Construct Validation of a Strategy Model of Student Self-Regulated Learning

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Using student interviews, teacher ratings, and achievement test outcomes, we validated a strategy model of student self-regulated learning as a theoretical construct. Forty-four male and 36 female high school students were asked to describe their use of 14 self-regulated learning strategies in six contexts, and their teachers rated these students for their self-regulated learning during class. Factor analyses of the teachers' ratings along with students' scores on a standardized test of mathematics and English revealed a single self-regulated learning factor that accounted for nearly 80% of the explained variance and two smaller factors that were labeled Student Verbal Expressiveness and Achievement. Students' reports of using self-regulated learning strategies during a structured interview correlated .70 with the obtained teachers' rating factor and were negatively related to the Student Verbal Expressiveness and Achievement Factors. Our results indicate both convergent and discriminative validity for a self-regulated learning construct.

An important new topic of research in student academic functioning has been termed *self-regulated learning* (Corno, 1986; Henderson, 1986; McCombs, 1986; Schunk, 1986; Wang & Peverly, 1986). Although interest in this topic has diverse theoretical origins, a common conceptualization of students has emerged as metacognitively, motivationally, and behaviorally active participants in their own learning process (Zimmerman, 1986). In terms of metacognitive processes, self-regulated learners plan, organize, self-instruct, and self-evaluate at various stages during the acquisition process. From a motivational vantage, self-regulated learners perceive themselves as self-efficacious, autonomous, and intrinsically motivated. In terms of behavior, self-regulated learners select, structure, and even create social and physical environments that optimize acquisition. According to this view, effective learners become aware of functional relations between their patterns of thought and action (often termed *strategies*) and social and environmental outcomes.

There is a growing research literature indicating the importance of students' use of self-regulated learning strategies. Recently Zimmerman and Martinez-Pons (1986) proposed a model that comprised 14 categories of self-regulated learning strategies that high school students use during class and study. These strategies included self-evaluation (Bandura & Cervone,

1983, 1986), organizing and transforming (Baird, 1983; Corno & Mandinach, 1983), goal-setting and planning (Bandura & Schunk, 1981; Mischel & Patterson, 1978), seeking information (Baird, 1983; Wang, 1983), keeping records and self-monitoring (Spates & Kanfer, 1977), environmental structuring (Thoresen & Mahoney, 1974), self-consequences (Mace & Kratochwill, 1985), rehearsing and memorizing (McCombs, 1984; Paris, Newman, & Jacobs, 1984), seeking peer, teacher, or adult assistance (Zimmerman, 1981), and reviewing notes, tests, or textbooks (Wang, 1983). In this initial research, students were interviewed with regard to the methods they used in six hypothetical learning contexts and rated their consistency in using each method. The measures of strategy use derived from this procedure, the Self-Regulated Learning Interview Schedule (SRLIS), were found to be highly correlated with the students' performance on standardized academic tests. However, demonstrations of a relation between students' reports of using self-regulated learning strategies during an interview and their level of achievement on standardized tests represent only a first step in validating Zimmerman and Martinez-Pons's (1986) model.

From a social (learning) cognitive perspective (Bandura, 1986; Zimmerman, 1983), knowledge of self-regulated learning strategies is distinctive from but related to use of these strategies in specific learning contexts. Environmental and motivational factors are assumed to affect students' decisions to use known self-regulated learning strategies. This interactional view of self-regulated learning focuses on how students selectively activate, alter, and sustain their learning practices in home and school contexts that vary in structure and content. This theoretical orientation led Zimmerman and Martinez-Pons (1986) to include in their model self-regulated learning strategies directed at improving students' motivation (e.g., self-consequences) and their immediate environment (e.g., environmental structuring), as well as their cognitive functioning.

In this study we investigated the relation between students' reports of using self-regulated learning strategies during an

interview (as assessed with the SRLIS) and teachers' observations of students' self-regulated learning performances in classroom situations. We assumed that teachers are in a position to observe not only students' use of many self-regulated learning strategies but also many outcomes of their strategy use, such as their promptness, comprehensiveness, and commitment. Thus teachers' observations provide a performance-based criterion of self-regulated learning that can be used to examine the validity of Zimmerman and Martinez-Pons's (1986) formulation further.

