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Content Specificity of Relations Between Academic Achievement and Academic Self-Concept

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In extension of research on the Marsh/Shavelson model of self-concept, a set of 14 academic self-concept scales was related to school performances in 8 school subjects for a sample of 507 high school boys. Correlations between matching areas of self-concept and achievement (.45 to .70; mean $r = .57$) were much larger than those typically found in previous research. Path models and multitrait-multimethod analyses demonstrated that self-concept/academic achievement relations were very specific to particular school subjects. The findings indicate that components of academic self-concepts are more differentiated—less correlated—than are achievement scores and that relations between academic self-concepts and academic achievements are more content specific than has been previously assumed.

The purpose of the present investigation is to extend theoretical and empirical research on the Marsh/Shavelson model of academic self-concept (Marsh, 1990d; Marsh, Byrne, & Shavelson, 1988; Marsh & Shavelson, 1985). Byrne's (1984) classic review of academic self-concept research distinguished within-network and between-network studies. Within-network studies evaluated the internal structure of self-concept, demonstrating that academic self-concept is distinct from nonacademic and general components of self-concept. Between-network studies related academic self-concept to other constructs, demonstrating that academic achievement is more strongly related to academic self-concept than to nonacademic and general components of self-concept. The present study builds on my earlier factor analyses (Marsh, 1990d), which identified 14 components of academic self-concept corresponding to core school subjects (e.g., English, mathematics, science) and noncore school subjects (e.g., art, music, physical education) (a within-network study) by examining relations between the 14 components of self-concept and academic achievement in specific school subjects (a between-network study).

The Marsh/Shavelson Model of Academic Self-Concept

Prior to the 1980s, reviews of self-concept research (e.g., Burns, 1979; Shavelson, Hubner, & Stanton, 1976; Wells & Marwell, 1976; Wylie, 1974, 1979) emphasized a lack of theoretical models and the poor quality of measurement instruments. Addressing these problems, Shavelson et al. reviewed existing research and developed a multifaceted, hierarchical model of self-concept. In their model a general facet at the apex of the self-concept hierarchy was divided into academic and nonacademic components of self-concept. Academic self-concept was then divided into self-concepts in particular subject areas (e.g., mathematics, English, etc.), and nonacademic self-concept was divided into social, emotional, and physical self-concepts. Of particular relevance was the assumption that subject-specific components of academic self-concept could be explained by a single, second-order factor of academic self-concept. Subsequent research, particularly that based on the set of Self Description Questionnaires (Marsh, 1990a), has supported the multidimensionality of self-concept and many aspects of the Shavelson et al. model (e.g., Boersma & Chapman, 1979; Byrne, 1984; Dusek & Flaherty, 1981; Fleming & Courtney, 1984; Harter, 1982; Marsh, 1988b, 1990a; Marsh, Byrne, & Shavelson, 1988; Soares & Soares, 1982).

Hierarchical factor analyses of responses by students of different ages (Marsh, 1987; Marsh & Hocevar, 1985; Marsh & Shavelson, 1985) were consistent with Shavelson et al.'s (1976) assumption that self-concept is hierarchically ordered, but the particular form of this higher order structure was more complicated and weaker than was previously proposed. This research consistently demonstrated the need for two second-order academic factors—mathematics/academic and verbal/academic—instead of the single higher order academic self-concept in the original Shavelson et al. model and led to the Marsh/Shavelson revision (Marsh, Byrne, & Shavelson, 1988; Marsh & Shavelson, 1985). Marsh, Byrne, and Shavelson (1988) tested the Marsh/Shavelson model with the verbal, mathematics, and general school scales from three different self-concept instruments. A first-order factor model provided good support for the nine a priori factors—mathematics, verbal, and general school factors from each of the three self-concept instruments. In the critical test, correlations among these nine first-order factors could not be adequately explained by a single higher order factor, as posited in the original Shavelson et al. model, but could be explained by two higher order factors, as posited in the Marsh/Shavelson

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revision. In the hierarchical model, the verbal/academic and mathematics/academic higher order factors were not significantly correlated.

