EXPLORATORY ANALYSIS OF THE STRUCTURE OF SCORES FROM THE MULTIDIMENSIONAL SCALES OF PERCEIVED SELF-EFFICACY

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The purpose of the present study was to examine the internal structure of scores from Bandura's Multidimensional Scales of Perceived Self-Efficacy (MSPSE). Data were obtained from college freshmen, a population previously untested with MSPSE. Results show that scores from nearly all items aligned almost exclusively with theoretically and empirically derived dimensions. Some differences in empirically derived dimensions occurred as a result of extraction procedures, although the differences observed still provided theoretically interpretable constructs. These results suggest that Bandura's scales, with slight revisions, show promise for research on self-efficacy with undergraduate college students.

Self-efficacy, briefly described, refers to an individual's judgment about his or her ability to accomplish a given task or activity. An individual's level of self-efficacy is thought to relate to the individual's choice of activities, effort in those activities, and perseverance in the activities (Bandura, 1977). Thus, self-efficacy, through its impact on behavioral choice, the extent of effort, and persistence when facing difficulties, influences performance behavior as well as psychological functioning (Bandura, 1997). Research has shown that self-efficacy is related to performance across a variety of behaviors (e.g., Hackett & Betz, 1989; Lopez & Lent, 1992; Pajares & Miller, 1994). Furthermore, the significance of self-efficacy has been demonstrated

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by theoretically and empirically associating self-efficacy with a number of important psychological constructs such as self-concept (Lent, Brown, & Gore, 1997), self-esteem (Woodruff & Cashman, 1993), depression (Ehrenberg, Cox, & Koopman, 1991; Kanfer & Zeiss, 1983), test anxiety (Shelton & Mallinckrodt, 1991), and assertiveness (Lee, 1984).

An important area in self-efficacy research concerns its measurement. Bandura (1977, 1997) argued that self-efficacy is best conceptualized and measured as a multidimensional construct and that researchers would find the most utility from self-efficacy by focusing on a specific context and activity domain. That is, researchers should align a given activity with self-efficacy for that activity rather than examining a global assessment of self-efficacy. For example, to understand how self-efficacy influences behaviors regarding mathematics achievement, one should examine an individual's level of mathematics self-efficacy (Pajares & Graham, 1999; Pajares & Miller, 1994). Moreover, the more task specific or context specific one can make the measurement of self-efficacy, the better the predictive (and possibly explanatory) role self-efficacy is likely to play in research on the task-specific outcomes of interest (Bandura, 1997; Pajares, 1996).

Following this logic, Bandura (1990) developed a set of scales, titled Multidimensional Scales of Perceived Self-Efficacy (MSPSE), to tap self-efficacy in nine domains. The nine domains, as labeled by Bandura, included enlisting social resources, academic achievement, self-regulated learning, leisure-time skills and extracurricular activities, self-regulatory efficacy (to resist peer pressure for high risk behaviors), self-efficacy to meet others' expectations, social self-efficacy, self-assertive efficacy, and enlisting parental and community support. The nine domains and the items used to measure each are provided in Table 1. Little has been published describing the theoretical or research-based logic followed in developing the items for this instrument. In one study, however, Zimmerman, Bandura, and Martinez-Pons (1992) reported that items designed to assess self-efficacy for self-regulated learning stemmed from the learning strategies that were categorized in Zimmerman and Martinez-Pons' (1986, 1988) research.

To date, there have been relatively few studies reporting the structure and validity of scores derived from MSPSE. In two studies, Bandura, Barbaranelli, Caprara, and Pastorelli (1996) and Bandura, Pastorelli, Barbaranelli, and Caprara (1999) used 37 items from MSPSE to study how perceived self-efficacy related to childhood depression and achievement among middle school children in Italy (the average age of participants was about 12 years). The 37 items they selected measured eight of Bandura's (1990) nine dimensions; self-efficacy for enlisting parental and community support was omitted. Rather than determining whether responses to each of the 37 items clustered according to the eight dimensions specified by Bandura (1990), Bandura et al. (1996, 1999) performed principal component

Table 1
Bandura's (1990) 57 Items and 9 Scales From the Multidimensional Scales of Perceived Self-Efficacy, With Descriptive Statistics

