

Rubric-Referenced Self-Assessment and Self-Efficacy for Writing

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ABSTRACT. The authors investigated the relation between long- and short-term rubric use (including self-assessment), gender, and self-efficacy for writing by elementary and middle school students ($N = 268$). They measured long-term rubric use with a questionnaire. They manipulated short-term rubric use by a treatment that involved reviewing a model and using a rubric to self-assess drafts. The authors collected self-efficacy ratings 3 times. Results revealed that girls' self-efficacy was higher than boys' self-efficacy before they began writing. The authors found interactions between gender and rubric use: Average self-efficacy ratings increased as students wrote, regardless of condition, but the increase in the self-efficacy of girls in the treatment group was larger than that for girls in the comparison group, and long-term rubric use associated only with the self-efficacy of girls.

Keywords: gender, rubric, self-assessment, self-efficacy, writing

Rubrics have become popular with teachers as a means of communicating expectations for an assignment, providing focused feedback on works in progress, and grading final products (Andrade, 2000; Moskal, 2003; Popham, 1997). Although educators tend to define *rubric* in slightly different ways, a commonly accepted definition is a document that articulates the expectations for an assignment by listing the criteria, or what counts, and describing levels of quality from excellent to poor (see Appendix A for rubrics that fit this definition). Current books and articles on classroom assessment are rife with claims about the potential for student-involved assessment in general and rubrics in particular to increase students' self-efficacy and, as a result, lead to improvements in learning and achievement (e.g., Arter & McTighe, 2001; Quinlan, 2006; Stiggins, 2001). The assumption is that heightened self-efficacy is one of the mechanisms by which rubrics provide an advantage, yet no empirical evidence of a relation between rubric use and self-efficacy exists.

Some research suggests that rubric use can be related to improvements in the quality of students' writing and knowledge of the qualities of effective writing. Researchers of writers in Grades 3 and 4 (Andrade, Du, & Wang, in

press) and in Grades 4, 5, and 6 (Ross, Rolheiser, & Hogaboam-Gray, 1999) have shown a relation between writing scores and rubric-referenced student self-assessment. In a study of group learning in five/Grade 6 social studies classes, Cohen, Lotan, Scarloss, Schultz, and Abram (2002) found that students who were informed of the evaluation criteria for written essays had higher quality discussions and better group products than did students who worked without knowing the criteria. Using path analysis, these authors concluded that knowledge of evaluative criteria had an indirect effect on essay scores, with group products and self-assessment (group discussions of the quality of their product) playing a key mediating role.

In a study of eighth-grade students' writing, Andrade (2001) showed that simply providing students with a rubric was associated with higher scores on only one of three essays; however, questionnaires administered at the end of the study revealed that students in the treatment group tended to identify more of the criteria by which their writing was evaluated. Andrade concluded that simply handing out and explaining a rubric can increase students' knowledge of the criteria for writing, but translating that knowledge into actual writing is more demanding. She recommended sustained attention to the process of assessing writing, including involving students in the design of rubrics by critiquing sample pieces of writing and by teaching students to self-assess their works in progress.

Andrade's (2001) recommendation regarding involving students in cocreating rubrics by critiquing examples is supported by research on the power of models in promoting skill acquisition. Zhu, Simon, and colleagues (Zhu, Lee, Simon, & Zhu, 1996; Zhu & Simon, 1987; Zhu, Zhu, Lee, & Simon, 2003) have demonstrated that studying worked-out examples of science or mathematics problems can help students acquire new information and skills, use the skills to solve new problems, and express solutions efficiently and

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accurately. Wiggins (1998) argued that examples or models can be equally useful in teaching writing. Noting that the performance standards on rubrics are open to interpretation and that some students' views of "what it means to meet these criteria and the standard may be way off the mark" (p. 183), Wiggins recommended giving students models to promote more accurate analyses of the criteria in a rubric. Orsmond, Merry, and Callaghan (2004) agreed that a key factor in self-assessment is students' understanding of specific criteria and recommended the use of a subject-specific exemplar.

For these reasons, students in the treatment group in the present study were given a model essay or story and asked to generate a list of criteria for their writing assignments by listing the qualities that made the model effective. Because we needed to use similar or identical rubrics in different classes to make cross-class comparisons, students were not involved in co-creating entire rubrics. Rather, they were asked to generate a list of the criteria for their assignment, which invariably matched the rubrics that they were given during the next class.

Although the aforementioned research suggests that rubric use can promote academic achievement, there are no available studies that directly investigate the mechanism behind any rubric advantage. Many educators believe that student confidence or self-efficacy is behind the effect. *Self-efficacy* is an individual's belief in his or her capability to achieve a specific goal (Bandura, 2003). Pajares (2000) noted, "It's not just a matter of how capable you are, it's also a matter of how capable you think you are" (p. 13). He cited extensive research that has shown that students' self-efficacy exerts a powerful influence on their academic achievement, including writing (Pajares, 2003; Pajares & Johnson, 1996; Pajares & Valiante, 1997), even at the elementary and middle school levels (Pajares, Miller, & Johnson, 1999; Pajares & Valiante, 1999). Highly efficacious students tend to see difficult tasks as challenges to be met. Their efficacious outlook fosters intrinsic interest in activities and prompts them to work harder, persist longer, adopt what they believe are better strategies, and seek help from teachers and peers. In contrast, students with low self-efficacy tend to avoid challenging tasks and give up quickly (Bandura; Schunk, 2003).

Claims about the self-efficacy-boosting powers of rubrics are common, especially in books and articles written for teachers. For example, Arter and McTighe (2001) asserted that engaging students in generating and using criteria (a partial rubric) "increases student motivation, confidence, and achievement" (p. xi). Similarly, Ross (2006) argued that self-assessments that focus "student attention on particular aspects of their performance (e.g., the dimensions of the co-constructed rubric)" (p. 6) contribute to positive self-efficacy beliefs. Quinlan (2006) claimed that, when given a rubric, students "approach assignments with more confidence and resulting increased self-efficacy" (p. 119). Stix (1996) maintained that involving students in developing a rubric can

boost their confidence in their own abilities and their motivation to push past difficulties. Popular assessment expert Rick Stiggins (2001) concurred, claiming that "confidence is key to student success in all learning situations" (p. 43) and that involving students in the assessment process allows teachers to "tap an unlimited wellspring of motivation that resides within each learner" (p. 46).

