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It Doesn't Hurt to Ask: Effects of Instructions to Be Creative, Practical, or Analytical on Essay-Writing Performance and Their Interaction With Students' Thinking Styles

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ABSTRACT: Whether instructions to be creative will act as goals or constraints was examined by comparing creative, practical, and analytical performance ratings under special instructions to be creative, practical, analytical, or under no special instructions at all, for 110 students with 2 different thinking styles. Consistent with goal-setting theory, specific-related instructions resulted in higher performance for each of the 3 performance ratings over no special instructions. In line with a person–situation fit model, people who prefer to play with their own ideas (i.e., those with a legislative thinking style) showed higher creative performance, whereas people who prefer to analyze and evaluate ideas (i.e., those with a judicial thinking style) showed lower creative performance when not given any special instructions.

How hard is it to get people to be more creative? What happens if you just ask them to be creative? Who thrives under that pressure and who folds? These questions have generated significant controversy among psychologists (Eisenberger & Cameron, 1996). Researchers who favor the importance of intrinsic motivation (e.g., Amabile, 1983; Lepper & Hodell, 1989) caution against using any extrinsic incentives based on their studies showing that creative performance is often negatively affected by anything that could be interpreted as an attempt to control behavior. Although a request to be creative is a rather mild extrinsic incentive, it could be interpreted by some people as an unwanted constraint, resulting in a decrement in creative performance. This negative effect might be explained by Brehm's (1966) theory of psychological reactance: People fight attempts to restrict their freedom. That is, people are motivated to maintain their freedom to behave how and when then want and may do the opposite of what they are told to do in reactance to a perceived threat to their freedom. At the same time, some researchers in the behaviorist camp have shown positive effects of reward on creative performance (e.g., Eisenberger & Armeli, 1997; Eisenberger, Armeli, & Pretz, 1998; Eisenberger & Selbst, 1994; Epstein, 1990; Stokes, in press). Other researchers studying the effects of goal setting have shown positive effects of creativity goals on creative performance. For example, Shalley (1991) used a complex in-basket exercise involving a series of memos that needed to be handled with students enrolled in an introductory business administration class and found that having creativity goals led to higher creativity than having no goals. One question this study addresses is whether one type of extrinsic motivator, namely, instructions to be creative, will show the positive goal effect or the negative constraint effect on creative performance.

Previous studies on the effect of specific instructions to be creative have shown conflicting results. Some studies that used the typical artificial creativity exercises, such as producing alternate uses for com-

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mon objects (e.g., bricks, newspaper), story titles, or cartoon captions (see Buyer, 1988; Gerlach, Schutz, Baker, & Mazer, 1964; Gilchrist & Taft, 1972; Manske & Davis, 1968), have shown that the instruction to "be creative" improved creative performance. One study used more complex tasks, such as solving a productivity problem in a research and development department and listing all the things a blind person would be likely to do better than a sighted person, assuming that the loss of sight was compensated for by an increased sensitivity of the remaining senses. This study found that the "be creative" instructions improved the performance of scientists who were considered creative by their supervisors but lowered the performance of the less creative scientists (Datta, 1963).

Similarly, Harrington (1975) found that "be creative" instructions improved the creative performance of those men who scored in the upper third of the Creative Personality Scale, which was derived from the Adjective Check List, but lowered the performance of the less creative group. In contrast, Oziel, Oziel, and Cohen (1972) found that a highly creative group did not improve under "be creative" instructions, whereas a less creative group did improve when creative groups were predefined by using the Welsh Figure Preference Test as the personality measure. Gilchrist and Taft (1972) found that both high- and low-creative architecture students (as rated by their instructors) benefitted from "be original" instructions.