	Scale Alpha[a]	Item Mean	Item Standard Deviation
Enlisting Social Resources	.63 (.60)		
1. How well can you get teachers to help you when you get stuck on schoolwork?		4.90	1.16
2. How well can you get another student to help you when you get stuck on schoolwork?		5.43	1.20
3. How well can you get adults to help you when you have social problems?		4.71	1.45
4. How well can you get a friend to help you when you have social problems?		5.86	1.21
Academic Achievement	.72 (.74)		
5. How well can you learn general mathematics?		5.62	1.53
6. How well can you learn algebra?		5.34	1.72
7. How well can you learn science?		5.11	1.47
8. How well can you learn biology?		5.00	1.48
9. How well can you learn reading and writing language skills?		5.54	1.31
10. How well can you learn to use computers?		5.31	1.33
11. How well can you learn a foreign language?		4.43	1.53
12. How well can you learn social studies?		5.19	1.33
13. How well can you learn English grammar?		5.37	1.41
Self-Regulated Learning	.86 (.87)		
14. How well can you finish homework assignments by deadlines?		6.05	1.19
15. How well can you study when there are other interesting things to do?		4.15	1.48
16. How well can you concentrate on school subjects?		4.80	1.25
17. How well can you take class notes of class instruction?		5.34	1.31
18. How well can you use the library to get information for class assignments?		4.84	1.51
19. How well can you plan your school work?		5.07	1.24
20. How well can you organize your school work?		5.28	1.27
21. How well can you remember information presented in class and textbooks?		4.94	1.04
22. How well can you arrange a place to study without distractions?		4.90	1.32
23. How well can you motivate yourself to do school work?		4.69	1.31
24. How well can you participate in class discussions?		4.51	1.46

(continued)

Table 1 Continued

	Scale Alpha[a]	Item Mean	Item Standard Deviation
Leisure-Time Skill and Extracurricular Activities	.76 (.74)		
25. How well can you learn sports skills?		5.44	1.52
26. How well can you learn dance skills?		4.77	1.63
27. How well can you learn music skills?		4.75	1.72
28. How well can you do the kinds of things that are needed to work on the school newspaper?		4.38	1.43
29. How well can you do the kinds of things needed to be a member of the school government?		4.48	1.52
30. How well can you do the kinds of things needed to take part in school plays?		4.27	1.61
31. How well can you do regular physical education activities?		5.57	1.35
32. How well can you learn the skills needed for team sports (for example, basketball, volleyball, swimming, football, soccer)?		5.68	1.45
Self-Regulatory Efficacy to Resist Peer Pressure	.81 (.79)		
33. How well can you resist peer pressure to do things in school that can get you into trouble?		5.70	1.30
34. How well can you stop yourself from skipping school when you feel bored or upset?		5.20	1.53
35. How well can you resist peer pressure to smoke cigarettes?		5.89	1.79
36. How well can you resist peer pressure to drink beer, wine, or liquor?		5.35	1.84
37. How well can you resist peer pressure to smoke marijuana?		6.32	1.51
38. How well can you resist peer pressure to use pills (uppers, downers)?		6.55	1.24
39. How well can you resist peer pressure to use crack?		6.79	0.86
40. How well can you resist pressure to have sexual intercourse?		5.38	1.90
41. How well can you control your temper?		5.12	1.41
Meet Others' Expectations	.81 (.73)		
42. How well can you live up to what your parents expect of you?		5.45	1.25
43. How well can you live up to what your teachers expect of you?		5.25	1.12
44. How well can you live up to what your peers expect of you?		5.52	1.11
45. How well can you live up to what you expect of yourself?		5.04	1.47

Table 1 Continued

	Scale Alpha[a]	Item Mean	Item Standard Deviation
Social Self-Efficacy	.76 (.83)		
46. How well can you make and keep friends of the opposite sex?		5.82	1.21
47. How well can you make and keep friends of the same sex?		5.94	1.04
48. How well can you carry on conversations with others?		5.79	1.07
49. How well can you work in a group?		5.64	1.11
Self-Assertive Efficacy	.79 (.84)		
50. How well can you express your opinions when other classmates disagree with you?		5.43	1.20
51. How well can you stand up for yourself when you feel you are being treated unfairly?		5.66	1.23
52. How well can you deal with situations where others are annoying you or hurting your feelings?		5.10	1.31
53. How well can you stand firm to someone who is asking you to do something unreasonable or inconvenient?		5.55	1.24
Enlisting Parental and Community Support	.79 (.70)		
54. How much can you get your parent(s) to help you with a problem?		5.53	1.48
55. How well can you get your brother(s) and sister(s) to help you with a problem?		5.32	1.64
56. How well can you get your parents to take part in school activities?		5.07	1.66
57. How well can you get people outside the school to take an interest in your school (community groups, churches)?		4.63	1.43