A second goal of this study was to examine the relation between teachers' observations of students' self-regulated learning and students' achievement outcomes. In previous efforts to validate the SRLIS, researchers relied on standardized achievement test results as the criterion (Zimmerman & Martinez-Pons, 1986). This procedure is not ideal because standardized tests are used to assess students' general ability as well as prior learning outcomes. By combining teachers' observational measures factorially with standardized achievement test outcomes, it is possible to separate student achievement outcomes associated with their *use* of self-regulated learning strategies from their general ability. This factorially refined criterion would offer a basis for examining the construct validity of SRLIS and the underlying model of self-regulated learning.

A rating scale that we developed for use by teachers involved students' use of self-regulated learning strategies that are readily observable in school or the immediate outcomes of strategy use (e.g., completing assignments on time or being prepared for class). In addition to items concerning behavioral manifestations of students' use of strategies, several items were developed to measure a motivational dimension of self-regulated learning: intrinsic interest in academic tasks (see Zimmerman, 1985). This scale included indirect as well as direct measures of students' use of strategies, on the assumption that some strategies are not easily observed.

In this investigation we sought to further validate Zimmerman and Martinez-Pons's (1986) model by (a) assessing teachers' ratings of students' outcomes of self-regulation learning, (b) correlating teachers' ratings with standardized measures of students' achievement, and (c) assessing the convergent validity of these two measures with students' SRLIS scores. We hypothesized that there would emerge from the teachers' ratings a common self-regulated learning factor that would be correlated with but distinct from students' performance on standardized tests and that students' interview measures of the use of self-regulated learning strategies would correlate significantly with this factor.

Method

Sample

A sample of 80 tenth-grade students was selected from a high school serving a middle-class suburb of a large eastern city. These students were randomly selected and represented a broad range of achievement levels. There were 44 boys and 36 girls, and the sample was predominantly White. The modal age of the students was 15 years.

Self-Regulated Learning Interview Schedule

This structured interview was developed to assess 14 classes of self-regulated learning strategies. The strategies were self-evaluation; organizing and transforming; goal-setting and planning; seeking information; keeping records and monitoring; environmental structuring; self-consequences; rehearsing and memorizing; seeking peer, teacher, or adult assistance; and reviewing tests, notes, and texts. One category of non-self-regulated learning responses (labeled "other") was also included.

Six different learning contexts were described to each student: in classroom situations, when studying at home, when completing writing assignments, when completing mathematics assignments, when preparing for and taking tests, and when poorly motivated to complete homework. These contexts are presented in Table 1. For each learning context, students were asked to indicate the methods that they used to accomplish the task at hand. If the student failed to offer an answer, he or she was asked, "What if you are having difficulty? Is there any particular method you use?" If the student still failed to suggest any self-regulated learning strategies, questioning was discontinued for that learning context. If the student mentioned one or more strategies, the interviewer asked him or her to rate the consistency with which each strategy was used according to a visually presented 4-point scale with categories ranging from *seldom* (1) to *most of the time* (4). Initial research on various scoring systems for the SRLIS indicated that a consistency-weighted score for each reported strategy was optimally predictive of students' achievement. Those results were reported along with definitions and examples of each of the 14 strategies by Zimmerman and Martinez-Pons (1986).

Rating Student Self-Regulated Learning Outcomes: A Teacher Scale

Initially, we developed a pool of approximately 25 items that indicated students' use of various self-regulated learning strategies in

Table 1
Self-Regulated Learning Contexts

1. Assume a teacher is discussing a topic with your class such as the history of the civil rights movement. He or she says that the class will be tested on the topic. Do you have a method to help you learn and remember what was discussed in class?

2. Teachers often assign their students the task of writing a short paper outside class on a topic such as your family history. They also often use the score as a major part of the grade. In such cases, do you have any particular method to help you plan and write your paper?