Katz and Poag (1979) replicated Harrington's (1975) study but included women and found that "be creative" instructions improved the quantity of responses for men but not for women and improved the proportion of creative responses for both. Although their explanation for these gender differences was not tested, they offered an interesting idea about the possibility that instructions can break habitual response patterns. They suggested that in ambiguous situations such as occur under neutral instructions, people respond with habitual strategies, one of which for women is to make use of verbal skills. Men, on the other hand, tend to rely on nonverbal skills in ambiguous situations. The "be creative" instructions disambiguate the situation, giving men permission to break from their habitual nonverbal response, which is not appropriate for a divergent-thinking task. Women's dominant response is appropriate for a divergent thinking task and, therefore, they show high responses even under the standard instructions.

Clearly, there are some moderating variables that need to be investigated to bring better understanding to the effect of instructions, goals, and other extrinsic motivators on creative performance. One possibility is suggested by Sternberg's (1988) concept of thinking style preferences and mental self-government. Just as a government is organized around certain functions such as instituting laws, enforcing them, and judging compliance with them, people prefer to use their intellectual abilities for certain functions, which gives them a characteristic thinking style. People with one style, called "legislative" after the branch of government that makes the laws, prefer to play with their own ideas; they like to do things their own way and come up with their own strategies for solving problems. People with a second style, called "executive" after the branch of government that executes the laws, prefer to follow directions, implement others' ideas, and have their roles clearly defined. People with the third style, called "judicial" for the judicial branch of the government, prefer to analyze, evaluate, and critique others' ideas.

Different academic assessment settings, such as multiple-choice tests versus independent projects, have been shown to be more favorable to different styles (Grigorenko & Sternberg, 1997). Examinations were most beneficial for judicial students, whereas independent projects favored legislative students and disadvantaged executive students. Teachers' thinking styles have been shown to match the stylistic pattern of their schools (Sternberg & Grigorenko, 1995). More generally, research has shown the importance of person–situation fit for other positive performance-related outcomes (Chatman, 1989; O'Reilly, Chatman, & Caldwell, 1991; Schneider, 1985). It seems reasonable to assume that after taking into consideration a student's intellectual ability, a match between the student's thinking style and what he or she is asked to do should result in higher performance than should a mismatch.

In their investment theory of creativity, Sternberg and Lubart (1995) suggested that a legislative style is necessary for creative performance. It may be that people with a more legislative style accept instructions to be creative as supporting their autonomy (Deci & Ryan, 1987), whereas those with a less legislative style find the same instructions controlling or intimidating (Amabile, 1983; Elliot & Harackiewicz, 1994). It also could be the case that people with a less legislative style find the instructions to be creative helpful in dis-

ambiguating the situation, as men did in the Katz and Poag (1979) study, and could show a benefit from the special instructions. In contrast, those with a more legislative style could show no improvement under the special instructions because they would use their habitual style, which would result in high creativity under either set of instructions. Another possibility is that people with all styles improve under the "be creative" instructions in a way similar to that shown with other goals that motivate behavior by directing attention, mobilizing effort, and increasing persistence (Latham & Locke, 1991).

In an effort to improve on previous instructions studies, this study used a common educational evaluation device, the essay question, rather than divergent thinking exercises that lack much real-world relevance. Teachers make judgments about their students' creative and analytical abilities every day based on their essay-writing performance. In addition, two other instruction sets were also employed to show more clearly the effect of the "be creative" instructions. Specifically, "be creative instructions" were compared to "be practical instructions," "be analytical instructions," and no special instructions.

The goal of this study was to investigate essay-test performance differences due to these two factors: different instructions given to students and the students' own thinking styles. Performances under three instructional sets were compared to those of a control group. Three thinking styles were measured by a self-report questionnaire. Based on goal-setting theory (Latham & Locke, 1991), it was expected that specific instructions to be creative, practical, or analytical would result in higher creative, practical, or analytical performance over no special instructions. Regarding thinking styles, in line with person–situation fit theory (Chatman, 1989; O'Reilly et al., 1991; Schneider, 1985) and Sternberg and Lubart's (1995) investment theory of creativity, it was expected that people who prefer to use their own ideas, that is, who show the legislative thinking style, would show higher creativity ratings than people who prefer to evaluate and critique others' ideas (judicial thinking style) or who prefer to follow directions (executive thinking style). Various creativity training programs emphasize the importance of thinking outside of the box (directions) and suspending criticism to generate creative ideas (e.g., Parnes, 1992; Prince, 1970). It was also expected that people with a judicial thinking style would show higher analytic ratings than those who prefer either of the other two styles, as analysis requires an evaluation or critique of the pros and cons of an idea. Linking preference styles as measured by a paper-and-pencil questionnaire to actual performance is an important contribution that this study makes. Analysis of the relative effects of instructions or thinking styles and the interaction between instructions and thinking styles was exploratory.