Note. $N = 651$.

analyses to learn whether responses would cluster on three general self-efficacy domains: academic self-efficacy, social self-efficacy, and self-regulatory efficacy. The researchers found that those items most associated with academic self-efficacy were those designed to measure self-regulated learning efficacy, academic achievement self-efficacy, and self-efficacy to meet others' expectations. The items most salient with social self-efficacy included those for enlisting social resources efficacy, self-assertiveness efficacy, and leisure-time skill and extracurricular activities efficacy. Finally, self-regulatory efficacy was defined by those items measuring self-regulatory efficacy to resist peer pressure.

Miller, Coombs, and Fuqua (1999) examined the psychometric properties of scores obtained from 500 high school students from all 57 items. They found general support for the nine dimensions proposed by Bandura (1990). They did report, however, that based on factor and component analyses of the data, the item-to-domain alignment devised by Bandura (see Table 1) did not hold completely. As a result, Miller et al. renamed some of the factors. Unfortunately, neither the structure nor pattern matrices for the first-order factor or component analyses were published, so it is difficult to determine which items clustered to form which factors. In addition, Miller et al. performed a second-order factor analysis of the nine first-order factors extracted. The model they selected included three second-order factors that they labeled Social Self-Efficacy, Task Management Efficacy, and Academic Efficacy. The description of these three second-order factors given by Miller et al. was consistent with the descriptions of the three factors reported by Bandura et al. (1996, 1999).

The studies cited above provide some evidence that the items developed by Bandura (1990) provide scores that appear to support the nine dimensions they were developed to assess. The structure of this instrument is still unclear considering that Miller et al. (1999) found that responses to a number of items did not associate with their expected factors and that Bandura et al. (1996, 1999) used only a subset of the 57 items. Consequently, the purpose of the present study was to provide additional empirical evaluation of the structure of Bandura's MSPSE and extend the generalizability of the use of MSPSE by examining scores from college freshmen. Previous studies have reported MSPSE validity data from middle school or high school students only.

Method

Participants

Undergraduate students ($N = 651$) enrolled in introductory psychology courses at a large, midwestern university participated in the study. The majority of the participants were freshmen (49%), single (87%), and female (51%), with a mean age of 20.06 years ($SD = 3.60$). The ethnic groups represented in the sample were Caucasian (80%), Asian (10%), Native American (5%), African American (3%), and Hispanic (2%). The participants voluntarily completed the MSPSE and received extra credit in their respective classes for their participation.

Instrument

The MSPSE is a self-report measure of perceived self-efficacy developed by Bandura (1990). For each MSPSE item, respondents are asked to rate their

level of capability on a 7-point scale (from 1, *not well at all*, to 7, *very well*) in performing a given activity. There are a total of 57 items that, by design, are intended to represent nine distinct domains of self-efficacy. As previously noted, all 57 items are reported in Table 1.

Results

Means and standard deviations for each item and measures of internal consistency (alphas) for each scale are provided in Table 1. Alphas ranged from a low of .63 for enlisting social resources to a high of .86 for self-regulated learning. The alphas found in this study replicated well those reported in Miller et al. (1999), which are reproduced in Table 1. Miller et al. found, for instance, that enlisting social resources had the lowest level of internal consistency ($\alpha = .60$) and that self-regulated learning had the highest ($\alpha = .87$).

To test for the internal structure of the scores obtained from the present study's sample, a series of principal axis factor and principal component analyses was performed. Several steps were taken to determine the number of factors to extract. First, the minimum eigenvalue of 1.00 criterion for selecting the number of factors to retain was considered. The minimum eigenvalue criterion did not produce a reasonable solution because 14 factors were extracted and because for several of these factors, only one item was salient with each factor. The scree plot also was examined. The plot showed a smooth curve with no clear demarcation noted among the eigenvalues in the scree. Finally, we used the parallel analysis procedure described by Thompson and Daniel (1996). With parallel analysis, one compares the size of eigenvalues from the obtained data with eigenvalues produced by randomly generated data. Factors are extracted until the randomly generated data produces eigenvalues larger than the obtained data. This procedure indicated that 10 factors should be extracted, which is more in line with the number of factors suggested by Bandura (1990). Given the close congruence between the number of factors suggested by the parallel analysis and the number suggested by Bandura, we opted to extract 10 factors for the analyses that follow.

