be situations where structurally similar tasks are perceived to be different and situations where dissimilar or only superficially analogous tasks are perceived to be alike. In the former instance, self-efficacy toward one task will not be transferred to the other whereas it will be rather inappropriately generalized in the latter. In school, students might consider a set of academic subjects or tasks to be similar or different. If one has already developed strong sense of personal competence toward one task, he or she will face a new, but similar task with a reasonable level of confidence based on his or her prior experiences.

It is important to note that there has not been a single study yet that systematically investigates the generalizability of academic self-efficacy. As a result, the degree of specificity in measuring efficacy perception differs among self-efficacy researchers. Some investigators seem to assume generalized sense of efficacy within a broader domain. Zimmerman and Martinez-Pons (1990), for example, asked students to report their verbal and math academic self-efficacy and found that they were substantially correlated. More often, self-efficacy is measured in terms of a specific task of interest (e.g., subtraction, Bandura & Schunk, 1981). It is not clear, then, whether and how much a successful increase in students' self-efficacy toward one task would help them face similar or otherwise related tasks. Will Schunk's students (Schunk, 1982, 1983) now armed with stronger self-efficacy toward subtraction confront division problems with increased self-assurance? Or, better yet, will they feel more confident in learning mathematics as a whole?

This study is an attempt to provide answers to those questions as well as a theoretical justification for measuring academic self-efficacy at a specified level. For instance, self-concept is usually measured at a subject level (e.g., English) whereas self-efficacy is often estimated at a task level (e.g., reading). Although self-efficacy has been assumed to be more specific than self-concept by many researchers (e.g., Schunk, 1991), the stronger explanatory power for students' academic achievement demonstrated by self-efficacy is sometimes attributed to such differences in measurement practices (see, for example, Marsh et al., 1991). It will be interesting to see, first, if it is justifiable to assess self-efficacy at a more global level (i.e., school subject and beyond) and, second, if self-efficacy so measured preserves its utility in explaining students' achievement and effort expenditure.

Method and Procedures

588 students from 4 high schools in the greater Los Angeles area participated in the study. Six school subjects were selected for measuring their academic self-efficacy: English, Spanish, US history, algebra, geometry, and chemistry. Seven representative problems of various types for each school subject were presented to the students through an overhead projector. A total of 42 problems were randomly interspersed with each other in order to prevent potential "set effect" that might influence students' similarity perception. Students rated their confidence that they would be able to solve each problem correctly on a scale ranging from 0 to 100 in 10-unit intervals. They were then asked to list two school subjects that were believed to be most similar to English and to algebra as a way of looking at the relationship between similarity perception and self-efficacy generalization.

In order to test the hypothesized relationship between similarity perception and self-efficacy generalization more directly, eight additional problems adopted from Bassok and Holyoak's experiment 1 (1989, p. 156) were presented. Four of them were arithmetic-progression problems taught in algebra and the other four were constant-acceleration problems taught in physics. Arithmetic-progression and constant-acceleration were considered isomorphic such that knowledge of one principle should enable one to solve problems involving the other. In the present study, a total of 8 pairs were constructed for comparison. Students were asked to estimate their confidence for solving each of the problems correctly and to rate the perceived similarity of the two problems in a given pair on a Likert type scale ranging from 1 to 7.

Results and Discussion

Reliability of the Measures

All the academic self-efficacy and perceived effort expenditure subscales for six school subjects demonstrated acceptable levels of reliability. The standardized Cronbach's αs ranged from .84 to .97. Median values were .91 and .87 for the academic self-efficacy and perceived effort expenditure subscales, respectively.

Confirmatory Factor Analyses

Tests of first-order factor models with differing degrees of generalizability. To test the differing degrees of generalizability of academic self-efficacy, six first-order confirmatory factor models were first specified. A total of 18 measured variables were created by combining students' self-efficacy scores on two or three problems in each school subject. Table 1 presents the descriptions and goodness-of-fit indexes of the confirmatory factor analysis models. Model 1 specifies three first-order factors: Verbal/English, Verbal/Spanish, and Math/Science Academic Self-Efficacy. It hypothesizes that academic self-efficacy generalizes within a set of school subjects that primarily require either verbal skills in English (i.e., English and US history), verbal skills in Spanish (i.e., Spanish), or math- and science-related skills (i.e., algebra, geometry, and chemistry). Model 1 does not fit the data well, $\chi^2(132, N = 578) = 1626.477$, $p < .001$ (NNFI = .814, CFI = .840).