3. Is there any particular method you use for completing your math assignments?

4. Most teachers give a test at the end of a marking period, and these tests greatly determine the final grade. Do you have a particular method for preparing for a test in classes like English or history?

5. Many times students have problems completing a homework assignment because there are other more interesting things they would rather do. Do you have any particular method for motivating yourself to complete your homework under these circumstances?

6. Most students find it necessary to complete some assignments or prepare themselves for class at home. Do you have any particular methods for improving your study at home?

class. Some strategies mentioned in the SRLIS, such as seeking teacher assistance, seeking information, and self-evaluation, were easily cast into item forms. Other strategies such as environmental structuring and seeking adult assistance were judged to occur mainly outside the classroom situations and were inapproriate for teachers. A third group of self-regulation strategies—in particular, (a) organizing and transforming and (b) goal-setting and planning—were judged to be sufficiently covert to preclude much direct observation by teachers. However, the immediate outcomes of these strategies were judged to be observable. For example, the unusualness of the student's comments and work would be an expected outcome of an organizing and transforming strategy, and the promptness and completeness of the student's work and class preparation would be an expected manifestation of goal-setting and planning. Last, we developed several items devoted to a motivational process underlying self-regulated learning, namely, students' intrinsic interest in academic tasks.

The pool of items were submitted to a panel of four experienced teachers, and their ratings of the suitability of the items were used to reduce the pool. Twelve items were judged to indicate students' self-regulated learning strategies and outcomes that would be readily observable to their teacher. These items are presented in Table 2.

Items 1 and 2 concern students' seeking of information, and Items 3, 8, and 12 deal with students' self-evaluation activities. Items 4 and

5 refer to the results of students' goal setting and planning (i.e., task completion), and Items 2 and 8 concern students' seeking of teachers' assistance. Items 7, 9, and 11 refer to novel or unconventional comments by the student, and these were viewed as manifestations of students' use of an organizing and transforming strategy. Items 6 and 10 reflect intrinsic motivation to learn.

Students were rated for each item in Table 2 according to a 5-point scale ranging from *never* (1) to *always* (5) by the teacher. Each test protocol had a space for the student's name to be entered.

Procedure

Parental consent was obtained for students who were selected to participate. Both parents and students were informed that the youngsters would be interviewed about their study practices. One of the principal investigators conducted the interview in a separate room in their school, and students' answers were recorded during the 15-min encounter. The strategy-consistency scoring procedure developed by Zimmerman and Martinez-Pons (1986) was used to score the students' answers, and a reliability check (see Withall, 1949) of more than 20% of the protocols by a graduate student indicated an agreement level of more than 80%. Areas of nonagreement were discussed subsequently with reference to the definitions of the strategies and were resolved through mutual consent.

Copies of the Rating Student Self-Regulated Learning Outcomes: A Teacher Scale (RSSRL) were distributed to a teacher of each student in the sample. Three teachers, each of whom had more than 5 years' experience, agreed to participate in the study. The two men and one woman represented three disciplines: English, social studies, and mathematics. No student was taught by more than one of the three teachers. The completed forms were collected from the teachers by the second author. The reliability of the RSSRL scale according to the Kuder-Richardson formula 20 was .95. Student scores on the Mathematics and English sections of the Metropolitan Achievement Test (MAT) were obtained from school records. For the students in the sample, the mean and standard deviation were 77.15 and 7.82, respectively, for mathematics and 74.88 and 17.25, respectively, for English.

Results

The students' means and standard deviations for each category of the RSSRL are presented in Table 2, and the means for each item of the SRLIS are presented in Table 3.

One of our goals was to explore the convergent validity of the RSSRL scale and standardized measures of students' achievement. To accomplish this, we performed a principal-components analysis, followed by an oblique factor rotation. We selected this procedure because we theorized that there existed a common students' self-regulated learning factor that would be separate from but correlated with student achievement on standardized tests. The results of this analysis are presented in Table 4.