In the present article, we admit to being skeptical of these claims, but there are reasons to believe them. Research has shown that there are a number of ways to boost self-efficacy, several of which may be enacted through a rubric. For example, in a study of undergraduate students' responses to rubric use over the course of a semester, Andrade and Du (2005) noted how students reported that having and using a rubric helped reduce anxiety about an assignment. Schunk (2001) noted that knowledge of specific performance standards can raise self-efficacy because progress toward an explicit goal is easy to gauge. Rubrics, by definition, provide specific performance standards and should boost self-efficacy.

There is some evidence that self-assessment or self-evaluation can also promote self-efficacy. For example, Paris and Paris (2001) reviewed research that suggests that self-assessment is likely to promote monitoring of progress, stimulate revision strategies, and promote feelings of self-efficacy. In a linear structural model, Wagner (1991, cited in Ross et al., 1999) found positive path coefficients from self-evaluation to self-efficacy. Schunk and Ertmer (1999) showed that "the opportunity for self-evaluation promoted self-efficacy" (p. 257). Schunk (2003) recommended giving students practice with criterion-referenced self-evaluation to develop and sustain self-efficacy for learning. Results from Kitsantas, Reiser, and Doster's (2004) study of 9th- and 10th-grade students who were learning to use presentation software showed that "among students who received organizational signals, those in the self-evaluation condition reported significantly higher levels of self-efficacy than did those in the no self-evaluation condition" (p. 284). In a qualitative study (Andrade & Du, 2005), undergraduates reported that criteria-referenced self-assessment made them feel more motivated and confident about their work.

We designed the present study to test the popular claims about the effects of rubric-referenced assessment, especially self-assessment, on elementary and middle school students' self-efficacy for a writing assignment. To investigate the influence of duration of exposure to rubrics, we examined short- and long-term rubric use. Because previous research has indicated that female students tend to have higher self-efficacy for writing than do boys (Pajares & Valiante, 1997, 1999), at least when researchers use measures that account for the tendency for girls and boys to use a different metric when providing confidence judgments (Pajares et al., 1999; Pajares & Valiante, 1999), in the present study, we also examined gender. The research questions that guided this study were the following:

Research Question 1: Is there a relation of short-term rubric use and elementary and middle school students' self-efficacy for a writing assignment?

Research Question 2: Is there a relation of long-term rubric use and self-efficacy for a writing assignment?

Research Question 3: Is there a gender difference in students' self-efficacy for a writing assignment?

Research Question 4: Does the effect of treatment differ by gender?

Answers to these questions will help researchers and teachers better understand and manage the relation between rubric use and students' confidence in and motivation for writing.

Method

Participants

Participants were 307 students in a convenience sample of volunteers in 18 elementary and middle school classes. After we accounted for missing data, including student absences from school during 1 or more days of the intervention, the actual sample size for the statistical analysis was 268. Of the classes, 9 were in a public school (School 1) with a population largely lower to middle class and White, 7 were in a private school for girls (School 2), and 2 were in a private school for boys (School 3). Both private school populations were largely middle to upper-middle class and White. All three schools were located in the Northeastern United States. Of the 18 classes, 13 were English or language arts, and 5 were history or social studies.

Table 1 presents the demographic information for the participants. Of the participants, 167 (62%) attended the public school, and the remaining 101 (38%) attended one of the two private schools. Among the participants, 99 (37%) were boys, and 169 (63%) were girls.

TABLE 1. Demographic Information for Participants (N = 268)

Demographic	School 1	School 2	School 3	Total
Condition				
Comparison	77	43	17	137
Treatment	90	30	11	131
Gender				
Female	96	73	0	169
Male	71	0	28	99
Grade level				
Grades 3–4	122	8	17	147
Grades 5–7	45	65	11	121
Ethnicity				
White	160	62	20	242
African American	6	2	1	9
Other	1	9	6	17
Total	167	73	28	268

Participating students' grade levels ranged from Grade 3 to Grade 7. The sample comprised 54 third-grade students (20.1%), 93 fourth-grade students (34.7%), 41 fifth-grade students (15.3%), 56 sixth-grade students (20.9%), and 24 seventh-grade students (9.0%). Ethnicity information was available for 239 participants in the study. The majority of those participants ($n = 242$; 90.3%) were White. Special needs information was available for the participants from the public school (School 1) and the private school for girls (School 2). Five student participants were identified by their school as having special needs in reading, 6 as having special needs in reading and writing, and 2 as having English as a second language.

The treatment and comparison groups consisted of intact classes, nine in each condition. We made assignments to the treatment or comparison group systematically, in terms of two variables: (a) the degree to which the classroom teachers had already used rubrics with the participating classes and (b) grade level. We took this approach to balance prior experience with rubrics and to ensure comparable numbers of students in each grade. As shown in Table 2, the treatment group consisted of four classes in Grades 3–4 and five classes in Grades 5–7; the comparison group comprised five classes in Grades 3–4 and four classes in Grades 5–7. Of the nine treatment classes, five had not used rubrics and four had used rubrics at least once or twice. Of the nine comparison classes, four had not used rubrics and five had used rubrics at least once or twice.

Instruments

Self-efficacy. Self-efficacy was measured through an adapted version of the Writing Self-Efficacy Scale used by Pajares, Hartley, and Valiante (2001). The 11-item writing self-efficacy scale (see Appendix B) measures individuals' confidence in their writing abilities, including their skill in handling commonly assessed qualities of writing: ideas and content, organization, paragraph formatting, voice and tone, word choice, sentence fluency and conventions (e.g., the 6+1 Trait Writing Method; see Culham, 2003; Spandel & Stiggins, 1997). Students were instructed to rate their confidence levels on a scale of 0–100. The 0–100 format was selected over the traditional Likert-type scale because Pajares et al. documented that a scale with a 0–100 format was psychometrically stronger than a 1–10 scale in regard to factor structure and internal consistency. Pajares et al. also found that, compared with the traditional Likert-type scale, the 0–100 scale has better discrimination and stronger relations with various achievement indexes. For the sample in the present study, the measure yielded alpha reliabilities of .91, .92, and .91 for the three administrations of the self-efficacy instrument, respectively.