Method

Participants

One hundred-fourteen Yale undergraduate students (47 men and 67 women, *M* age = 18.7 years, 87% in their 1st or 2nd year of college) volunteered to participate in exchange for 1 hr of experimental participation credit in their introductory psychology class. Participants signed up for experiment times that were listed on a board advertising all of the experiments eligible for course credit. This experiment was entitled, "Following Instructions" and was offered at five different times during November 1996. Some times were more popular than others, resulting in groups ranging from 3 to 44 students participating at one time. Participants were given a packet of instruction materials that randomly divided them into one of eight groups: three experimental groups and a control group for each of two essay questions, which were based on two different reading passages. Four participants were eliminated due to missing data, resulting in 110 participants with full data for analysis.

Materials

The instruction sheet informed participants that this project involved reading a passage, writing an essay about it, and completing two questionnaires. They were asked to complete the parts of the study in the order presented and not to look ahead. They received one of two essay questions and passages to read.

One passage by Reiser (1996) described her life as a night-shift nurse and asked participants to describe the adjustments they would make in their lifestyle and the impact working a night-shift job would have on their life satisfaction. The second passage, excerpted from Baron (1995) and Stevenson and Stigler (1992), de-

scribed the lower scores American children achieved on standardized tests relative to their counterparts in Asia and some of the differences in school systems and asked participants to present a few alternative possible solutions to the education crisis. Passages were selected to be about very different topics that could involve discussing an issue with either a creative, practical, or analytical emphasis. No effect due to essay was expected, nor any interaction between essay version and instruction condition; rather, the second essay was included to serve as a conceptual replication of the first essay but on a different topic.

After the essay, participants were asked to complete a 24-item thinking styles questionnaire, a subset of Sternberg and Wagner's (1991) larger Thinking Styles Inventory. Each item endorsed a preference for making decisions or handling problems in a certain way, and participants were to indicate how well the item described them on a 1 (*not at all well*) to 7 (*extremely well*) scale. The introduction indicated that there were no right or wrong answers. Scale items are shown in Table 1. The three scales used—legislative, executive, and judicial—have been shown to be reliable in previous studies with coefficient alphas ranging from .72 to .81 for college students (Sternberg & Wagner, 1991).

In addition, all participants were requested (a) to answer demographic questions, such as age, gender, year in school, native language, and SAT scores; (b) to indicate how much they enjoyed writing the essay and how much they knew or thought about the topic prior to writing the essay on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*a great deal*); and (c) to indicate how well the words *creative*, *practical*, and *analytical* described them on the same 1 to 7 Likert scale. Native language and SAT scores (Math and Verbal) were requested to ensure that groups were equivalent in abil-

Table 1. *Principal-Components Varimax-Rotated Factor Pattern of Thinking Styles Questionnaire Items*