For each method of extraction, the factors were rotated using three approaches: varimax, promax (with $k = 4$), and direct oblimin (with delta = 0.00). For both the principal component and principal axis factor solutions examined, the three rotational methods produced identical or nearly identical results in terms of how the items clustered. In fact, the only substantive difference—explained below—came not from the rotational method but from the method of extraction. This finding was unexpected considering that component and factor analyses typically yield highly similar results when the number of variables and the size of the sample are large (Nunnally & Bernstein, 1994; Thompson & Daniel, 1996), which is the case in the present study.

As a result of these six analyses, two things became clear. First, 5 of the 57 items did not appear to relate well to any of the other items and thus did not relate strongly to any one factor as judged by the structure and pattern matrices produced. These items, which were dropped from further analyses, included the following:

1. How well can you get teachers to help you when you get stuck on schoolwork?
10. How well can you learn to use computers?
11. How well can you learn a foreign language?
12. How well can you learn social studies?
21. How well can you remember information presented in class and textbooks?

Second, both principal components and principal axis solutions produced seven factors that showed identical item clustering no matter which method of extraction or which method of rotation was used. For the remaining three factors, substantive differences occurred, as pointed out above, only between the two methods of extraction. In both cases, however, the three factors produced by both methods were theoretically meaningful and interpretable. Because the method of rotation produced nearly identical solutions within methods of extraction, the pattern/structure coefficients resulting from varimax rotation for both principal components and principal axis factoring, and the alphas for each factor, are presented in Tables 2 and 3, respectively. The first 10 prerotational eigenvalues were 10.74, 3.89, 3.20, 2.70, 2.18, 1.93, 1.66, 1.61, 1.41, and 1.29, which accounted for 58.8% of the variance.

As noted above, 7 of the 10 factors (or components) identified by the analyses showed identical item clustering. These 7 factors, with their corresponding item numbers, are listed, named, and described as follows:

1. Self-Regulated Learning Efficacy: Composed of Items 14, 15, 16, 17, 18, 19, 20, 22, 23, and 34. All of these items, except for Item 34, were designed by Bandura to measure efficacy for self-regulated learning. Item 34 fits as well because it asks respondents to judge their ability to stop themselves from skipping school when feeling bored.
2. Self-Regulatory Efficacy to Resist High Risk Behaviors: Composed of Items 33, 35, 36, 37, 38, 39, and 40. Bandura developed all of these to assess one's level of efficacy in resisting peer pressure to participate in deviant behaviors.
3. Social Self-Efficacy: Composed of Items 2, 4, 46, 47, 48, and 49. Items 46 through 49 were developed to measure one's social self-efficacy in terms of friendships. Items 2 and 4 also deal with peer and friend activities.
4. Self-Assertive Efficacy: Composed of Items 24, 50, 51, 52, and 53. Items 50 through 53 were constructed to assess self-assertive efficacy, and Item 24 fits because it examines how well a student can participate in class discussions, which represents an assertive behavior.
5. Enlisting Parental and Adult Support Efficacy: Composed of Items 3, 54, 55, 56, and 57. Items 54 through 57 were developed to tap parental, familial, and adult support. Item 3 also fits this cluster as it asks how well a student can get an adult to assist them with a problem.

Table 2
Principal Components Structure/Pattern Coefficients With Varimax Rotation