On the basis of the Marsh/Shavelson model, Marsh, Byrne, and Shavelson (1988) hypothesized that first-order components of academic self-concept corresponding to each of the core academic subjects in a typical academic curriculum could be explained by second-order mathematics/academic and verbal/academic components. To test this proposal, Marsh (1990d) constructed the Academic Self Description Questionnaire (ASDQ) II. In consultation with school administrators at the school where the research was conducted, a set of 14 school subjects taken by all students was determined, and corresponding self-concept scales were constructed. Factor analyses identified the scales that the ASDQ II was designed to measure, demonstrating that academic self-concept is remarkably content specific. As posited, two higher order factors explained relations among core academic subjects. Additional higher order factors were needed, however, to explain self-concepts in other, noncore subjects (e.g., physical education, art and music). Even for the core academic components, however, the hierarchy was weak and much of the variance in specific subject self-concepts was unexplained by the higher order factors. Thus, support for the theoretical model was not interpreted to mean that academic self-concepts in subjects such as computer studies, geography, history, foreign languages, and commerce can be well represented by the two higher order components of academic self-concept. Perhaps the most remarkable finding was that factor analyses so clearly identified so many different components of academic self-concept. The logical extension of this research, which is the focus of the present investigation, is to evaluate whether the usefulness of so many content specific components of academic self-concept is supported by between-network studies that consider, for example, relations between academic self-concept and academic achievement.

Relations Between Academic Achievement and Academic Self-Concept

Wylie noted that "many persons, especially educators, have assumed unhesitatingly that achievement and/or ability measures will be related strongly to self-conceptions of achievement and ability and to overall self-regard as well" (1979, p. 355). This research, however, typically has not found substantial self-concept/achievement relations. In a meta-analysis, Hansford and Hattie (1982) reported a mean correlation of only .21 between self-concept and achievement measures. Of the 1,136 correlations in their meta-analysis, 1% were greater than .7, 2% were greater than .6, 5% were greater than .5, and 90% were less than .4. Hansford and Hattie noted, however, that academic achievement was more highly correlated with measures of academic self-concept than with generalized measures of self-concept (also see Byrne, 1984).

The separation of mathematics and verbal self-concepts has been a particular focus in evaluating the Marsh/Shavelson model. In support of this distinction, research with students of different ages has found that verbal achievement is most highly correlated with verbal self-concept and that mathematics achievement is most highly correlated with mathematics self-concept (see Marsh, 1990a). What has been surprising is that components of academic self-concept are consistently much more distinct than are the corresponding components of academic achievement. For example, verbal and mathematics achievements typically are correlated .5 to .8, whereas verbal and mathematics self-concepts are typically nearly uncorrelated. The surprising lack of correlation between mathematics and verbal self-concepts led to the Marsh/Shavelson revision of the original Shavelson et al. model described earlier and also prompted the development of the internal/external frame of reference (I/E) model (e.g., Marsh, 1986, 1990a). According to the I/E model, students form their academic self-concept in any one subject area using both an external, normative basis of comparison ("How do my skills in this subject compare with those of other students?") and an internal, ipsative basis of comparison ("How do my skills in this subject compare with my skills in other subjects?"). Because of the internal, ipsative component of this model, academic self-concepts in different subjects are predicted to be substantially less correlated than the corresponding skill areas, and particularly high skill levels in any one subject result in lower self-concepts in other subject areas. Consistent with the I/E model, a large number of studies have shown that better mathematics skills are associated with better mathematics self-concepts but slightly lower verbal self-concepts, whereas better verbal skills are associated with better verbal self-concepts but slightly lower mathematics self-concepts. (e.g., Marsh, 1988b; Marsh, 1990a, 1990c; Marsh, Byrne, & Shavelson, 1988).