Item	Factor 1: Executive Style	Factor 2: Legislative Style	Factor 3: Judicial Style	Communality
Executive Style				
E8 I like to follow definite rules or directions.	.84	–.04	.02	.70
E4 I check to see what method or procedure should be used.	.76	.08	.02	.58
E7 I enjoy working on things I can do by following directions.	.74	–.06	–.18	.59
E3 I like projects with clear structure and set plan and goal.	.72	–.07	.01	.45
E5 I like situations in which my role is clearly defined.	.65	.15	–.03	.45
E2 I am careful to use the proper method to solve problems.	.64	–.25	.10	.49
E6 I like to solve a problem following certain rules.	.64	–.29	–.06	.49
E1 When discussing or writing, I follow formal rules.	.53	–.03	.13	.30
L6 Before starting, I like to figure out for myself how I will work.	.44	.11	.24	.27
Legislative Style				
L2 I use my own ideas and strategies to solve problems.	–.13	.77	.09	.61
L4 I like problems where I can try my own way of solving.	–.12	.71	.28	.60
L7 I feel happier about a job when I can decide for myself.	–.09	.67	.36	.59
L5 When working on a task, I like to start with my own ideas.	.01	.65	–.08	.43
L1 When making decisions, I tend to rely on my own ideas.	–.01	.64	–.17	.44
L8 I like situations where I can use my own ideas and ways.	–.01	.64	.10	.42
L3 I like to play with my ideas and see how far they go.	–.16	.60	.44	.58
J2 With opposing ideas, I like to decide which is right.	.30	.43	.12	.29
Judicial Style				
J7 I like to compare and rate different ways of doing things.	.00	.08	.75	.57
J4 I like to study and rate different views and ideas.	–.03	.14	.72	.54
J8 I enjoy analyzing, grading or comparing things.	–.05	–.05	.69	.47
J5 I prefer to grade the design or method of others.	.10	.15	.66	.47
J3 I like to check and rate opposing points of view.	.10	.08	.62	.40
J6 When deciding, I like to compare the opposing viewpoints.	.13	–.03	.47	.24
J1 When discussing or writing, I like criticizing others' ways.	–.02	.10	.46	.22
Sum of Eigenvalues	4.26	3.59	3.40	11.25
Percentage of Variance Accounted for	18	15	14	47

ity. No group differences were found. A measure of enjoyment and familiarity with the topic was taken because of previous studies showing the importance of knowledge and motivation for creative performance (Sternberg & Lubart, 1995). The measure of enjoyment can be interpreted as a measure of intrinsic motivation, whereas the instruction group provided an extrinsic motivator.

Procedure

The control groups received the simple essay instructions as described previously. The experimental groups were instructed to answer the same question but to be particularly creative, practical, or analytical. The specific instructions were (a) "Be creative in your response, i.e., inventive, original, novel, imaginative. Graduate students will rate the quality of your paper based specifically on evidence of your creative ability—your ability to create, design, invent, originate, imagine"; (b) "Be practical in your response, i.e., address practical implementation and usefulness. Graduate students will rate the quality of your paper based specifically on evidence of your practical ability—your ability to use, apply, implement, utilize, put into practice"; or (c) "Be analytic in your response, i.e., thorough in your analysis and critique of the benefits and disadvantages. Graduate students will rate the quality of your paper based specifically on evidence of your analytical ability—your ability to analyze, judge, evaluate, compare, contrast." All participants received only one essay and only one set of instructions.

Scoring

Six Yale Psychology Department graduate student raters were paid $10 per hr up to a maximum of $100 to rate the essays. Raters were not told the participants' instructions. Each rater was given a set of scoring instructions that included (a) whether to do the education or night-shift papers first so that half did one and half did the other first; (b) a list of the order within each essay group to do the ratings so that all possible rating orders were used once; that is, whether to rate creative, analytical, or practical first, second, or third; and (c) definitions and a coding scheme for each of the ratings. Participants' essays were presented in six different random orders. The six raters and the researcher met for a 1½-hr training meeting to discuss the method and definitions and to rate and discuss rating differences for one of each of the essay topics. Each essay was first rated on a 1 (*low*) to 7 (*high*) scale for how much the rater liked the essay or how good the rater thought it was. Raters were instructed to reflect their personal biases and preferences in this liking–good rating so that they could be more objective in their ratings of creative, practical, and analytical performance. It was not important whether there was a difference between rating for goodness or liking; rather, what was important was that the raters had an opportunity to record their biases in a rating other than the specific ratings of interest in this study. Performance ratings were also on a 1 (*low*) to 7 (*high*) scale. The liking–good ratings were not analyzed by instruction group or by thinking style.