Item Number	Rotated Components									
	1	2	3	4	5	6	7	8	9	10
19	*.81*	.08	.12	.06	.13	.02	.04	.09	.07	.10
23	*.77*	.06	.04	.13	.09	.04	.05	.06	.09	.00
20	*.76*	.08	.16	–.01	.18	.05	.03	.10	.08	.05
15	*.76*	.05	–.02	.06	.01	–.02	.04	.02	.07	.05
16	*.76*	.04	.08	.16	.08	.02	.15	.08	.13	.01
14	*.62*	.10	.30	–.19	.06	.17	.03	.06	.07	.03
22	*.62*	.02	–.02	.16	.19	.07	.09	.02	.08	.05
17	*.58*	.09	.16	.13	.07	.07	.05	.25	.08	–.01
34	*.47*	*.36*	.00	–.02	.09	.07	.06	–.05	.20	–.05
18	*.37*	–.06	–.08	.25	.02	–.02	.09	.26	.10	.20
37	.06	*.83*	.07	.00	.07	.02	.03	–.04	–.01	–.01
38	.02	*.83*	.17	.02	.00	.05	.05	.08	–.11	–.09
39	–.04	*.71*	.19	.08	–.06	.03	.12	.16	–.16	–.07
36	.11	*.70*	–.20	.06	.09	–.02	–.12	–.09	.19	.05
35	.09	*.64*	–.04	–.05	.07	.09	.08	–.02	.21	.04
40	.17	*.55*	–.03	–.07	.12	–.17	–.13	.01	.26	.07
33	.17	*.54*	–.03	.18	.17	.00	–.02	.06	.25	.07
48	.03	.03	*.63*	.36	.11	.05	–.06	.14	.00	.23
47	.11	.10	*.61*	.02	.17	.15	.04	.02	.21	–.05
49	.14	.05	*.60*	.29	.11	.16	–.03	.06	.02	.14
2	.13	–.06	*.58*	.14	.20	.02	.07	.05	.04	–.04
46	.07	.00	*.55*	.22	.15	.08	.03	.06	.24	.23
4	.10	.05	*.50*	.10	*.32*	–.02	–.02	.20	.05	–.02
50	.05	.03	.32	*.73*	.09	.03	.04	.12	–.02	.11
51	.11	.05	.31	*.73*	.10	.15	.05	.01	–.01	.02
52	.17	.05	.17	*.62*	.05	.16	–.03	–.04	.25	.03
53	.15	.16	.09	*.57*	.12	.11	.05	–.11	.27	.09
24	.09	–.06	.07	*.57*	.17	.02	.05	.23	–.05	.17
54	.13	.07	.14	.09	*.75*	.05	–.03	.01	.20	–.02
55	.10	.05	.13	.13	*.71*	.08	.04	.03	.14	.06
56	.18	.10	.15	–.04	*.69*	.09	.05	.12	.09	–.02
3	.10	.06	.18	.13	*.64*	–.02	–.12	–.06	–.01	.11
57	.18	.12	.20	.14	*.60*	.08	.02	.11	.07	.15
32	.09	.01	.13	.09	.09	*.91*	.06	–.03	.04	.05
25	.08	–.01	.02	.15	.05	*.87*	.06	–.01	.07	.12
31	.12	.05	.18	.11	.10	*.84*	.05	.06	.04	.05
6	.18	.04	.14	–.12	–.10	–.01	*.82*	–.23	.04	.14
5	.13	.03	.16	–.10	–.06	.03	*.81*	–.23	–.01	.12
7	.14	–.02	–.15	.24	.05	.11	*.76*	.20	.06	–.16
8	.12	.01	–.14	.29	.08	.10	*.67*	.31	.07	–.20
9	.14	.05	.17	.03	–.04	–.04	–.07	*.73*	.07	.05
13	.16	.10	.16	–.13	–.01	.02	–.03	*.64*	.16	.11
28	.18	–.03	.05	.20	.19	–.01	–.08	*.56*	.02	*.35*

(continued)

Table 2 Continued

Item Number	Rotated Components 1	2	3	4	5	6	7	8	9	10
29	.14	–.01	.05	.26	.29	.11	.16	*.47*	–.01	.22
42	.26	.17	.22	.05	.21	.09	.11	.16	*.62*	–.12
41	.07	.15	–.06	.02	.11	–.07	–.04	–.02	*.61*	.18
43	*.40*	.17	.20	.12	.18	.09	.17	.19	*.56*	–.06
44	.20	.08	*.37*	.11	.13	.10	.12	.22	*.55*	.01
45	.29	.03	*.31*	.16	.07	.14	–.02	.02	*.54*	–.01
27	.04	.05	.07	.15	–.01	.04	.07	.10	.10	*.76*
26	.10	.00	.17	.06	.15	.28	–.08	.14	.03	*.62*
30	.04	–.09	.02	.17	.17	–.03	–.02	.41	–.07	*.55*

Note. Coefficients ≥ |.30| are italicized. $N = 651$.