Relation to Research in Other Areas

My emphasis on more specific components is not, of course, unique to the study of academic self-concept. The appropriate level of construct specificity has been a central issue in the longstanding person–situation debate in personality research (e.g., Mischel, 1968; Mischel & Peake, 1982). Mershon and Gorsuch (1988), for example, reported that the use of a larger number of more specific personality factors consistently resulted in better predictions of real-life data than did the use of fewer, more global personality factors. This finding controverted the current trend in personality research of focusing on a relatively small number of global personality traits (e.g., the "big five"; see McCrae & Costa, 1988) and Goldberg's (1972) earlier finding that 5 or 6 factors were as predictive as 11 factors. Across a broad range of academic and nonacademic components of self-concept, agreement between self-ratings and ratings by significant others have been consistently higher for content-specific dimensions of self-concept than for general self-concept (see Marsh, 1990a). Similar trends have been observed in self–other agreement on personality traits (see McCrae & Costa, 1988). Historically, a major distinction between self-concept research and self-efficacy research has been their respective emphases on global measures and specific measures. Bandura (1986) has been particularly critical of an overemphasis of global measures in self-concept

research, arguing that this impairs the ability to understand and predict behavior in particular situations and does not take into account the complexity and variation of self-perceptions. In their review of perceived control and academic achievement based on social learning theory, attribution theory, and instrinsic motivation theory, Stipek and Weisz (1981) hypothesized that academic specific measures should correlate more strongly with academic achievement than should generalized measures of perceived control. Perhaps reflecting the quality of existing instruments, however, Stipek and Weisz found little or no support for this hypothesis. In summary, whereas support for the use of more content-specific constructs rather than general constructs has not always been found, the issue has been the focus of considerable effort in educational and psychological research.

The Present Investigation

The purpose of the present investigation is to relate ASDQ II scales to school performances in eight different school subjects. I hypothesize that academic achievement in each school subject will correlate more highly with the corresponding academic self-concept scale than with any other self-concept scale. Adopting the terminology of multitrait–multimethod (MTMM) analysis (Campbell & Fiske, 1959), I predict that relations between academic self-concepts and academic achievements will exhibit both convergent and discriminant validity. Thus, for example, grades in English classes should correlate highly with English self-concept (convergent validity) and more highly with English self-concept than with any other ASDQ II scale (divergent validity). I also hypothesize that, consistent with the I/E model and earlier research, academic self-concept scales will be more differentiated—less correlated—than the corresponding academic achievement scores.

Method

Sample and Procedure

Students were 507 boys in Grades 7–10, who attended the same Catholic boys school in metropolitan Sydney, New South Wales, Australia. Factor analyses of the ASDQ II responses were reported by Marsh (1990d), but the relation of these responses to school achievement has not been considered previously. Project staff met with the classroom teachers prior to collection of the data to describe how to administer the instruments, and the ASDQ II was administered by classroom teachers to all students in attendance on that day. Students were assured of the anonymity of their responses, were read a standardized set of instructions, and then were asked to complete sample items (see Marsh, 1990d, for more detail).

Self-Concept Scales

The scales on the ASDQ II corresponded to subjects actually taken by these students: English language, English literature, foreign languages, history, geography, commerce, computer studies, science, mathematics, physical education, health, music, art, industrial arts, and religion. For present purposes the first 9 subjects listed were designated as the core academic subjects. A separate, 6-item self-concept scale was constructed for each school subject. For all the scales, the wording of the 6 items was strictly parallel except for the particular subject area. The 6 items were the following: "Compared to others my age I am good at . . ."; "I get good marks in . . . classes"; "Work in . . . classes is easy for me"; "I'm hopeless when it comes to . . ." (reverse scored); "I learn things quickly in . . ."; "I have always done well in . . ." In responding to each item, students selected one of six response categories: *false, mostly false, more false than true, more true than false, mostly true,* or *true.*