Models 2 and 3 presume greater specificity of academic self-efficacy compared to Model 1. Model 2 posits four first-order factors (i.e., Verbal/English, Verbal/Spanish, Math, and Chemistry Academic Self-Efficacy) by separating out the academic self-efficacy factors for math and science subjects from Model 1. Model 3 also tests a four-factor structure (i.e., English, Spanish, US History, Math/Science Academic Self-Efficacy) by specifying individual self-efficacy factors for each of the verbal subjects. The goodness-of-fit indexes for both models are better than those for Model 1 but still fail to delineate the empirical data adequately, $\chi^2(129, \underline{N} = 578) = 1062.882$, $\underline{p} < .001$ (NNFI = .881, CFI = .900), for Model 2 and $\chi^2(129, \underline{N} = 578) = 1317.008$, $\underline{p} < .001$ (NNFI = .849, CFI = .873), for Model 3.

Next two models hypothesize five first-order academic self-efficacy factors. Verbal/English, Verbal/Spanish, Algebra, Geometry, and Chemistry Academic Self-Efficacy factors are specified for Model 4. Its presumption is that academic self-efficacy generalizes between English and US history since both subjects demand good verbal skills in English. Model 4 assumes less generalizability of academic self-efficacy in the quantitative area, specifying separate factors for each of the math and science subjects. Model 5, on the contrary, postulates English, Spanish, US History, Math, and Chemistry Academic Self-Efficacy factors under the premise that academic self-efficacy transfers within math subjects--algebra and geometry. Both models fit the data reasonably well with Model 5 demonstrating a better fit, $\chi^2(125, \underline{N} = 578) = 731.905$, $\underline{p} < .001$ (NNFI = .920, CFI = .935) than Model 4, $\chi^2(125, \underline{N} = 578) = 950.699$, $\underline{p} < .001$ (NNFI = .892, CFI = .912). The superior fit of Model 5 is also confirmed by other goodness-of-fit indexes such as the ratio of chi-square to its degrees of freedom (7.606 for Model 4 and 5.855 for Model 5) and the average absolute standardized residuals (.031 for Model 4 and .026 for Model 5).

The last first-order confirmatory factor analysis model (Model 6) posits six separate first-order factors for each school subject (i.e., English, Spanish, US History, Algebra, Geometry, and Chemistry Academic Self-Efficacy). The fit of the model is satisfactory, $\chi^2(120, \underline{N} = 578) = 609.996$, $\underline{p} < .001$, with both its nonnormed and comparative fit indexes well over .90 (NNFI = .933, CFI = .948). These values are noticeably greater than those for all the other first-order factor models. Model 6 displays a significant reduction in chi-square value over Model 5, $\Delta\chi^2(5, \underline{N} = 578) = 121.909$, $\underline{p} < .001$, justifying the specification of six separate factors for each school subject.

Loadings of measured variables on their respective factors were all statistically significant and substantial in magnitude in all first-order confirmatory factor analysis models that displayed an acceptable fit. Such results are not to be expected if students' perception of their scholastic capability is specific enough that it varies considerably across different types and difficulty levels even within a range of tasks that belong to the same school subject. It thus appears that students' perceptions of their capability toward divergent tasks are internally consistent within the boundary of each school subject.

Hierarchical confirmatory factor analyses. Two second-order factor structures based on the six first-order factors were fitted to the empirical data to further test the generalizability of academic self-efficacy beyond boundaries of specific school subjects. Marsh and Hocevar (1985) recommended the use of a target coefficient (TC) together with other goodness-of-fit indexes in evaluating the fit of higher-order factor structures. The target coefficient reflects the proportion of variance in lower-order factors that is explained by higher-order factors, indicating exclusively the fit of hierarchies imposed. Another way to examine the effectiveness of higher-order factors is to compute the percentage of variance explained in each lower-order factor by subtracting its disturbance term from 1 and multiplying the result by 100. Since the confirmatory factor analysis corrects for measurement error, the disturbance terms represent systematic variance unique to a given factor that cannot be accounted for by its higher-order factors.