Previous exposure to rubrics. Students' exposure to rubrics was measured in two ways. Teachers who volunteered to participate in the study were asked about their rubric use with the class or classes involved in the research. Their

TABLE 2. Number of Classes Assigned to Treatment and Comparison Conditions, by Grade Level and Teachers' Prior Rubric Use

Group	Teacher's prior rubric use (<i>Yes</i>)		Teachers' prior rubric use (<i>No</i>)		Total
	Grades 3-4	Grades 5-7	Grades 3-4	Grades 5-7	
Treatment	1	3	3	2	9
Comparison	2	3	3	1	9

responses were confirmed by observation in their classroom and categorized according to the 0-4 scale in Table 3. Of the 15 teachers in the study, 3 were categorized as Level 0, 3 as Level 1, 5 as Level 2, 3 as Level 3, and 1 as Level 4. The teacher rating of prior rubric use by the treatment group was not statistically different from that of the comparison group, $t(16) = 0.80, p = .44$. This variable was used to assign classes to treatment condition and was not included in the analysis because it is a class-level variable.

Data for a student-level variable regarding prior rubric use were generated by asking students to answer two questions on a questionnaire administered at the beginning of the study: (a) "Has your teacher for *this class* ever given you a rubric for a writing assignment? (*Yes or No*)" and (b) "If yes, about how many times has your teacher given you

a rubric for a writing assignment? (1-2 times, 3-5 times, 6-10 times, 10 or more times)." Class averages of students' responses ranged from 0 (*No, my teacher has not given a rubric for a writing assignment*) to 3.28 (*Yes, my teacher has given a rubric for a writing assignment 3-5 times*). The average rating for the treatment group was 1.41 ($SD = 1.44$). The average rating for the comparison group was 1.05 ($SD = 0.97$). The average student rating of previous rubric use in the treatment group was higher than that of the comparison group, $t(266) = 2.46, p = .015$.

The data collected from the questionnaires were used as a measure of long-term rubric use. Data were collected between January and March of 2006. Because each class began meeting in September, we defined *long-term rubric use* as use for between 5 and 7 months.

Writing assignments. Each class was asked to do a writing assignment. Of the 18 classes, 2 third-grade classes (1 treatment and 1 comparison) wrote stories. The remaining 16 classes (8 treatment and 8 comparison), including 2 more third-grade classes, wrote persuasive essays. The writing process in each class resembled a writers' workshop: Students engaged in some form of prewriting, wrote rough drafts, received feedback from the classroom teacher, and wrote final drafts.

Procedures

Table 4 summarizes the sequence of events followed by each class. To ensure the fidelity of the treatment, the first author co-led Class Periods 1, 2, and 4 with the classroom teachers.

The treatment condition differed from the comparison condition in three ways: The students in the treatment group (a) read a model story or essay, discussed its strengths and weaknesses, and generated a list of qualities of an effective story or essay; (b) received a written rubric (Appendix A); and (c) used the rubric to self-assess their first drafts. The students in the comparison group did not read a model but did generate a list of qualities of an effective story or essay. The comparison group did not receive a rubric. Students in the comparison group were asked to review their first drafts and note possibilities for improvement in the final draft. They did not self-assess their drafts according to a rubric.

Models and criteria generation. The treatment group was given a model story or essay to prompt discussion of the

TABLE 3. Teachers' Reported Level of Prior Rubric Use with Participating Classes

Level	Description of Rubric Use
0	I do not use rubrics in this class.
1	I use rubrics in this class. I create the rubric and discuss the expectations with students but do not hand out the rubric before students begin an assignment. I use the rubric to grade student work.
2	I use rubrics in this class. I create the rubric and hand out and review the rubric with students before they begin to work on their assignments. I use the rubric to grade student work.
3	I use rubrics in this class. I create and review the rubric with students before they begin their assignments. I ask students to use the rubric to evaluate their own or others' writing some of the time. I use the rubric to grade student work.
4	I use rubrics in this class. I sometimes or always create the rubric with my students. We review the rubric before they begin their assignments. I ask students to use the rubric to evaluate their own and their peers' work most of the time. I use the rubric to grade student work.

TABLE 4. Sequence of Events, by Condition and Class Period

Group	Class Period 1	Class Period 2	Class Period 3	Class Period 4	Class Period 5+
Treatment	<ol style="list-style-type: none"> 1. Introduce assignment. 2. Read and discuss model story or essay. 3. Generate list of qualities of an effective story or essay. 4. Practice self-efficacy rating. 5. Administer first self-efficacy assessment. 	<ol style="list-style-type: none"> 1. Hand out and discuss rubric 2. Administer second self-efficacy assessment 3. Students do prewriting (e.g., outlining, brainstorming) 	Students write first drafts.	<ol style="list-style-type: none"> 1. Students use rubric to self-assess first drafts. 2. Administer third self-efficacy assessment. 	<ol style="list-style-type: none"> 1. Classroom teacher gives each student feedback. 2. Students write final drafts.
Comparison	<ol style="list-style-type: none"> 1. Introduce assignment. 2. Generate list of qualities of an effective story or essay. 3. Practice self-efficacy rating. 4. Administer first self-efficacy assessment. 	<ol style="list-style-type: none"> 1. Administer second self-efficacy assessment. 2. Prewriting (e.g., outlining, brainstorming). 	Students write first drafts.	<ol style="list-style-type: none"> 1. Students self-assess drafts without rubric. 2. Administer third self-efficacy assessment. 	<ol style="list-style-type: none"> 1. Classroom teacher gives each student feedback. 2. Students write final drafts.

qualities of effective writing and scaffold thinking about the criteria for students' own essays or stories. Researchers have argued that the process of generating criteria is beneficial to students (Andrade, 2000, 2001; Ross et al., 1999). However, for research purposes, the rubrics given to different classes in the treatment group were the same; different classes did not cocreate idiosyncratic rubrics.

Self-assessment. The rubric-referenced self-assessment done by students in the treatment group was guided by the first author. Students were asked to underline key phrases in the rubric with colored pencils (e.g., "clearly states an opinion") and then underline or circle in their drafts the evidence of having met the standard articulated by the phrase (e.g., his or her opinion). If they found they had not met the standard, they were asked to write themselves a reminder to make improvements when they wrote their final drafts.

Self-efficacy ratings. All student participants were administered the Writing Self-Efficacy Scale (see Appendix B) three times: (a) during Class Period 1, after the writing assignment was introduced; (b) during Class Period 2, after the rubric was handed out (treatment) or not handed out (comparison); and (c) during Class Period 4, after the rubric-referenced self-assessment of drafts (treatment) or review of drafts (comparison). On the advice of Bandura (2006), the first administration of the instrument was preceded by briefly practicing self-efficacy rating. Students

were asked to rate their confidence that they could jump increasing distances (three, five, and seven floor tiles) on a scale of 0–100 and to then actually attempt the jumps.