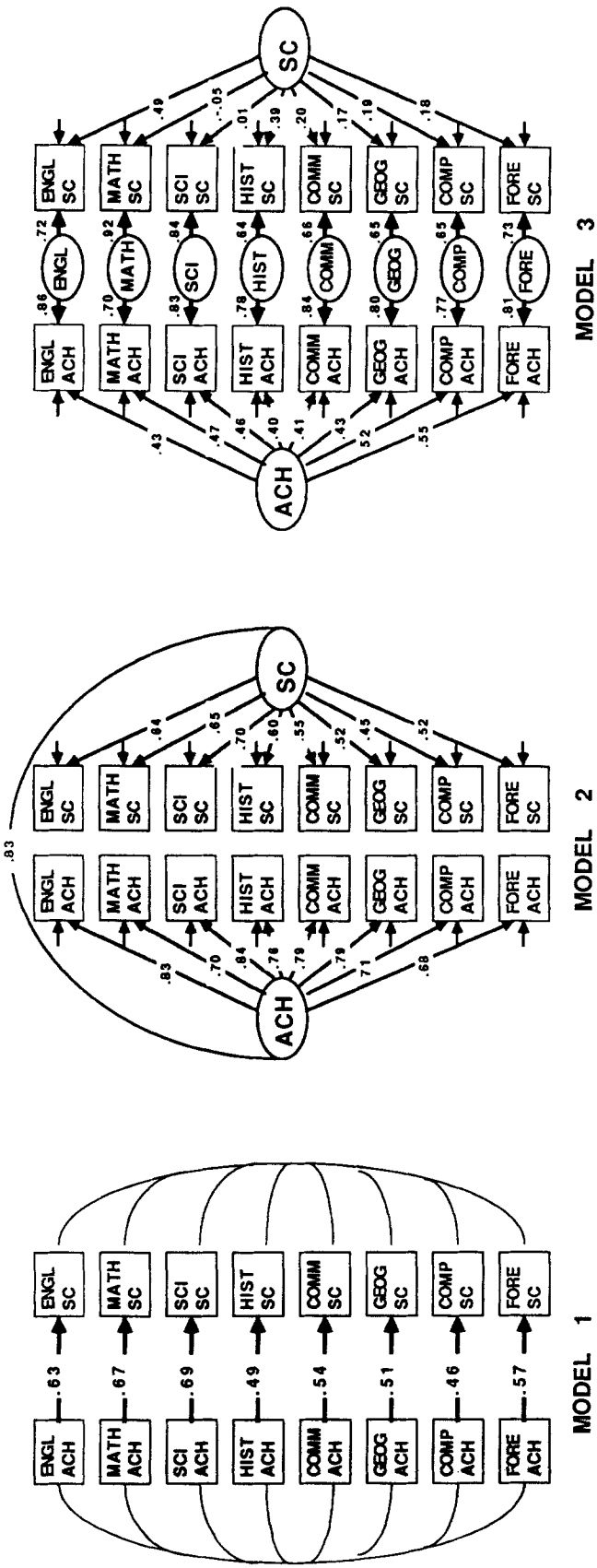
Coefficient alpha estimates of reliability for the 15 ASDQ II scales varied from .885 to .949 (*Mdn* = .921). Exploratory factor analyses and confirmatory factor analyses (CFA; Marsh, 1990d) provided a well-defined solution with factors corresponding to 14 of the 15 specific subjects; the English language and English literature scales formed a single English factor, whereas items representing each of the remaining scales formed separate factors. Thus, for present purposes 14 areas of academic self-concept are considered and English self-concept is defined as the mean of responses to the English language and English literature scales.

School Grades

School grades were available from the official school records for the first and second semesters of the year in which the ASDQ II was administered. (The ASDQ II instrument was administered in the middle of the second semester). In each subject students in the same year in school were examined with the same final examination at the end of each semester, and this examination was used by the school to standardize school grades ($M = 60$, $SD = 12$). However, classes were graded according to the ability of students in mathematics in Grades 9 and 10 and in Science in Grade 10. For these classes only, the score on the official school records referred to achievement in relation to other students within the same ability-level class. When the same student was enrolled in the same subject for both semesters, the correlations between grades received in each semester ranged from .60 to .93 (mean $r = .76$) across the 8 subjects. English, mathematics, science, and history were compulsory for all students in Grades 7–10; thus, grades in these subjects were available for almost all students. Separate grades for both semesters were available for nearly all students in English, mathematics and science, whereas about half of the students had grades for only one semester of history. The remaining subjects were not required of all students in all years, and the percentage of students having a grade for at least one semester varied: Commerce (85%), Geography (73%), Computer Studies (51%), and Foreign Languages (53%). According to school policy, performances in other school subjects (art, physical education, health, religion, music, and industrial arts) are not recorded for purposes of the school records in Grades 7 and 8, when these subjects are compulsory. Because school grades were available for fewer than 10% of the students in each of these subjects, school grades in these subjects are not considered in this article.