Model 7 posits a single second-order General Academic Self-Efficacy factor defined by six first-order factors. Model 8 specifies two correlated second-order factors, Verbal and Quantitative Academic Self-Efficacy, each defined by three first-order factors in verbal and math-related areas. From the goodness-of-fit indexes summarized in Table 1, it can be seen that Model 8 fits the data noticeably better, $\chi^2(128, \underline{N} = 578) = 715.651$, $\underline{p} < .001$ (NNFI = .925, CFI = .937), than Model 7, $\chi^2(129, \underline{N} = 578) = 873.223$, $\underline{p} < .001$ (NNFI = .905, CFI = .920). A more definitive result comes from comparison of the target coefficients which shows that Model 8 is capable of accounting for about 93% of the covariances in the six first-order factors (TC = .934), which is almost 10% more than what Model 7 can represent (TC = .836).

Evidence pointing to the relative superiority of Model 8 over Model 7 can also be found in the magnitude of disturbance terms. Figures 1 and 2 depict the factor structures of Models 7 and 8, respectively. As can be seen, Model 8 brings a sizable reduction in the disturbance terms of English and US History Academic Self-Efficacy factors in particular, exhibiting the necessity of a separate Verbal second-order factor apart from the Quantitative Academic Self-Efficacy factor. Still, over 96% of the variance in the first-order Spanish Academic Self-Efficacy remains unexplained. It strongly implies that more than two higher-order factors may be necessary to effectively reproduce the observed data.

An examination of factor correlations in six first-order factor structures discloses higher intercorrelations of self-efficacy perceptions in math and science subjects compared to those in verbal subjects. The average correlation is .77 among Algebra, Geometry, and Chemistry Academic Self-Efficacy in the six first-order factor structure. These values are markedly higher than the average correlation of .33 among English, Spanish, and US History Academic Self-Efficacy. It is speculated that the reason for the greater generalizability witnessed in the area of math and science might be due to the relative unfamiliarity toward those subjects on the part of students.

Recent research with the expert-novice paradigm (e.g., Chi, Feltovich, & Glaser, 1981) shows that as one becomes more knowledgeable and skillful in any given field, his or her categorization schemes in the field also become more elaborate. In a similar vein, high school students, being relative novices in the area of math and science compared to their experience in verbal subjects, might believe that school subjects that deal with numbers share greater similarity to each other because of the mere fact that they require certain arithmetic skills. It is not evident whether such broader categorization will stay constant as students acquire more experience in the respective subjects.

Interestingly, the second-order Verbal and Quantitative Academic Self-Efficacy factors were significantly and positively correlated with each other , $r(578) = .63$, $p < .001$. This finding stands in direct contrast to the reports that verbal and math academic self-concepts are almost always uncorrelated (e.g., Byrne & Shavelson, 1986; Marsh, Byrne, & Shavelson, 1988; Vispoel, 1995). The observed correlation between the Verbal and Quantitative Academic Self-Efficacy factors effectively dismisses the operation of internal comparison processes in self-efficacy formation. Marsh (1990) suggested that students compare their verbal skills to their math skills within the internal frames of reference which results in negatively correlated perceptions of their verbal and math self.

Self-efficacy is one's belief about his or her capability to successfully carry out a course of action to bring about a desired outcome (Bandura, 1977). Judgment of self-efficacy is heavily influenced by what constitutes success in a given task, and thus is presumed to be more or less independent of one's level of performance in other areas. In fact, several researchers reported results consistent with those of the present study when they employed only cognitive dimensions of academic self-concept (Skaalvik & Rankin, 1995) or measures of academic self-efficacy (Marsh et al., 1991; Zimmerman & Martinez-Pons, 1990). The results of the current investigation contribute to the understanding of the different mechanisms involved in the formation of academic self-concept and self-efficacy.