In-class writing. Students were given class time to complete each step of the writing process. The amount of class time devoted to writing (not instruction or treatment) varied by class, from 90 to 265 min. The amount of time devoted to writing was determined by the teachers, who were encouraged to conduct their lessons as they typically did. No upper or lower limit on writing time was set by the researchers. The average time spent on writing by the treatment group was 159 min ($SD = 52$ min). The average time spent on writing by the comparison group was 156 min ($SD = 24$ min). On average, the treatment and comparison groups had equivalent amounts of class time for writing, $t(16) = 0.20$, $p = .84$. Writing time was not significantly correlated with any of the three self-efficacy ratings ($r = .28$, $p = .26$; $r = .25$, $p = .32$; and $r = .11$, $p = .65$; respectively).

Results

Preliminary Analysis

For the full sample ($N = 268$), the mean of the self-efficacy rating was 82.6 ($SD = 17.10$) for the first administration, 83.5 ($SD = 17.32$) for the second administration,

and 87.7 ($SD = 14.16$) for the third administration. The mean rating on the first self-efficacy scale is comparable to those of previous research with elementary and middle school students' mean prewriting self-efficacy ratings of 80, 84, 83, and 78 ($SDs = 14.6, 12.6, 13, \text{ and } 17.4$, respectively; Pajares et al., 1999; Pajares & Valiante, 1999). The means and standard deviations of self-efficacy ratings at each of the three times are compared by gender in Table 5.

Differences by condition. The means and standard deviations of self-efficacy ratings at the three times by group (treatment or comparison) are also shown in Table 5. A t test analysis showed no difference between the treatment and comparison groups in scores for the first two administrations of the self-efficacy instrument. At Time 3, the average writing self-efficacy score of the treatment group was higher than that of the comparison group. The difference approached but

did not reach statistical significance, $t(266) = 1.79, p = .075$. Figure 1 shows the pattern of change in self-efficacy for the treatment and comparison groups.

Differences by gender. A t test analysis showed gender differences in self-efficacy scores, favoring girls for the first administration of the self-efficacy instrument, $t(266) = 2.48, p < .05$. The differences between boys and girls approached significance for the third administration of the instrument, $t(266) = 1.92, p = .056$. However, at Time 2, the differences in the average writing self-efficacy scores for girls and boys were not statistically significant. Figure 2 shows the pattern of change in self-efficacy for boys and girls.

Differences by grade level and school type. A t test showed no statistically significant differences in self-efficacy ratings across grade levels (Grades 3–4 vs. Grades 5–7) for any of the three administrations of the self-efficacy assessment:

TABLE 5. Means and Standard Deviations of Self-Efficacy Scores at the Three Different Times, by Condition and Gender (N =268)

Variable	Time 1					Time 2					Time 3					
	M	SD	t	p	ES	M	SD	t	p	ES	M	SD	t	p	ES	
Condition			0.14	.885	.02			-0.49	.626	.06				-1.79	.075	.22
Comparison	82.76	16.032				82.94	17.764				86.20	15.016				
Treatment	82.45	18.204				83.98	16.905				89.29	13.078				
Gender			2.48	.014	.31			1.32	.189	.17				1.92	.056	.24
Female	84.57	15.712				84.51	17.058				88.97	13.532				
Male	79.25	18.845				81.63	17.709				85.56	14.996				

Note. ES = effect size.

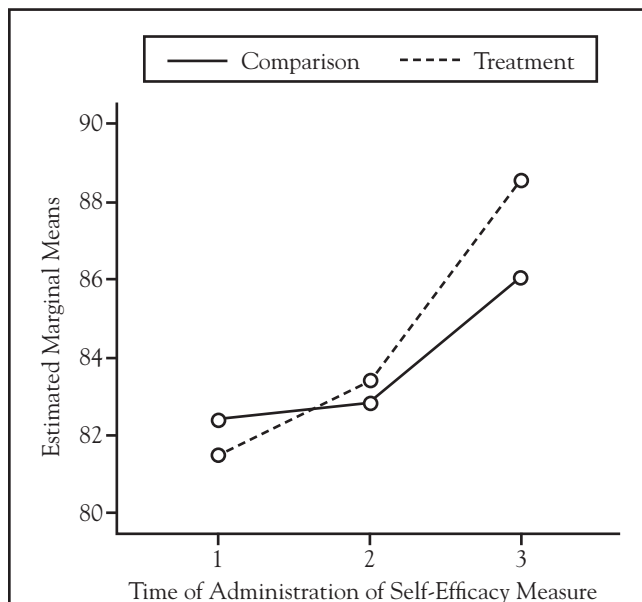


FIGURE 1. Estimated marginal means of writing self-efficacy scores across three time points, by treatment and comparison condition (N = 268).



FIGURE 2. Estimated marginal means of writing self-efficacy scores across three time points, by gender (N = 268).

$t(266) = -0.46, p = .644$; $t(266) = 0.10, p = .919$; and $t(266) = 0.20, p = .840$, for the three administrations of self-efficacy assessment, respectively. Similarly, a t test showed no statistically significant differences in self-efficacy ratings between students in public schools and students in private schools: $t(266) = 0.90, p = .371$; $t(266) = 0.72, p = .471$; and $t(266) = 0.78, p = .434$, for the three administrations of self-efficacy assessment, respectively.

Partial correlation between prior rubric use and self-efficacy ratings. We conducted partial correlations between student reports of previous rubric use and self-efficacy ratings at the three different times to examine the correlation between experience with rubrics and self-efficacy and changes in self-efficacy, controlling for treatment condition, gender, grade level, and school type. As shown in Table 6, prior rubric use was positively correlated with self-efficacy ratings at the three different times. For this reason, prior rubric use was included as a covariate in a subsequent repeated measures analysis of variance (ANOVA).

Repeated Measures ANOVA

Because self-efficacy ratings were assessed repeatedly at three different times as students wrote, we used a repeated measures ANOVA to examine the effect of rubric-referenced self-assessment on self-efficacy ratings. Models were first evaluated for the full sample and then separately

for the male and female subsamples. For the full sample, the design included two between-subjects factors (condition as treatment or comparison group and gender as female or male) and the covariate (previous exposure to rubrics). For the male and female subsample analyses, the design only included the between-subjects factor of condition and the covariate (previous exposure to rubrics). The within-subject factor in all these analyses was the administration of the self-efficacy measure (Times 1–3).