Table 3
Principal Axis Structure/Pattern Coefficients With Varimax Rotation

Item Number	Rotated Components 1	2	3	4	5	6	7	8	9	10
19	*.79*	.09	.16	.08	.13	.09	.03	.06	.06	–.02
20	*.74*	.09	.14	.01	.18	.13	.05	.10	.07	–.04
23	*.73*	.07	.07	.12	.08	.05	.04	.10	–.01	.09
16	*.73*	.04	.10	.14	.07	.10	.03	.12	.06	.15
15	*.70*	.06	.07	.06	.02	–.01	.00	.07	.02	.05
14	*.57*	.10	.06	–.10	.09	.25	.14	.09	.10	–.07
22	*.56*	.03	.09	.14	.17	.00	.07	.10	.06	.08
17	*.54*	.10	.20	.09	.07	.17	.06	.10	.00	.10
34	*.43*	*.33*	–.05	.00	.10	.01	.06	.19	.05	.04
18	*.33*	–.03	*.30*	.17	.02	–.03	.00	.08	.02	.11
38	.03	*.82*	–.01	.00	–.01	.21	.03	–.09	.00	.06
37	.06	*.80*	–.04	.02	.08	.06	.02	.02	.04	–.02
36	.10	*.65*	–.03	.08	.10	–.23	–.01	.19	–.05	–.10
39	–.02	*.64*	.05	.04	–.06	.21	.01	–.11	.03	.12
35	.11	*.57*	–.01	–.02	.08	–.04	.08	.20	.06	.02
40	.16	*.49*	.04	–.03	.13	–.04	–.13	.21	–.04	–.12
33	.17	*.48*	.10	.16	.16	–.02	.01	.22	–.02	.02
28	.16	–.01	*.64*	.11	.13	.08	–.01	.06	–.10	.02
30	.03	–.08	*.60*	.12	.12	.02	.00	–.05	–.05	.01
29	.14	.01	*.50*	.18	.20	.09	.09	.04	.05	.15
9	.15	.06	*.50*	–.04	–.03	.21	–.07	.08	–.13	.10
27	.03	.04	*.47*	.19	.03	.01	.09	.06	.10	–.07
13	.17	.10	*.45*	–.13	.00	.18	–.01	.14	–.04	.04
26	.08	–.01	*.44*	.13	.15	.11	.26	.02	.01	–.13
51	.11	.04	.11	*.70*	.11	.25	.13	.00	.02	.07

Table 3 Continued

Item Number	Rotated Components									
	1	2	3	4	5	6	7	8	9	10
50	.04	.02	.24	*.69*	.09	.27	.03	–.02	.01	.07
52	.16	.05	.07	*.56*	.09	.13	.14	.19	–.02	.03
53	.15	.15	.05	*.51*	.14	.07	.12	.20	.03	.06
24	.08	–.05	*.33*	*.42*	.12	.09	.03	–.01	–.03	.12
54	.13	.08	.04	.10	*.73*	.14	.04	.17	–.05	.03
55	.11	.06	.11	.13	*.63*	.13	.08	.12	.01	.04
56	.19	.10	.11	–.02	*.59*	.17	.08	.11	.01	.06
3	.09	.06	.09	.15	*.54*	.15	.02	.02	–.06	–.08
57	.17	.12	.22	.15	*.51*	.19	.08	.09	.01	.01
48	.03	.02	.28	*.37*	.13	*.55*	.07	.00	–.01	–.07
47	.13	.10	.00	.08	.20	*.53*	.14	.17	.02	.01
49	.13	.04	.18	*.32*	.14	*.50*	.16	.03	.03	–.07
2	.13	–.05	.07	.16	.20	*.46*	.05	.07	.03	.03
46	.08	.01	.20	.26	.18	*.44*	.11	.18	.04	–.03
4	.11	.05	.17	.11	.28	*.42*	.00	.09	–.03	.00
32	.09	.01	.02	.10	.09	.13	*.91*	.03	.05	.04
25	.08	–.01	.08	.16	.05	.02	*.83*	.06	.02	.07
31	.12	.05	.09	.12	.09	.19	*.78*	.04	.04	.05
42	.28	.18	.05	.05	.19	.24	.07	*.59*	.03	.11
43	*.40*	.18	.12	.10	.15	.22	.08	*.57*	.07	.15
44	.22	.09	.18	.12	.13	*.36*	.09	*.50*	.06	.09
45	.29	.05	.03	.18	.11	.28	.12	*.44*	–.02	.01
41	.10	.16	.08	.05	.13	–.03	–.03	*.38*	.01	–.07
6	.17	.03	–.07	.00	–.07	.03	.03	.05	*.93*	.18
5	.12	.02	–.07	.02	–.03	.04	.07	.02	*.84*	.18
8	.16	.03	.09	.12	.03	.01	.06	.04	.14	*.86*
7	.18	–.01	.04	.11	.01	–.04	.08	.05	.27	*.82*