Relationships Between Perceived Similarity and Self-Efficacy Ratings

In light of the above results supporting the generalizability of academic self-efficacy beyond a specific task or school subject, it was of great interest to find out the cognitive basis for such generalizability. When asked to write down two school subjects that they believed were similar to English, 286 students selected Spanish, followed by 226 students choosing US history, $\chi^2(4, N = 542) = 688.203$, $p < .001$, as the most similar subject. As the second most similar subject to English, 245 students listed US history with another 162 naming Spanish, $\chi^2(4, N = 514) = 367.479$, $p < .001$. In sum, 76.1% of the students selected a combination of Spanish and US history as the two most similar school subjects to English. For school subjects similar to algebra, geometry and chemistry were selected as the most and second most similar subject by 406, $\chi^2(4, N = 526) = 1130.635$, $p < .001$, and 402 students, $\chi^2(4, N = 523) = 1108.826$, $p < .001$, respectively. This yields a striking 92.3% of the students reporting a combination of geometry and chemistry as the two most similar school subjects to algebra. These results are consistent with the finding that academic self-efficacy exhibits greater generalizability among algebra, geometry, and chemistry.

More convincing evidence for the proposed relationship between perceived similarity and self-efficacy generalization comes from the algebra-physics problem pairs constructed from those adopted from Bassok and Holyoak (1989). If the generalizability of academic self-efficacy indeed depends on the perceived similarity among tasks, it is expected that students report comparable levels of self-efficacy for the set of problems perceived as similar. Stated differently, students' self-efficacy ratings for Problems A and B in each pair should be more highly correlated with each other as the perceived similarity ratings of the two increases.

A correlational analysis revealed that the relationship was in the hypothesized direction although it failed to reach statistical significance, $\underline{r}(8) = .43$, $\underline{p} > .05$. As the students' similarity ratings for the pairs increased, the correlation between their self-efficacy ratings toward each pair's first and second problem also increased. It is suspected that the exact probability level associated with the reported coefficient might have been penalized by the small sample size ($\underline{N} = 8$; eight problem pairs).

Utilizing a somewhat different dependent measure can overcome this problem. Specifically, the self-efficacy difference scores can be computed by taking the absolute difference between students' self-efficacy ratings for Problems A and B in each pair. A score of zero would indicate that the student reported exactly the same level of self-efficacy for both of the problems in any given pair. A self-efficacy difference score of 100 denotes that the student felt absolutely confident for solving one of the problems in the pair (i.e., self-efficacy rating of 100) while felt completely unconvinced of his or her capability to solve the other (i.e., self-efficacy rating of 0). Therefore, greater degrees of self-efficacy generalization are represented by lower self-efficacy difference scores.

Across the eight problem pairs, the self-efficacy difference scores demonstrated a negative relationship with the perceived similarity ratings, $r(575) = -.17$, $p < .001$. Difference in self-efficacy ratings between problems decreased as the similarity between them increased. The same pattern held when each problem pair was examined separately. With an exception of Pair 4, all the remaining pairs displayed a significant negative relationship between the two.

Additional t tests were carried out in order to examine the relationship between perceived similarity and self-efficacy generalization more closely. Students were divided into two groups according to the average similarity ratings they gave across the eight problem pairs. One group consisted of students with average similarity ratings of 5 or above, whereas the other was composed of those with average similarity ratings of 3 or below. A t-test revealed that there was a significant difference in self-efficacy difference scores between the two groups, $t(75.94) = 3.15$, $p < .01$. Specifically, students with high average perceived similarity ratings reported more comparable levels of self-efficacy for the problems in the pairs which was indicated by significantly lower average self-efficacy difference scores ($M = 4.730$, $SD = 4.236$) compared to their counterparts ($M = 9.482$, $SD = 10.900$). Results from additional t tests run for each of the pairs separately corroborated this general outcome. On the whole, there was considerably greater degrees of self-efficacy generalization for the students who reported perceiving greater similarity between the two problems in each pair than those who did not.