Three factors accounted for 82% of the variance of the measures. Factor I accounted for 79.2% of the explained variance, Factor II for 12.3%, and Factor III for 8.6%.[1] The

Table 2
Item Means and Standard Deviations of the Rating Student Self-Regulated Learning Outcomes: A Teacher Scale

Item	M	SD
1. Does this student solicit additional information about the exact nature of forthcoming tests?	3.03	1.06
2. Does this student solicit additional information about your expectations or preferences concerning homework assignments?	2.05	1.09
3. Does this student display awareness concerning how well he/she has done on a test before you have graded it?	3.06	0.94
4. Does this student complete assignments on or before the specified deadline?	3.48	0.99
5. Is the student prepared to participate in class on a daily basis?	3.78	0.95
6. Does this student express interest in course matter?	2.67	1.11
7. Does this student offer relevant information that was *not* mentioned in the textbook or previous class discussions?	2.18	1.06
8. Will this student seek assistance from you on his/her own when he/she is having difficulty understanding schoolwork?	3.77	0.98
9. Will this student ask unusual or insightful questions in class?	2.01	1.10
10. Will this student volunteer for special tasks, duties, or activities related to coursework?	2.09	0.94
11. Does this student express and defend opinions that may differ from yours or those of classmates?	2.11	1.04
12. Does this student solicit further information regarding your grades or evaluations of his or her school work?	2.69	1.09

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[1] The sum of these three factors is slightly more than 100% because of rounding errors.

Table 3
Students' Self-Regulated Learning Strategy Means and Standard Deviations

Strategy	M	SD
Self-evaluation	0.88	2.12
Organizing and transforming	2.57	5.35
Goal setting and planning	2.29	3.80
Seeking information	2.91	5.54
Keeping records and monitoring	2.82	5.66
Environmental structuring	1.44	7.19
Self-consequences	1.00	2.27
Rehearsing and memorizing	1.63	5.25
Seeking peer assistance	1.16	2.44
Seeking teacher assistance	1.45	3.13
Seeking adult assistance	0.64	2.04
Reviewing tests	0.73	9.40
Reviewing notes	3.57	7.94
Reviewing texts	1.95	7.98
Other	1.69	1.08

unrotated (principal-component) loadings on Factor I indicate large coefficients for all RSSRL items, as well as moderate loadings by the two measures of students' achievement. These findings indicate that RSSRL items reflected a common students' self-regulated learning characteristic, and all items were relatively good measures of Factor I. Loadings on Factor II revealed three RSSRL items (7, 9, and 11) with large loadings (both before and after rotation) and two items (6 and 10) with moderate loadings after rotation. Each of these items referred to students' level of verbal expressiveness during class: students' expressing interest in course matter (Item 6), offering relevant information (Item 7), asking unusual questions (Item 9), volunteering (Item 10), or expressing differing opinions (Item 11). Only two variables loaded heavily on Factor III: MAT mathematics and English achievement. Therefore, Fac-

tor I was labeled Student Self-Regulated Learning; Factor II was labeled Student Verbal Expressiveness; and Factor III was labeled Student Achievement.

The correlation between rotated Factors I and II was .57; between rotated Factors I and III, it was .43; and between rotated Factors II and III, it was .36. Of importance, however, is that in principal-components analyses, an orthogonal (uncorrelated) criterion is used to determine the factor structure of these variables. Because both the uncorrelated (principal-components) and the correlated (oblique) analyses revealed essentially the same three-factor solution, we can conclude that teachers' ratings of students' self-regulated learning were factorially distinct from students' verbal expressiveness during class and achievement on standardized tests. The communalities for the RSSRL items are a conservative index of the reliability of each item, and the high coefficients indicate that all items contributed to the high reliability of the scale reported earlier.