Statistical Analysis

In the present investigation, a number of CFA models (see Figure 1), designed to test various aspects of the relations between achievement scores and self-concept scales, were evaluated with LISREL VII (Jöreskog & Sörbom, 1988). An important issue is how to determine whether the fit of a particular model is sufficient to support the a priori model. The general approach is to evaluate the parameter estimates to determine whether they are consistent with predictions, to evaluate goodness of fit, and to compare the fit and parsimony of



alternative models. Researchers have developed a variety of goodness-of-fit indicators to aid in this process, and those that appear to be among the most useful are the following: (a) the chi-square goodness-of-fit statistic, (b) the Tucker–Lewis index (TLI), and (c) the relative noncentrality index (RNI; see Marsh, Balla, & McDonald, 1988; McDonald & Marsh, 1990). The chi-square goodness-of-fit statistic is used for formal tests of statistical significance, and the other two indices estimate the covariance explained by a model. The TLI and the RNI differ primarily in that the TLI imposes a penalty based on the number of estimated parameters, whereas the RNI does not. In this respect, the TLI reflects both goodness of fit and model parsimony, whereas the RNI reflects only goodness of fit. Although there are no clearly established rules as to what constitutes a "good" fit, a widely applied guideline for relative indices such as the RNI and the TLI is .90. An index of .90 can be roughly interpreted as being able to explain 90% of the covariation among the measured variables.

Preliminary Analyses

In preliminary analyses, I examined the relations between school grades and all ASDQ II scales separately for each semester. For all 8 achievement scores in both semesters, each achievement score was more highly correlated with the matching academic self-concept scale than with any other academic self-concept scale. Across all 8 achievement scores, correlations with the matching area of self-concept are similar for the first semester (mean r = .55), for the second semester (mean r = .56), and for the average grade across the two semesters (mean r = .57). The means of correlations between matching areas of achievement were also similar for each year group considered separately (mean rs of .59, .61, .59 and .60 for Grades 7–10, respectively). In contrast to the substantial correlations between achievements and the core areas of academic self-concept, correlations between achievements and the remaining noncore areas of academic self-concept are substantially smaller (rs of .29 to −.17; see Table 1). Although not a focus of subsequent analyses, these results indicate that self-concepts in noncore areas are relatively independent of achievements in core school subjects (also see Marsh, 1990d). On the basis of these preliminary analyses, I conducted subsequent analyses on the set of correlations between the 8 achievement scores, averaged across the two semesters, and the corresponding 8 areas of academic self-concept scales. I used two major analytic approaches to examine relations between achievement scores and self-concept scales: path models based on the I/E model and MTMM models, the latter of which were used to test the convergent and discriminant validity of the relations.

Figure 1 (opposite). Three confirmatory factor analysis models relating eight achievement scores to eight academic self-concept scales. (ENGL = English; MATH = Mathematics; SCI = Science; HIST = History; COMM = Commerce; GEOG = Geography; COMP = Computer Studies; FORE = Foreign Languages; ACH = Achievement; SC = Self-Concept; TLI = Tucker–Lewis index; RNI = relative noncentrality index. In Model 3, the eight content-trait factors are correlated, but these are not presented in order to avoid clutter. For Model 1, $\chi^2(56, N = 507) = 145$, TLI = .96, RNI = .98; for Model 2, $\chi^2(103, N = 507) = 1{,}220$, TLI = .72, RNI = .76; and for Model 3, $\chi^2(60, N = 507) = 139$, TLI = .97, RNI = .98.)