Relationships Among Academic Self-Efficacy, Effort Expenditure, and Academic Achievement

Results from the present study strongly suggest that students' perceptions of self-efficacy indeed generalize over the confines of a particular task or school subject. Whether or not academic self-efficacy measured at a more global level preserves its utility in explaining students' effort expenditure and achievement, then, comes as the next logical question.

Students' perceived self-efficacy was significantly and positively related to their usual effort expenditure in all six school subjects (minimum r = .11, maximum r = .47, median r = .26). Academic self-efficacy also exhibited a significant positive relationship with students' estimated grade in each school subject with an exception of US history (minimum r = .08, maximum r = .60, median r = .43). Perceived effort expenditure and grades were also significantly and positively correlated with each other, again, with US history being the only exception (minimum r = .03, maximum r = .52, median r = .23).

The results thus far indicate that academic self-efficacy remains as a strong predictor of students' scholastic endeavor when assessed at a subject level. Next, a structural model of academic self-efficacy, effort expenditure, and academic achievement was fitted to the data to find out whether or not the even more global measures of academic self-efficacy--Verbal and Quantitative Academic Self-Efficacy--retain their predictive power over effort expenditure and achievement factors in their respective areas.

The initial a priori model specified each of the second-order Verbal and Quantitative Academic Self-Efficacy factors to be defined by three first-order factors as in Model 8. The second-order Verbal and Quantitative Academic Self-Efficacy factors were then postulated to influence Verbal and Quantitative Achievement factors directly as well as indirectly through their direct effects on Verbal and Quantitative Effort factors. The fit of this model was only marginally acceptable, $\chi^2(390, N = 412) = 1412.341$, $p < .001$ (NNFI = .878, CFI = .891). Modification indexes suggested that allowing some of the error variances to covary would significantly improve the model fit. They also proposed a path to be opened between the first-order Chemistry Academic Self-Efficacy and the second-order Verbal Academic Self-Efficacy. The final model includes seven additional parameters compared to the initial model (i.e., six error covariances and a path from Verbal Academic Self-Efficacy to Chemistry Academic Self-Efficacy). This model fits the data quite well, $\chi^2(383, N = 412) = 982.179$, $p < .001$ (NNFI = .927, CFI = .936).

As depicted in Figure 3, Verbal Academic Self-Efficacy significantly influences Verbal Achievement both directly ($\beta = .297$) and indirectly through its direct effect on Verbal Effort ($\beta = .146$). Verbal Effort wields a modest positive impact on Verbal Achievement ($\beta = .216$). The relationships among academic self-efficacy, effort, and achievement tend to be stronger among the quantitative factors. Direct paths from the second-order Quantitative Academic Self-Efficacy to Quantitative Achievement ($\beta = .572$) and Quantitative Effort ($\beta = .471$) are considerably stronger than those found for Verbal Academic Self-Efficacy. Quantitative Effort exercises a small positive impact on Quantitative Achievement ($\beta = .187$). Overall, the results document the ability of the second-order Verbal and Quantitative Academic Self-Efficacy factors to predict the levels of effort expenditure and achievement in the corresponding area.

More rigorous tests of the relationship between self-efficacy and achievement should involve some forms of experimental manipulation, longitudinal designs, or both.

Another obvious limitation of the present study is the lack of students' performance scores on the problems presented for judging their self-efficacy. The overall results, however, unequivocally display that self-efficacy plays an important role in students' academic performance. The degree of generalizability and the predictive utility demonstrated by self-efficacy in the present study provides an empirical justification for using both specific and global indicators of academic self-efficacy. Future research should test the hypothesis that a disagreement in measurement levels results in an attenuation of the observed relationships between the self-constructs and achievement indexes.