Our third goal was to validate structured interview measures of students' self-regulated learning against a factorially refined construct derived from teachers' ratings and students' standardized test outcomes. The use of factorially derived criteria would also reveal the impact of two potentially confounding SRLIS variables: students' verbal expressiveness and achievement on standardized tests. Students' reports of strategy use were correlated by means of multivariate canonical procedures with their loadings on each of the three factors after the oblique factor rotation. Factor I was viewed as a construct validity criterion of students' self-regulated learning, whereas Factors II and III were viewed as confounding. The canonical correlation procedure is recommended when the relation between two theoretically distinct sets of variables is of interest (Tatsuoka, 1971). In our study, students' reports of self-regulated learning strategies constituted one set of variables, and the three derived factor scores constituted the second set.

Table 4
Factor Loadings for Items of the RSSRL and the Mathematics and English MAT

	Factors						
	Unrotated[a]			Rotated[b]			
Variable	I	II	III	I	II	III	Communality
RSSRL							
Item 1	.81	−.37	.00	.89	−.10	.11	.79
Item 2	.85	−.37	−.10	.95	−.05	.02	.87
Item 3	.88	−.36	−.10	.79	.15	.05	.81
Item 4	.76	−.25	−.17	.82	.06	−.08	.67
Item 5	.71	−.32	−.11	.83	−.06	−.02	.62
Item 6	.88	.14	−.10	.46	.54	.03	.80
Item 7	.76	.44	−.10	.10	.83	.01	.79
Item 8	.88	.03	.05	.52	.38	.17	.78
Item 9	.75	.55	−.11	−.01	.95	−.04	.87
Item 10	.90	.09	−.06	.51	.48	.05	.83
Item 11	.72	.54	.03	−.08	.90	.10	.81
Item 12	.86	−.13	−.06	.71	.20	.05	.75
MAT							
Mathematics	.43	.03	.79	−.13	.06	.93	.81
English	.54	−.15	.46	.28	−.05	.58	.52

Note. RSSRL = Rating Student Self-Regulated Learning Outcomes: A Teacher Scale; MAT = Metropolitan Achievement Test.
[a] A principal-components analysis. [b] An oblique rotation.

One substantial canonical correlation ($R = .70$) emerged from this analysis, $\chi^2(42, N = 80) = 75.00, p < .001.$[2] The loadings of the three derived factor scores on the canonical root were 2.02 for Factor I, -0.56 for Factor II, and -0.77 for Factor III. These canonical loadings indicated that students' reports of self-regulated strategies correlated primarily and positively with Factor I. The smaller negative loadings for Factors II and III indicate that both factors may have functioned as suppressors in forming the canonical root; that is, the canonical correlation between student self-regulated learning strategy measures and Factor I was enhanced by the elimination of variance attributable to Factors II and III.

The loadings given to students' reports of using self-regulated learning strategies on the canonical root are presented in column 1 of Table 5. As with standardized regression weights, canonical loadings represent the conjoint weighting of all self-regulation strategies for optimally predicting the canonical root. The results indicated that the strategy of rehearsing and memorizing was the best predictor of the canonical root. Organizing and transforming contributed the second largest loading, followed by seeking peer assistance and seeking information.

These loadings do not, however, indicate the contribution of each self-regulated learning strategy when considered alone to the canonical root. Canonical loadings also take into account collinearity among the strategies (Tabachnick & Fidell, 1983). The relative contribution of individual strategies can be ascertained from correlations between each strategy measure and the canonical root.[3] These results are presented in column 2 of Table 5. These correlation coefficients revealed a number of self-regulated learning strategies that were significantly related to the canonical root, in addition to the four with substantial canonical loadings. These strategies were keeping records and monitoring, self-consequences, seeking adult assistance, and reviewing tests.