Table 1
Relations Between School Achievements and Academic Self-Concept in Eight Core Subjects and Six Noncore Subjects

Measure/ subject	School achievement								Core self-concept								Noncore self-concept					
	EN	MA	SC	HI	CO	GE	CS	FL	EN	MA	SC	HI	CO	GE	CS	FL	MU	AR	IN	RE	HE	PE
School achievement																						
EN	—																					
MA	545	—																				
SC	664	625	—																			
HI	680	506	609	—																		
CO	724	493	649	636	—																	
GE	641	613	643	633	646	—																
CS	542	548	621	514	485	595	—															
FL	555	497	614	417	506	502	563	—														
Core self-concept																						
EN	**642**	257	428	432	459	363	317	370	—													
MA	436	**662**	542	410	440	482	427	410	302	—												
SC	453	412	**702**	434	428	409	422	434	368	516	—											
HI	396	218	382	**495**	373	318	254	321	530	306	407	—										
CO	402	229	340	376	**541**	352	242	158	442	329	356	352	—									
GE	313	236	292	370	332	**501**	239	223	318	323	340	392	317	—								
CS	170	257	278	151	159	189	**454**	292	273	359	379	256	209	248	—							
FL	313	206	322	248	312	227	333	**575**	392	324	363	313	247	296	352	—						
Noncore self-concept																						
MU	233	210	206	199	212	187	263	274	273	226	258	267	173	277	337	414	—					
AR	031	−014	049	069	000	094	079	116	174	114	192	232	061	199	318	268	317	—				
IN	−013	002	022	077	000	077	116	063	116	182	191	161	074	206	321	229	239	702	—			
RE	253	096	191	219	216	159	281	265	436	183	274	416	319	297	335	353	284	301	234	—		
HE	160	059	142	183	106	058	223	102	369	221	303	392	267	273	296	199	179	266	321	419	—	
PE	−082	−163	−093	003	−063	−082	−112	−170	071	042	105	117	127	125	070	−003	−033	156	262	138	497	—

Note. EN = English; MA = Mathematics; SC = Science; HI = History; CO = Commerce; GE = Geography; CS = Computer Studies; FL = Foreign Languages; MU = Music; AR = Art; IN = Industrial arts; RE = Religion; HE = Health; PE = Physical education. All correlations are presented without decimals. The values in boldface are correlations between matching areas of self-concept and achievement and are the "convergent validities" in the multitrait–multimethod analyses. Correlations based on noncore areas of self-concept were excluded for the purpose of fitting Models 1–3 (see Figure 1).

Results and Discussion

Path Models Relating Achievement to Self-Concept

In Model 1 (Figure 1), the eight achievement scores are related to the eight corresponding core areas of self-concept (see Table 1). In this model, each achievement is posited to be related to only the matching self-concept score. For example, the path coefficient relating English achievement to English self-concept is freely estimated, whereas the path coefficients relating English achievement to the remaining 7 self-concept scores are fixed at zero. In the entire model, 8 of 64 possible path coefficients are freely estimated, whereas the remaining 56 are fixed at zero. In Model 1 the path coefficients leading from each achievement score to the matching self-concept scale are all substantial (.454 to .702; mean r = .572). With the conventional guidelines of acceptable fit (e.g., TLI > .9), Model 1 provides a very good fit to the data (TLI = .959). Hence, a model positing each academic self-concept rating as a function of only the matching area of academic achievement fits the data very well.[1]

Multitrait–Multimethod Analysis of Relations Between Achievement and Academic Self-Concept