Note. Coefficients ≥ |.30| are italicized. $N = 651$.

6. Sports/Physical Self-Efficacy: Composed of Items 25, 31, and 32. These three items all relate to team sports or physical activities.
7. Self-Efficacy for Meeting Others' Expectations: Composed of Items 41, 42, 43, 44, and 45. Items 42 through 45 were developed by Bandura to assess efficacy for meeting others' expectations. Item 41 asks respondents to assess their ability to control their temper. Although the fit of this item is somewhat unclear, perhaps respondents viewed the ability to control their temper along the same lines as meeting others' expectations.

The remaining 11 of the 52 items included on the instrument formed three different factors that varied depending on the extraction method. Below are the factors for each method of extraction.

Principal Components

1. Self-Efficacy for Academic Achievement: Composed of Items 5, 6, 7, and 8, each of which asks students to judge their ability to learn in mathematics or science.
2. Self-Efficacy for Communication: Composed of Items 9, 13, 28, and 29. Items 9 and 13 relate to language skills (writing, grammar), and Items 28 and 29 ask whether respondents think they could do things well that relate to working on a school newspaper or being a member of school government, both of which require good communication skills.
3. Self-Efficacy for Performing Arts: Composed of Items 26, 27, and 30. Each of these relate to either dance, music, or acting skills.

Principal Axis Factors

1. Performing Arts and Communication Efficacy: Composed of Items 9, 13, 26, 27, 28, 29, and 30. Items 9, 13, 28, and 29 relate to communication, and Items 26, 27, and 30 assess performing arts activities.
2. Self-Efficacy for Mathematics: Composed of Items 5 and 6. Both of these relate to mathematics.
3. Self-Efficacy for Science: Composed of Items 7 and 8. Both of these relate to science.

The choice of which of these clustering formations presented above to use for research depends on taste, research objectives, and theoretical orientation. It appears, however, that the principal components solution may be preferable because it combines mathematics and science to form self-efficacy for academic achievement and because it distinguishes between self-efficacy in communication and the performing arts. Perhaps the development and inclusion of additional items would eliminate or reduce the discrepancy between the principal components and principal axis results.

To test whether the pattern of second-order factors obtained by Bandura et al. (1996, 1999) and Miller et al. (1999) would replicate with the current data, component scores from the 10 components identified with principal component analysis were computed. Scores for each component were calculated by taking the mean response for items that identified the given component (e.g., the mean of Items 26, 27, and 30 for performing arts). Correlations, descriptive statistics, and alphas for each of these variables are presented in Table 4.

Three components were extracted. This number was decided based on the minimum eigenvalue of 1.00 rule (the first three prerotational eigenvalues were 3.51, 1.21, and 1.07, respectively, for a total of 58% of the variance) and because Bandura et al. (1996, 1999) and Miller et al. (1999) extracted three second-order components. Results of the second-order components analysis, with direct oblimin rotation (delta = 0.00), are presented in Table 5.

The three factors identified appear to parallel those presented by Bandura et al. (1996, 1999) and Miller et al. (1999). Miller et al.'s labels were used to

Table 4
Descriptive Statistics for and Correlations Among Ten Efficacy Components