Full sample. Results for the full sample are presented in Table 7. The sphericity assumption was not met, $\chi^2(2, N = 268) = 20.78, p < .001$, indicating the heterogeneity of variances and covariance. In many areas of psychology, the covariance between the levels of the repeated measures variables often does not conform to this assumption (see Hertzog & Rovine, 1985; Keselman, Algina, & Kowalchuk, 2001; McCall & Appelbaum, 1973). Alternative approaches, including the multivariate approach and univariate tests with adjusted degrees of freedom, have generally been applied when covariance is heterogeneous. In the present study, the two alternative approaches produced similar findings. We report results from the multivariate tests.

Results of the within-subjects tests showed that the main effect of time (1–3) was statistically significant, multivariate $F(2, 262) = 16.15, p < .001$, indicating that the self-efficacy ratings of participants increased over time. The effect size ($\eta_p^2 = .11$) was small. Post hoc comparisons of marginal means were performed using the Bonferroni adjustment for multiple comparisons. There was no statistically significant difference between the average self-efficacy ratings at Time 1 ($M = 82.0, SE = 1.05$) and Time 2 ($M = 83.1, SE = 1.09, p = .307$), but the increase from a mean of 83.1 ($SE = 1.09$) at Time 2 to a mean of 87.3 ($SE = 0.89$) at Time 3 was statistically significant ($p < .001$). The marginal means of self-efficacy ratings across the three times presented in Figure 1 indicate that there was a large increase in average self-efficacy rating from Time 2 to Time 3 for the treatment and comparison groups.

Results of the between-subjects tests showed that the treatment condition had no statistically significant effect on self-efficacy, $F(1, 263) = 0.17, p = .684$. There was a statistically

TABLE 6. Partial Correlations Between Self-Efficacy Scores at Times 1, 2, and 3 and Prior Exposure to Rubrics (N = 268)

Time	Prior exposure to rubrics
1	.25**
2	.20**
3	.16*

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

TABLE 7. Test of Within-Subject and Between-Subjects Effects (N = 268)

Source	F	df	p	Partial η^2
Multivariate within-subject effects				
Time (1–3)	16.15	2	.000	.110
Time \times Students' Previous Exposure to Rubrics	2.16	2	.118	.016
Time \times Condition	1.73	2	.179	.013
Time \times Gender	1.63	2	.197	.012
Time \times Condition \times Gender	0.87	2	.421	.007
Between-subjects effects				
Students' previous exposure to rubrics	11.86	1	.001	.043
Condition	0.17	1	.684	.001
Gender	4.95	1	.027	.018
Condition \times Gender	1.43	1	.234	.005

significant main effect of gender on writing self-efficacy ratings, $F(1, 263) = 4.95, p = .027$. The average self-efficacy rating for girls was higher than that of boys, but the effect size was very small ($\eta_p^2 = .02$). The results also suggested an association between previous exposure to rubrics and elementary and middle school students' ratings of their self-efficacy for writing an assigned story or essay, $F(1, 263) = 11.86, p = .001$. The effect size was very small ($\eta_p^2 = .04$).

We also attempted a model that included grade level (Grades 3–4 vs. Grades 5–7) and school type (public vs. private) as between-subjects factors, in addition to condition and gender. Results indicated that neither the main effect of grade level or school type nor the interaction effect between condition and either grade level or school type was statistically significant.

Female subsample. Results for the female subsample are presented in Table 8. Results of the within-subject tests showed that, in addition to the main effect of time, multivariate $F(2, 165) = 9.62, p < .001$, the interaction between condition and the three administrations of the self-efficacy measure was statistically significant, multivariate $F(2, 165) = 3.61, p = .029$. The marginal means of self-efficacy ratings across the three times for the female subsample are shown in Figure 3. From Time 1 to Time 3, girls in the treatment condition experienced a larger increase in their average self-efficacy rating as compared with girls in the comparison condition: The increase was 7.2 points for girls in the treatment group, compared with 1.5 points for girls in the comparison condition. Results of the between-subjects tests showed that the condition had no statistically significant effect on

self-efficacy, $F(1, 166) = 0.52, p = .473$. Much as for the results from the full sample analysis, a relation between previous exposure to rubrics and girls' ratings of their self-efficacy for writing was found, $F(1, 166) = 10.97, p = .001$.

Male subsample. The results for the male subsample are presented in Table 9. Only the main effect of time was

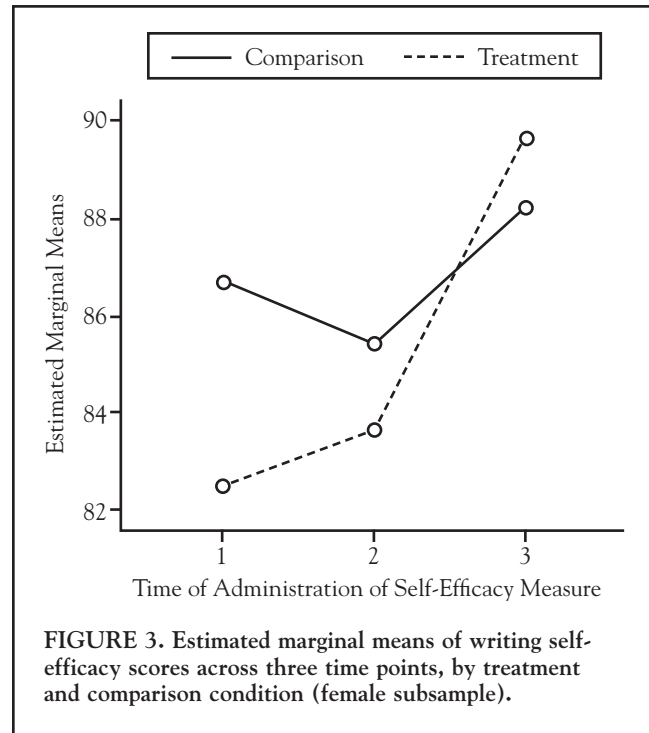


FIGURE 3. Estimated marginal means of writing self-efficacy scores across three time points, by treatment and comparison condition (female subsample).