Discussion

The results indicate that two methodologically disparate measures of students' use of self-regulated learning strategies

Table 5
Students' Self-Regulated Learning Strategy Loadings on and Correlations With the Canonical Root

Strategy	Loading	r
Self-evaluation	−.06	−.10
Organizing and transforming	.34	.36**
Goal setting and planning	.00	−.01
Seeking information	.23	.28**
Keeping records and monitoring	.05	.24*
Environmental structuring	.16	.15
Self-consequences	−.04	.19*
Rehearsing and memorizing	.60	.48**
Seeking peer assistance	.23	.31**
Seeking teacher assistance	.12	.14
Seeking adult assistance	.06	.22*
Reviewing tests	.20	.24*
Reviewing notes	.08	−.15
Reviewing texts	−.12	−.23*

$*p < .05.$ $**p < .01.$

(i.e., students' interviews and teachers' ratings) both revealed a common underlying construct. Although the teachers' ratings dealt with such diverse matters as students' seeking information, self-evaluation, task completion, seeking teachers' assistance, organization and transformation of information, and intrinsic motivation, all loaded on a single factor (Factor I) in the principal-components analysis. Furthermore, students' standardized achievement test scores loaded only moderately on this factor, as theorized. These data provide rather compelling evidence that teachers view students' self-regulated learning as a single, theoretical entity. This factor (which accounted for 80% of the explained variance of the teachers' ratings and students' achievement) was largely responsible for the high canonical correlation ($R = .70$) between the teachers' ratings and students' reports of self-regulated learning strategies.

In their now classic article, Campbell and Fiske (1959) argued that the most demanding criterion of construct validity can be applied only when different methods are used to measure a common construct. Such an approach distinguishes convergent (theoretically related) from methodologically correlated variance in outcome measures. These conditions obtained in our research because two highly disparate procedures were used to assess students' self-regulated learning: a structured interview with students and a teachers' questionnaire. The resultant canonical correlation provided clear evidence of the convergent validity of these two measures, derived from Zimmerman and Martinez-Pons's (1986) strategy model.

In addition to indicating the convergent validity of the two measures of students' use of self-regulated learning strategies, our data revealed its discriminant validity as well. According to Campbell and Fiske (1959), *discriminant validity* refers to the quality of a measure that enables one to distinguish between an intended construct and closely related constructs. In our study, students' performance on a standardized achievement test was hypothesized to be correlated with but distinct from self-regulated learning. Evidence that students' standardized achievement scores (especially mathematics) loaded heavily on a separate factor (Factor III) and only moderately on the teachers' rating factor (Factor I) indicated that two distinct factors were present, as theorized. The moderately negative loading of Factor III (-0.77) on the canonical root was evidence that the structured interview procedure could enable us to discriminate students' achievement variance that was separate factorially from their self-regulated learning practices.

A further concern was the potentially confounding effects of students' verbal expressiveness in measures of self-regulated learning. Previously, Zimmerman and Martinez-Pons (1986) discussed the issue of whether the students' self-reports of strategy use indicated actual differences in academic performance or merely indicated differences in students' articulateness. They concluded that their results could not be attributed

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[2] This test was based on Wilks's lambda multivariate criterion.

[3] This canonical statistic is comparable with the within-group correlation of discriminant function analyses (see Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975, p. 460).

to verbal fluency because students in a low-achievement group displayed more "other" comments (unrelated to self-regulated learning) than did students in a high-achievement group.

Our results provided even more conclusive evidence that students' verbal expressiveness was not a major confounding factor in these measures of self-regulated learning. In rating students' self-regulated learning, teachers differentiated students' verbal expressiveness as a separate factor (Factor II). This indicated a substantial degree of selectivity by the teachers in rating their students on the RSSRL. The moderate negative loading of Factor II (−0.56) on the canonical root indicated that the structured interview procedure was successful also in discriminating the potentially confounding effects of this methodologically related variance. In summary, students' reports of using self-regulated learning strategies not only showed convergent validity by a substantial canonical correlation with a factor derived from teachers' ratings, but also showed discriminative validity by producing negative loadings on two potentially confounding factors: students' achievement test variance that was unrelated to self-regulated learning and students' verbal expressiveness.