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Table 1

Descriptions of Confirmatory Factor Analysis Models Tested and Goodness-of-Fit Indexes

Model	Description	χ^2	df	χ^2/df	NNFI	CFI	Res.	TC
Null	18 uncorrelated first-order factors	9488.065	153	62.014	.000	.000		
1	Three correlated first-order factors: Verbal/English, Verbal/Spanish, and Math/Science Academic Self-Efficacy	1626.477	132	12.322	.814	.840	.050	
2	Four correlated first-order factors: Verbal/English, Verbal/Spanish, Math, and Chemistry Academic Self-Efficacy	1062.882	129	8.239	.881	.900	.033	
3	Four correlated first-order factors: English, Spanish, US History, Math/Science Academic Self-Efficacy	1317.008	129	10.209	.849	.873	.044	

Table 1 (continued)

Model	Description	χ^2	df	χ^2/df	NNFI	CFI	Res.	TC
4	Five correlated first-order factors: Verbal/English, Verbal/Spanish, Algebra, Geometry, Chemistry Academic Self-Efficacy	950.699	125	7.606	.892	.912	.031	
5	Five correlated first-order factors: English, Spanish, US History, Math, and Chemistry Academic Self-Efficacy	731.905	125	5.855	.920	.935	.026	1.000
6	Six correlated first-order factors: English, Spanish, US History, Algebra, Geometry, and Chemistry Academic Self-Efficacy	609.996	120	5.083	.933	.948	.024	1.000
7	One second-order factor defined by six first-order factors (English, Spanish, US History, Algebra, Geometry, and Chemistry Academic Self-Efficacy)	873.223	129	6.769	.905	.920	.054	.836

Table 1 (continued)

Model	Description	χ^2	df	χ^2/df	NNFI	CFI	Res.	TC
8	Two correlated second-order factors: Verbal and Quantitative Academic Self-Efficacy defined by six first-order factors	715.651	128	5.591	.925	.937	.039	.934

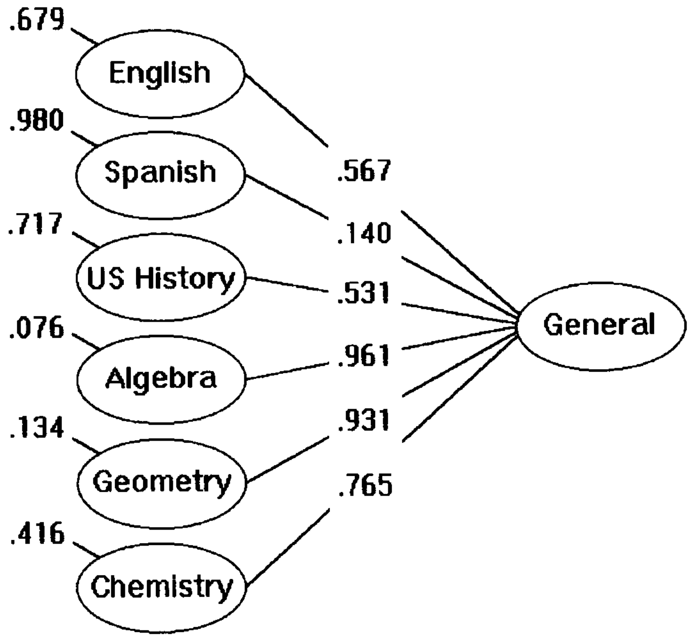
Note. N = 578. NNFI = Bentler-Bonnett nonnormed fit index; CFI = comparative fit index; Res. = average absolute standardized residuals; TC = target coefficient. The first-order Verbal/English Academic Self-Efficacy factor is defined by English and US history academic self-efficacy variables. The first-order Verbal/Spanish Academic Self-Efficacy factor is defined by Spanish academic self-efficacy variables. The first-order Math/Science Academic Self-Efficacy factor is defined by algebra, geometry, and chemistry academic self-efficacy variables. The first-order Math Academic Self-Efficacy factor is defined by algebra and geometry academic self-efficacy variables. The second-order Verbal Academic Self-Efficacy factor is defined by English, Spanish, and US History first-order Academic Self-Efficacy factors. The second-order Quantitative Academic Self-Efficacy factor is defined by Algebra, Geometry, and Chemistry first-order Academic Self-Efficacy factors.

Figure Captions

Figure 1. Model 7 with one second-order academic self-efficacy factor defined by six first-order factors. All paths are significant at $p < .05$.

Figure 2. Model 8 with two second-order academic self-efficacy factors defined by six first-order factors. All paths are significant at $p < .05$. Verbal = Verbal Academic Self-Efficacy; Quant. = Quantitative Academic Self-Efficacy.