TABLE 8. Test of Within-Subject and Between-Subjects Effects for the Female Subsample (n = 169)

Source	F	df	p	Partial η^2
Multivariate within-subject effects				
Time (1–3)	9.62	2	.000	.104
Time \times Students' Previous Exposure to Rubrics	1.14	2	.323	.014
Time \times Condition	3.61	2	.029	.042
Between-subjects effects				
Students' previous exposure to rubrics	10.97	1	.001	.062
Condition	0.52	1	.473	.003

TABLE 9. Test of Within-Subject and Between-Subjects Effects for the Male Subsample (n = 99)

Source	F	df	p	Partial η^2
Multivariate within-subject effects				
Time (1–3)	6.85	2	.002	.126
Time \times Students' Previous Exposure to Rubrics	1.20	2	.306	.025
Time \times Condition	0.07	2	.936	.001
Between-subjects effects				
Students' previous exposure to rubrics	1.81	1	.181	.019
Condition	0.95	1	.333	.010

statistically significant, multivariate $F(2, 95) = 6.85, p = .002$. Unlike the results from the female subsample, the results from the male subsample indicated that the relation between boys' reported prior rubric use and self-efficacy was not statistically significant, $F(2, 96) = 1.81, p = .181$, nor was the interaction between condition and the three administrations of the self-efficacy measure, multivariate $F(2, 95) = 0.07, p = .936$. The pattern of change in self-efficacy scores for boys in the treatment and comparison groups was similar (see Figure 4).

Discussion

This discussion is framed in terms of our four research questions.

Research Question 1. The present study provides only partial support for the popular claim that rubric-referenced assessment is related to increases in students' self-efficacy for a written assignment. The data show that, on average, all students' self-efficacy increased as they progressed through the writing process, regardless of condition. Even reviewing a model piece of writing had no apparent relation with self-efficacy: There were no statistically significant between-groups differences in self-efficacy ratings at Time 2, which were done during Class Period 2, 1 day after students in the treatment classes reviewed the model.

One explanation for the average increase in self-efficacy ratings by students in the treatment and comparison groups can be found in Bandura's (1986) theory regarding mastery experiences. According to Bandura, *mastery experiences*, or outcomes interpreted as successful, can raise self-efficacy. Because all of the students in the present study completed

at least a rough draft of their written pieces, it is likely that they all experienced some sense of having mastered the assignment, especially after having reviewed or self-assessed their drafts (recall the large increases in average self-efficacy between Times 2 and 3). Pajares (2003) noted that writing programs like writers' workshops "endeavor to build students' efficacy in writing" (p. 154), so in the present study, we were not surprised to find a steady climb in all students' self-efficacy ratings as they incrementally created their stories or essays.

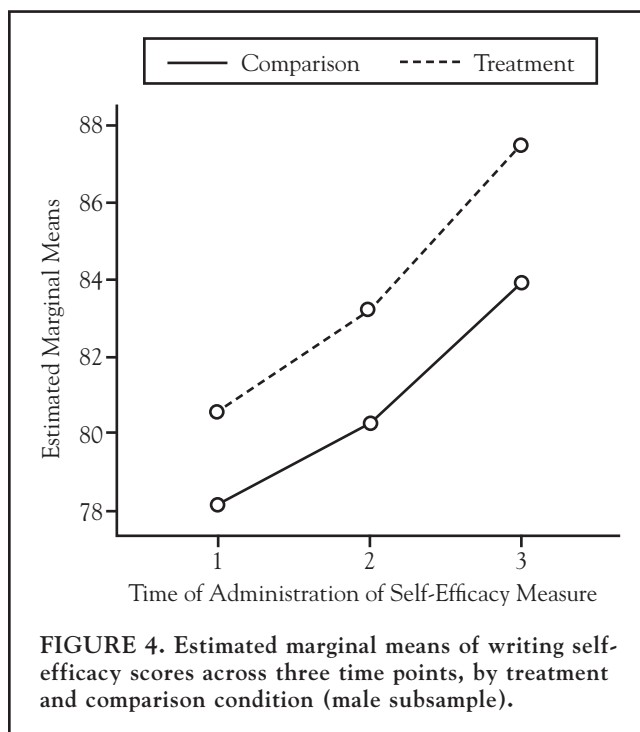
It is important to note that, although the data suggest no association between rubric-referenced assessment and self-efficacy for the full sample, there was a statistically significant interaction between gender and rubric-referenced assessment. When the data were analyzed in terms of gender, it became apparent that the relation between rubric use and self-efficacy differed for boys and girls in the treatment group. These findings are discussed in terms of Research Questions 2, 3, and 4.

Research Question 2. Although there was no relation between prior rubric use and self-efficacy for boys, self-efficacy for girls was related to long-term rubric use. Girls who reported more previous exposure to rubrics tended to have higher self-efficacy for writing.

Research Question 3. We found the expected gender difference in self-efficacy: Girls' average self-efficacy for writing tended to be higher than did that of boys, though the difference was small and only statistically significant at Time 1, before the students began writing. This finding is consistent with previous research on gender differences in self-efficacy for writing, including studies that used Likert-type scales (Pajares & Valiante, 1997) and studies that accounted for girls' tendencies to underrepresent their confidence on such scales by asking them to compare their writing capabilities to those of other students (Pajares et al., 1999; Pajares & Valiante, 1999).

Research Question 4. We found an interesting interaction between gender and rubric use. Although there was no relation between rubric use and self-efficacy for boys, self-efficacy of girls was related to short-term rubric use. Self-efficacy of girls in the treatment group was higher than that of girls in the comparison group at Time 3, after engaging in rubric-referenced self-assessment (see Figure 3). As suggested by a comparison of self-efficacy ratings at Time 1 (when the assignment was introduced) and Time 2 (after reviewing a model or not and getting the rubric or not), simply reviewing the model and handing out the rubric was not associated with an increase in girls' self-efficacy for the assignment. Girls' self-efficacy ratings appear to be particularly susceptible to rubric-referenced self-assessment.

We turned to the literature on attribution theory to understand the differences we found between boys and girls. In general, the research shows that middle school girls tend to hold task (or mastery) goals, whereas boys tend to hold performance-approach (or ego) goals, in writing (Pajares, Britner, & Valiante, 2000) and mathematics (Middleton



& Midgley, 1997). That is, girls tend to be more concerned with mastering a writing task than do boys, who, on average, tend to be more concerned with showing someone else that they are capable. Our findings regarding the differences in increases in self-efficacy after self-assessment may reflect these different achievement goals: Girls may derive more satisfaction and confidence from self-generated evidence of progress on a writing assignment than do boys, who seek confirmation of progress from others, including perhaps their teachers and peers.