The correlations between the 8 achievement scores and the matching academic self-concept scores are presented in the form of an MTMM matrix (Table 1). In the MTMM analogy, the multiple traits are the 8 different content areas, whereas the multiple methods refer to the two different constructs (academic achievement and self-concept). Whereas there are useful analogies between this correlation matrix and a traditional MTMM matrix, there are also important distinctions. In both MTMM analyses and the present analyses, the major emphasis is on convergent and discriminant validity. Convergent validity is inferred from high correlations among matching areas of achievement and academic self-concept. Divergent validity is inferred when correlations between matching areas of achievement and academic self-concept (i.e., the convergent validities) are larger than correlations between nonmatching areas. In MTMM analysis, however, there is also an important emphasis on method effects. Thus, for example, if the correlations among traits are substantially larger when assessed by one method, the larger correlations are interpreted to be an undesirable method effect or bias. In the present application, however, each "method" refers to a different construct (academic achievement and self-concept), each of which is posited to be distinct. Thus, there should be substantial covariance that is specific to each construct, and such a "construct effect" should not be considered a bias. In fact, an important prediction of this study is that correlations among achievement scores should be substantially higher than correlations among academic self-concept scales. In a preliminary inspection of the MTMM matrix (Table 1), using traditional MTMM guidelines (Campbell & Fiske, 1959; Marsh, 1988a), I observe the following:

1. Convergent validities (correlations between matching areas of achievement and self-concept) are large and statistically significant for all 8 content areas (rs vary from .454 to .702; mean r = .572). This supports the convergent validity of the academic self-concept ratings and matching achievement scores.

2. Convergent validities (mean r = .572) are larger than other correlations in the same row or column of the 8 × 8 square submatrix of self-concept/achievement correlations (.170 to .542; mean r = .332) for all 112 comparisons. This supports the divergent validity of the academic self-concept ratings and the content specificity of relations between academic self-concept and achievement.

Correlations among the 8 achievement scores (.417 to .724; mean r = .581) are substantially larger than correlations among the 8 academic self-concept scales (.209 to .530; mean r = .343). This supports the hypothesis that different areas of self-concept are more distinct than are the corresponding areas of achievement.

Confirmatory Factor Analysis Multitrait–Multimethod Models

The usefulness of inspecting MTMM matrices to infer construct validity is widely accepted, but more recently researchers have emphasized the important advantages of applying CFA models of MTMM data (e.g., Marsh, 1988a, 1989a; Widaman, 1985). For present purposes, two such models are considered.

Model 2 (Figure 1) posits only two factors: one latent achievement factor and one latent self-concept factor. According to this model, the relations between the achievement scores and the self-concept responses can be explained in terms of the one correlation between these two latent constructs. Whereas the size of this correlation is substantial (r = .83), the goodness of fit of this model is poor (TLI = .719).

In Model 3 relations among the 16 measured variables (the 8 achievement scores and the 8 self-concept scales) are explained in terms of 1 of 8 (content-specific) trait factors, a general achievement factor, and a general self-concept factor (Figure 1). For both achievement scores and self-concept scales, trait factor loadings (means of .799 and .731, respectively) are consistently large for all 8 school subjects. Hence, both achievement scores and self-concept ratings are largely determined by the particular content area. What is interesting to note is that the general construct factor loadings are consistently larger for achievement scores than for self-concept scores (means of .460 vs. .198), whereas the residual variance terms are consistently larger for self-concept scores than for

[1] In a subsequent, unreported analysis, I used LISREL's automatic modification index (Jöreskog & Sörbom, 1988) to select the path coefficients that contributed most to the overall goodness of fit at each step of the analysis until no additional parameters contributed significantly. The first 8 of the 16 parameters selected by this stepwise procedure were the original 8 parameters posited a priori in Model 1. The sizes of the additional 8 path coefficients were all small (−.191 to .182), their inclusion had little effect on the parameter estimates originally posited in Model 1, and the improvement in fit due to the these additional parameters was only modest (TLIs of .98 vs. .96). Hence, this a posteriori model was not considered further.

achievement scores (means of .631 vs. .385). These results suggest that much of the residual variance in the achievement scores (i.e., variance that is independent of self-concept ratings) can be explained in terms of a general achievement factor, whereas residual variance in the self-concept ratings cannot be explained by a general self-concept factor.[2] Because the self-concept ratings are very reliable, this means that there is considerable variance in each self-concept scale that is independent of the achievement scores and the other self-concept scales. This finding is also consistent with the prediction that the self-concept scales are more distinct—less correlated—than are the achievement scores. Consistent with the path model (Model 1 in Figure 1), the MTMM analyses demonstrate that relations between academic achievement and academic self-concept are remarkably content specific.