Efficacy Components	1	2	3	4	5	6	7	8	9	10
1. Academic Achievement										
2. Performing Arts	.01									
3. Assertiveness	.16*	.33*								
4. Communication	.06	.43*	.34*							
5. Meet Others' Expectations	.18*	.19*	.38*	.33*						
6. Self-Regulated Learning	.28*	.21*	.33*	.37*	.53*					
7. Self-Regulated Peer Pressure	.04	.03	.12*	.11*	.33*	.28*				
8. Social	.08*	.33*	.51*	.35*	.47*	.34*	.13*			
9. Physical/Sports	.16*	.21*	.31*	.13*	.24*	.22*	.05	.30*		
10. Enlist Adult Support	.04	.26*	.37*	.32*	.44*	.37*	.24*	.48*	.22*	
M	5.27	4.60	5.25	4.95	5.28	5.04	6.00	5.75	5.57	5.06
SD	1.24	1.28	0.95	1.03	0.93	0.93	1.06	0.79	1.32	1.15
Alpha	.81	.66	.78	.70	.77	.88	.82	.78	.90	.80

Note. $N = 651$.
*$p < .05$.

Table 5
Second-Order Principal Components Analysis Pattern (and Structure) Coefficients With Oblimin Rotation

	Components		
Efficacy Variables	1	2	3
Performing arts	*.80* (*.73*)	–.21 (–.03)	–.10 (.06)
Social	*.68* (*.73*)	.11 (*.36*)	–.10 (.28)
Communication	*.66* (*.68*)	.18 (.26)	.09 (.08)
Assertiveness	*.61* (*.68*)	.06 (.25)	.25 (.40)
Enlist adult support	*.51* (*.60*)	*.42* (*.54*)	–.06 (.13)
Self-regulated peer pressure	–.13 (.04)	*.84* (*.79*)	–.13 (–.04)
Meet others' expectations	.28 (*.48*)	*.61* (*.71*)	.20 (*.36*)
Self-regulated learning	.21 (*.43*)	*.54* (*.64*)	*.33* (*.46*)
Academic achievement	–.24 (–.02)	.07 (.14)	*.88* (*.84*)
Physical/sports	*.34* (*.43*)	–.15 (.01)	*.52* (*.58*)

Note. Structure coefficients in parentheses. Coefficients ≥ |.30| are italicized. $N = 651$.

name these factors as they seemed closest to the current findings. The first component, called "social efficacy," is composed of perceived efficacy for performing arts, social activities, communication, assertiveness, and enlisting adult support. The second component, called "efficacy for task manage-

ment," is represented by perceived efficacy to self-regulate peer pressure to engage in risky activities, efficacy to self-regulate learning activities, and efficacy to meet others' expectations. The final component was tentatively labeled "academic achievement efficacy" because the perceived efficacy for academic achievement variable appears to dominate this component; however, efficacy for physical and sports activities also was salient with this component, albeit weakly, when compared with academic achievement efficacy. The inclusion of the physical and sports efficacy variable makes interpretation of this component more difficult, but it is important to note that this variable also correlated with the social efficacy component as well, which appears to be a better fit.

Discussion

Self-efficacy is a multidimensional construct (Bandura, 1997). To understand how self-efficacy relates to various psychological and educational outcomes of importance (e.g., academic achievement, motivation) across a variety of domains, it is necessary to have available instruments that tap disparate domains and provide valid and reliable scores. The results of the present study provide some evidence that Bandura's (1990) MSPSE does just that for college freshmen. The internal structure and empirical dimensions found correspond with previous factor and component analyses of MSPSE scores from middle school students (Bandura et al., 1996, 1999) and high school students (Miller et al., 1999). Although the results of the current study further confirm the usefulness of the MSPSE, more research is needed to learn whether the results observed from the present and previous studies will replicate and generalize to other populations and settings.

Bandura et al. (1996, 1999) found that second-order factors from MSPSE correlated well with theoretically associated outcomes. However, additional research is needed to examine the construct validity of scores from the various scales (i.e., first-order factors) contained in MSPSE. At least two studies have provided such evidence. In the first study, Zimmerman et al. (1992) found that measures of self-efficacy for academic achievement and self-efficacy for self-regulated learning obtained from the MSPSE correlated in a theoretically appropriate manner with parent grade goals, student grade goals, and final course grades for high school students in a social studies class. In the second study, Pajares and Graham (1999) found, in their investigation of mathematics performance for middle school students, that self-efficacy for self-regulated learning correlated positively with a number of theoretically linked variables (e.g., mathematics performance and mathematics self-concept) and negatively with mathematics anxiety. Additional research that tests whether scores from the various MSPSE scales correlate with theoretically related constructs will help establish the utility of MSPSE for future research on self-efficacy.

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