Researchers have shown boys' and girls' differing attribution patterns to be related to different ways of responding to feedback. Research by Dweck and her colleagues (Dweck & Bush, 1976; Dweck, Davidson, Nelson, & Enna, 1978) and others (Deci & Ryan, 1980; Hollander & Marcia, 1970) has shown that girls are more likely than are boys to attribute failure to ability rather than to motivation, effort, or the agent of evaluation. As a result of these attributions, girls' performance following negative adult feedback tends to deteriorate more than does boys' performance. However, a study by Roberts and Nolen-Hoeksema (1989) found no evidence that women's greater responsiveness to evaluative feedback led to performance decrements, suggesting women's tendencies toward maladaptive responses to feedback are not absolute. Also of interest are earlier studies by Bronfenbrenner (1967, 1970), who found that when peers—instead of adults—delivered failure feedback, the pattern of attribution and response reversed: Boys attributed the failure to a lack of ability and showed impaired problem solving, whereas girls more often viewed the peer feedback as indicative of effort and showed improved performance.

Noting that the more traditional finding of greater helplessness among girls was evident only when the evaluators were adults, Dweck et al. (1978) took these findings to mean "that boys and girls have not learned one meaning for failure and one response to it. Rather, they have learned to interpret and respond differently to feedback from different agents" (p. 269). We speculate that, in the present study, generating the feedback themselves protected girls from the potentially debilitating effects of negative adult feedback. As a result, the girls in this study may have attributed any shortcomings they encountered in their writing to effort, which they could control. An effort attribution could have led to increased feelings of self-efficacy. The boys in the study, however, might have been less influenced by the presence of the rubric because they placed less value on their own feedback.

This hypothesis regarding differences in girls' and boys' responses to self-assessment requires further investigation but has indirect support from previous researchers who showed that simply being given a rubric was associated with lower scores for a written assignment for girls but not for boys (Andrade, 2001) and that rubric-referenced self-assessment was associated with higher scores on a similar written assignment for girls and not boys (Andrade & Boulay,

2003). Again, it appears that girls may be affected by rubric-referenced self-assessment in a way that boys are not.

The results for boys suggested no positive relation between self-efficacy and long-term rubric use or short-term rubric-referenced self-assessment, but it also suggested, fortunately, no negative relation. The findings of the present study lead us to conclude that, although broad claims about the confidence-boosting potential of rubrics may be overblown, the relation between (a) girls' self-efficacy and rubric use in general and (b) rubric-referenced self-assessment in particular may have meaning. Educators concerned with using assessment to boost the self-efficacy of boys are advised to seek other approaches.

The limitations of this study include the short treatment time; the largely White, middle-class sample; and the smaller number of boys ($n = 99$) than girls ($n = 169$). We recommend that in the future researchers extend the length of time when students engage in rubric-referenced assessment and include more balanced and diverse samples. We also recommend that researchers use larger samples to accommodate the requirements of hierarchical linear modeling that might better treat the shared variances within classrooms, schools, and grade levels.

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APPENDIX A
Rubrics Given to Students in the Treatment Condition

Family Story Rubric (Grade 3)

Criteria	3	2	1	0
Ideas and Content	The paper tells an interesting family story with lots of relevant details. It tells why the family loves the story. It stays on topic.	The paper tells a story but without much detail. Does not tell why family loves the story. Stays on topic.	There is a very general story but the writing strays off topic or doesn't give enough detail.	The story is unclear. It may be repetitious or disconnected thoughts with no main point.
Organization	The story has a beginning with an interesting lead, a middle, and an ending. It is in an order that makes sense.	The story has a beginning, middle and end. The order makes sense.	The story has an attempt at a beginning &/or ending. Some ideas seem out of order.	There is no real beginning or ending. Ideas seem loosely strung together.
Voice	The writer sounds like a real person who likes the story. The story tells what the people in it thought and felt.	The writer seems sincere but not enthusiastic. Tells a little about what people thought and felt.	The story could have been written by anyone. Tells very little about what people thought and felt.	The writing is bland. It sounds like the writer doesn't like the story. No thoughts or feelings.
Word Choice	Descriptive words are used ("comical" instead of "funny" or "miserable" instead of "sad").	The words are mostly ordinary, with a few attempts at descriptive words.	The words are ordinary but generally correct.	The same words are used over and over. Some words are used incorrectly.
Sentence Fluency	The sentences are complete, clear, and begin in different ways.	The sentences are usually correct.	There are many incomplete sentences and run-ons.	The story is hard to read because of incomplete and run-on sentences.
Conventions	Spelling, punctuation, capitalization, grammar and paragraphs are correct. Only minor edits are needed.	Spelling, punctuation and caps are usually correct. Some problems with grammar and paragraphs.	There are enough errors to make the writing hard to read and understand.	There are so many errors that the writing is almost impossible to read.
Neatness	The writing is neat.	The writing is readable.	There are problems with neatness but the writing can be figured out.	The writing is almost impossible to read.

Persuasive Essay Rubric (Grades 3–4)

Criteria	4	3	2	1
Ideas and Content	The paper clearly states an opinion and gives 3 clear, detailed reasons in support of it.	An opinion is given. One reason may be unclear or lack detail.	An opinion is given. The reasons given tend to be weak or inaccurate. May get off topic.	The opinion and support for it is buried, confused and/or unclear.
Organization	The paper has a beginning with an interesting lead, a middle, and an ending. It is in an order that makes sense. Paragraphs are indented and have topic and closing sentences and main ideas.	The paper has a beginning, middle and end. The order makes sense. Paragraphs are indented; some have topic and closing sentences.	The paper has an attempt at a beginning &/or ending. Some ideas may seem out of order. Some problems with paragraphs.	There is no real beginning or ending. The ideas seem loosely strung together. No paragraph formatting.