Figure 3. A final second-order model of academic self-efficacy, effort expenditure, and achievement. Variances and covariances of disturbance terms are deleted from presentation for clarity. All paths are significant at $p < .05$. V/SE = Verbal Academic Self-Efficacy; Q/SE = Quantitative Academic Self-Efficacy; V/Effort = Verbal Effort; Q/Effort = Quantitative Effort; V/Ach = Verbal Achievement; Q/Ach = Quantitative Achievement.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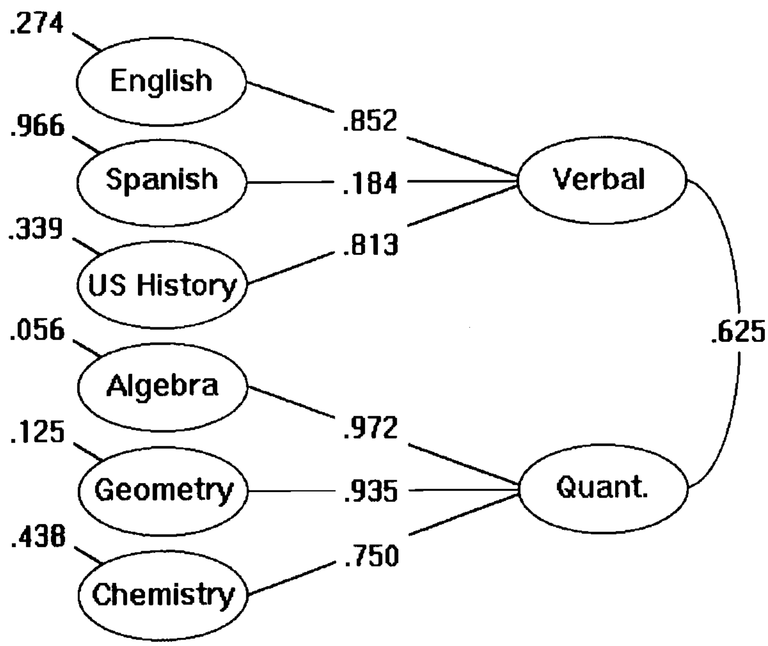
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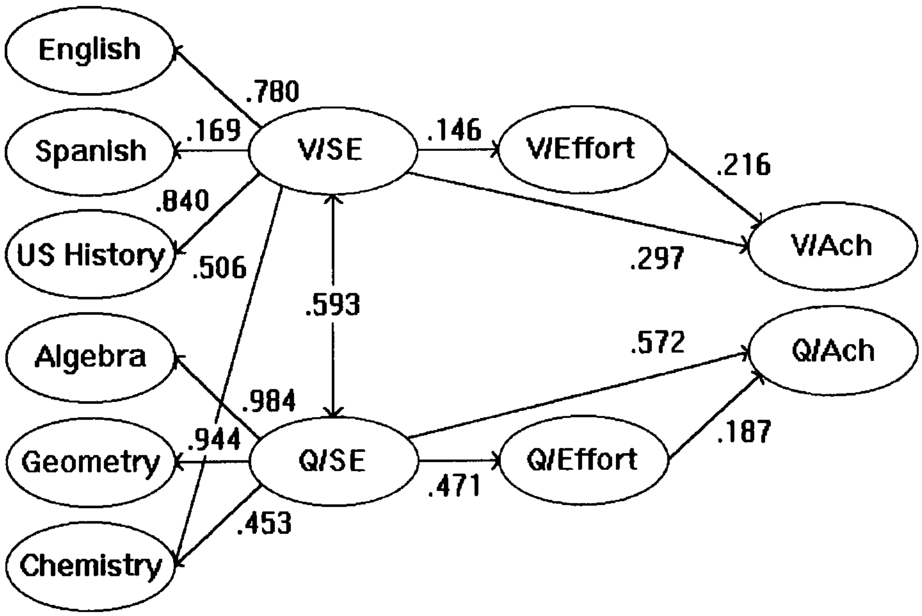
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