Summary and Implications

The present investigation reflects a natural extension of empirical and theoretical trends toward considering more specific components of academic self-concept, as illustrated in the original Shavelson et al. (1976) model, Byrne's (1984) review, and the Marsh/Shavelson model (Marsh, Byrne, & Shavelson, 1988; Marsh & Shavelson, 1985). Marsh (1990d) continued this trend in a (within-network) factor analysis study showing that students have distinct self-concepts in a wide variety of specific school subjects. The present study demonstrates that these specific components of academic self-concept are reflected in relations with external criteria, which is a between-network issue. The present investigation is apparently unique in considering relations between academic self-concept and achievement in such a wide variety of content areas. Hence, whereas the content specificity of relations between academic achievement and self-concept found in this study is consistent with previous research, the findings reflect an apparently important extension of previous research.

The focus of this study has been the content specificity of self-concept/achievement correlations, but it is important to note that the sizes of these correlations (.45 to .70) are substantially larger than those that have been typically reported (e.g., Byrne, 1984; Hansford & Hattie, 1982; Marsh, 1990a). Previous research has found that self-concept/achievement relations are larger if the self-concept measures reflect academic rather than nonacademic or general components of self-concept. Logically, it follows that even higher self-concept/achievement correlations should be found in instances in which self-concepts and achievements are measured in even more specific contents areas. The results support this prediction, providing further evidence for the construct validity of self-concept responses and for the Marsh/Shavelson model. The demonstration is also important because some reviews in related areas (e.g., Stipek and Weisz's, 1981, review of locus of control research) have reported that academic specific measures perform no better than more general measures, even when it seems logical that they should.

The results of the present investigation should not be interpreted to mean that academic self-concept responses "merely" represent objective achievement indicators. The Shavelson et al. and Marsh/Shavelson models propose that self-concept and achievement are distinct constructs, and this hypothesis is supported by the MTMM results and the finding that the academic self-concept scales are substantially less correlated—more differentiated—than the corresponding achievement scores. These findings indicate that academic self-concepts are affected by different processes than are the achievement scores, and the findings are consistent with predictions from the I/E model. Other research shows that academic self-concept contributes, beyond what can be explained by prior achievement, to the prediction of subsequent achievement (Marsh, 1990b), subsequent coursework selection (Marsh, 1989b), subsequent educational aspirations (Marsh, 1991), and eventually, university attendance (Marsh, 1991). Future research is needed to establish whether more content-specific measures of academic self-concept, such as those considered in this study, have even stronger influences on subsequent achievement, coursework selection, and university attendance.

The results of the present investigation provide strong support for the content specificity of academic self-concepts and their relation to academic achievement. However, there are limitations in the study that warrant consideration. Because this is the first application of the ASDQ II measure and because the study is based on responses by students in a single Catholic boys high school, it is important to establish the extent to which the results generalize to other populations. Also, whereas the academic self-concepts for core subjects that were the focus of this study are likely to have broad generality, some of the noncore subjects (e.g., religion) may not. Despite these potential limitations, the results of this study have clear implications for researchers who want to use academic self-concept measures. Particularly when the focus of the research is a specific academic content area, researchers should avoid relying on a general measure of academic self-concept. It is important to collect content-specific measures of academic self-concept that are most directly relevant to the particular aims of the study. Whereas it may be reasonable to also consider general academic and nonacademic measures of self-concept, intervention effects and other relations are likely to be larger for appropriately selected content-specific measures of academic self-concept.

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[2] An additional model was tested in which the General Self-Concept and General Achievement factors were correlated. This additional model did not differ significantly from Model 3 (see Figure 1) in its ability to fit the data, and the correlation between the General Achievement and General Self-Concept factors was not statistically significant. Because both models fit the data equally well and lead to the same substantive conclusions, the more parsimonious Model 3 is preferable, and this additional model is not considered further.

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