(appendix continues)

APPENDIX A (Cont.)
Rubrics Given to Students in the Treatment Condition

Criteria	4	3	2	1
Voice and Tone	The writing shows what the writer thinks and feels. It sounds like the writer cares about the topic.	The writing seems sincere but not enthusiastic. The writer's voice fades in and out.	The paper could have been written by anyone. It shows very little about what the writer thought and felt.	The writing is bland and sounds like the writer doesn't like the topic. No thoughts or feelings.
Word Choice	Descriptive words are used ("helpful" instead of "good" or "destructive" instead of "bad").	The words are mostly ordinary, with a few attempts at descriptive words.	The words are ordinary but generally correct.	The same words are used over and over. Some words are used incorrectly.
Sentence Fluency	The sentences are complete, clear, and begin in different ways.	The sentences are usually correct.	There are many incomplete sentences and run-ons.	The story is hard to read because of incomplete and run-on sentences.
Conventions	Spelling, punctuation, capitalization, and grammar are correct. Only minor edits are needed.	Spelling, punctuation and caps are usually correct. Some problems with grammar.	There are enough errors to make the writing hard to read and understand.	The writing is almost impossible to read because of errors.

Persuasive essay rubric (Grades 5–7)

Criteria	4	3	2	1
Ideas and Content	The paper clearly states an opinion and gives 3 clear, detailed reasons in support of it. Opposing views are addressed.	An opinion is given. One reason may be unclear or lack detail. Opposing views are mentioned.	An opinion is given. The reasons given tend to be weak or inaccurate. May get off topic.	The opinion and support for it is buried, confused and/or unclear.
Organization	The paper has an interesting beginning, developed middle and satisfying conclusion in an order that makes sense. Paragraphs are indented, have topic and closing sentences, and main ideas.	The paper has a beginning, middle and end in an order that makes sense. Paragraphs are indented; some have topic and closing sentences.	The paper has an attempt at a beginning &/or ending. Some ideas may seem out of order. Some problems with paragraphs.	There is no real beginning or ending. The ideas seem loosely strung together. No paragraph formatting.
Voice and Tone	The writing shows what the writer thinks and feels. It sounds like the writer cares about the topic.	The writing seems sincere but the writer's voice fades in and out.	The paper could have been written by anyone. It shows very little about what the writer thought and felt.	The writing is bland and sounds like the writer doesn't like the topic. No thoughts or feelings.
Word Choice	The words used are descriptive but natural, varied and vivid.	The words used are correct, with a few attempts at vivid language.	The words used are ordinary. Some may sound forced or clichéd.	The same words are used over and over, some incorrectly.
Sentence Fluency	Sentences are clear, complete, begin in different ways, and vary in length.	Mostly well-constructed sentences. Some variety in beginnings and length.	Many poorly constructed sentences. Little variety in beginnings or length.	Incomplete, run-on and awkward sentences make the paper hard to read.
Conventions	Spelling, punctuation, capitalization, and grammar are correct. Only minor edits are needed.	Spelling, punctuation and caps are usually correct. Some problems with grammar.	There are enough errors to make the writing hard to read and understand.	The writing is almost impossible to read because of errors.

(appendix continues)

APPENDIX A (Cont.)
Rubrics Given to Students in the Treatment Condition

Persuasive Essay Rubric (Grade 7 Essay on Bombing of Japan During WWII)

Criteria	3	2	1	0
Outline (15)	The outline uses proper outline format and reflects the content of the paper.	Uses proper format and reflects most of the content of the paper.	Errors in formatting &/or significant mismatches b/w outline and paper.	No outline or just a token outline.
Ideas and Content (25)	The topic is focused and main thesis is clear. Relevant, accurate facts & details provide evidence for the thesis. The author explains how the facts support the thesis, and addresses opposing views.	The topic is evident but broad and lacking in detail. The writing stays on topic but doesn't address minor parts of the assignment.	There is a very general topic but the writing strays off topic or doesn't address major parts of the assignment.	The topic and main ideas are unclear. The writing may be repetitious or disconnected thoughts with no main point.
Organization (40)	Essay has an interesting motivator, developed middle, and scintillating conclusion that restates the thesis and blueprint in new words. There are at least 3 middle paragraphs with a topic sentence and concluding sentence. The order of ideas makes sense.	The paper has a beginning, middle and end. Sequencing is logical.	The paper has an attempt at an intro &/or conclusion. Some ideas seem out of order.	There is no real introduction or conclusion. Ideas seem strung together in a loose fashion.
Voice (5)	The writing matches the purpose and audience. The author seems to care about the topic. Tone and style are engaging.	The writing seems sincere but the author's voice fades in and out.	The writer seems to be aware of an audience but does not attempt to engage it.	The writing is inappropriate for the purpose or audience, & bland or mechanical.
Word Choice (5)	Uses specific, powerful words, striking phrases, and lively verbs.	Words used are adequate, with a few attempts at colorful language.	Words used are ordinary but generally correct.	Limited, repetitive vocabulary. Words are sometimes used incorrectly.
Sentence Fluency (5)	Sentences are well-constructed and have different beginnings and lengths. Easy to read aloud.	Sentences are usually correct. Some variety in beginnings and length.	Many poorly constructed sentences. Little variety in beginnings/length.	The paper is hard to read because of incomplete, run-on and awkward sentences.
Conventions (5)	Double spaced. Few errors in spelling, punctuation, capitalization, grammar. Numbers < 11 or starting sentences spelled out. Uses third person. No slang.	Conventions are usually correct. Some problems with grammar, syntax and/or paragraphing.	Errors are frequent enough to be distracting.	Frequent errors make the paper almost impossible to read.

APPENDIX B
Self-Efficacy Scales

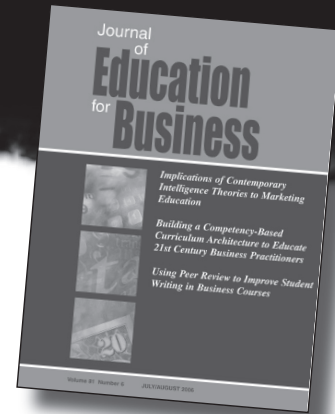
Research ID number: _____ Date: _____

Directions: On a scale from 0 (*cannot do it*) to 100 (*completely sure I can do it*), show how confident are you that you can perform each of the writing tasks below on this week's essay. You may use any number between 0 and 100.

- | Cannot do it | Medium/Sure I can do it | Completely sure I can do it |
|--------------|-------------------------|-----------------------------|
| 0 | 10 20 30 40 50 60 70 | 80 90 100 |
| _____ 1. | | |
| _____ 2. | | |
| _____ 3. | | |
| _____ 4. | | |
| _____ 5. | | |
| _____ 6. | | |
| _____ 7. | | |
| _____ 8. | | |
| _____ 9. | | |
| _____ 10. | | |
| _____ 11. | | |

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