The correlations of students' reports of using each self-regulated learning strategy with the canonical root (Table 5, column 2) indicated that most, but not all, strategies included in Zimmerman and Martinez-Pons's (1986) model were valid predictors of a common construct derived from teachers' ratings of students' self-regulated learning and achievement test scores. Interestingly, students' reports of rehearsing and transforming and of organizing and transforming were most highly correlated with teachers' ratings, despite their highly covert nature. Students' reports of seeking information and seeking peer assistance were the next highest predictors of teachers' ratings, followed closely by seeking adult (non-teacher) assistance. It appears that self-regulated students were not passive learners but actively sought out information and assistance when needed. This is one of the most widely emphasized characteristics of self-regulated learners (e.g., Zimmerman, 1986), and our data support its theoretical importance.

Although correlated with teachers' ratings, students' reports of seeking teacher assistance did not reach statistical significance. In earlier research by Zimmerman and Martinez-Pons (1986), students' reports of using this strategy were predictive of their achievement track in school, and thus it appears to have academic utility. It is possible that teachers placed less emphasis on the importance of this strategy than did students during their interviews. Similarly, the correlation of students' reports of "environmental structuring" with teachers' ratings of academic self-regulation fell short of statistical significance, unlike the students' achievement track evidence reported by Zimmerman and Martinez-Pons. Insofar as we expected this self-regulated learning strategy to occur mainly outside the classroom, it was not surprising that teachers did not observe its impact fully.

It was also interesting that students' reports of "reviewing tests" were positively related to teachers' ratings of students' self-regulated learning; however, students' reports of reviewing notes and reviewing text were negatively related to teachers' ratings. In contrast to these findings, Zimmerman and Mar-

tinez-Pons (1986) reported positive correlations between all three forms of students' reviewing and their achievement track placement in school. Because the RSSRL did not specifically require teachers' observations of students' reviewing activities, the academic impact of text reviewing may have been more discernible to teachers than the impact of reviewing in the other two areas. To correct this limitation, one could add additional items dealing specifically with reviewing text and notes to the RSSRL.

Two other strategies failed to correlate with teachers' ratings. First, students' reports of goal setting and planning were not related to teachers' observations of self-regulated learning despite evidence by Zimmerman and Martinez-Pons (1986) that this strategy was related to students' achievement track placement in school. We had assumed that teachers' ratings of students' promptness in completing assignments would be related to students' interview reports of using of this strategy, but apparently this assumption was unwarranted. We suggest that items dealing specifically with goal setting and planning might be developed for inclusion in the RSSRL. Second, students' reports of using self-evaluation strategies also failed to correlate with teachers' ratings of students' self-regulated learning in either this study or in prior research (Zimmerman & Martinez-Pons, 1986). Although the importance of self-evaluation has been widely theorized, empirical evidence concerning this hypothesis has been inconsistent. For example, Glenberg and Epstein (1985) found that skilled readers often fail to monitor their comprehension and learning accurately as they read text materials. In contrast, Peterson, Swing, Braverman, and Buss (1982) reported that students' monitoring of their understanding during mathematics lessions was correlated with subsequent achievement.

Our data do, however, provide some basis for continuing to study certain forms of self-evaluation in future research. Item 3 of the teachers' rating scale, which pertained to students' awareness of their test outcomes before grading by the teacher, loaded heavily on the main self-regulated learning factor. Clearly, the teachers viewed this form of students' self-evaluation as related to self-regulated learning. These results suggest that in further efforts to assess this particular self-regulated learning strategy, researchers might profitably focus on contexts in which students are tested.

In interpreting the results of construct validity studies such as this, we assumed that there was no single, all-encompassing criterion of self-regulated learning. Instead, the empirical strategy was to examine converging sources of information while fully realizing the limitations of each. When we compared our results with those of the earlier investigation by Zimmerman and Martinez-Pons (1986), not all self-regulated learning strategies that were predictive of students' academic track functioning were evident to these teachers when they used the RSSRL. Four such strategies were discussed earlier. In this sense, teachers' ratings in our study represent an important, albeit limited, source of information about students' self-regulated learning. Other measures of students' strategy use and outcomes are needed, such as direct students' observations during academic functioning and ratings by other observers of students (e.g., peers or parents) in order to provide the most comprehensive criterion of construct validity.

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