Results

Analyses consisted of hierarchical regressions examining performance effects due to instruction group, thinking style, and their interactions, controlling for an ability measure and a motivation measure. In summary, all performance ratings improved under the " be creative, practical, or analytical instructions" compared to the control group, which received no special instructions. See Figure 1 for the performance ratings by instruction group. Scores were standardized with a mean of zero. Therefore, above-average groups are shown above the zero line and below-average groups are shown below the zero line. The differences were most notable for creative performance and least notable for practical performance.

Performance Ratings

Participants were more familiar with the education topic than the night-shift topic, $t(112) = -.301$, $p = .003$, and showed higher creative and practical performance ratings for the more familiar topic. To minimize these performance differences due to the topic that are not relevant to this study, *z* scores for each individual judge's ratings were computed separately within essay groups and then averaged across the six judges to create the performance ratings used in further analyses. Interrater reliabilities (standardized item coefficient

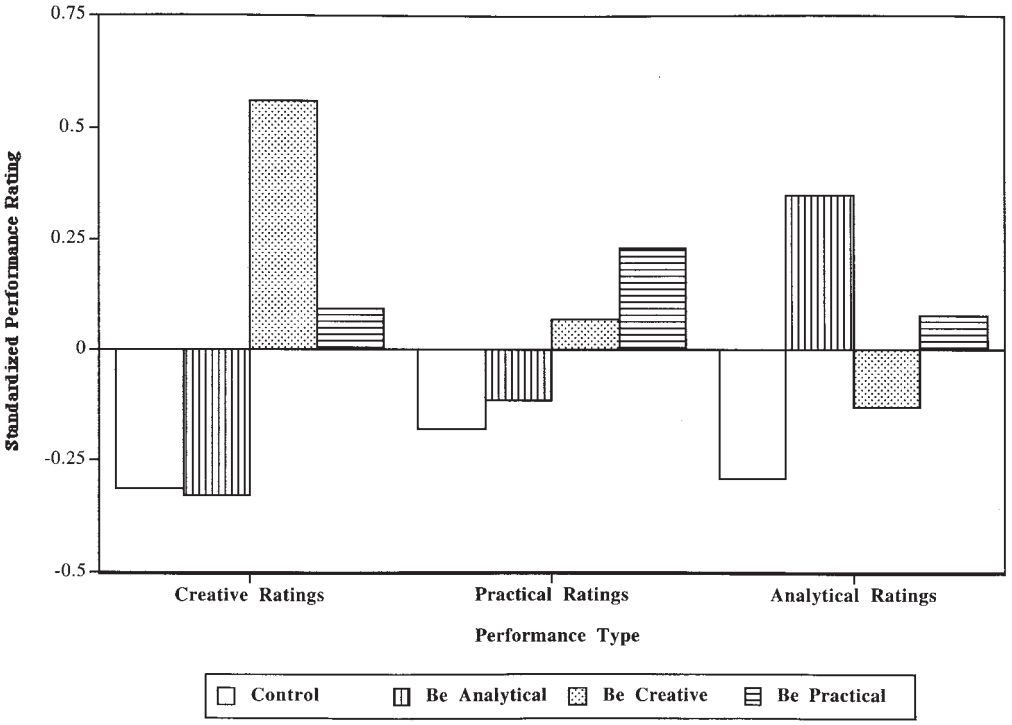

Figure 1. *Standardized creative, practical, and analytical ratings by instruction group.*

alphas) of the mean ratings of the six judges were .82 for creative performance, .84 for practical performance, and .80 for analytical performance. Although halo effects can be a problem when using the same judge for multiple ratings, the judges were able to clearly distinguish creative performance from the other two. Distinguishing practical from analytical performance was more difficult. Creative performance correlated .27 with practical performance and .26 with analytical performance. Practical performance correlated .46 with analytical performance. The difference between the two correlations, .46 and .27, was marginally significant, $t = 1.88$, $p = .06$.

Thinking Style Preferences

The 24-item questionnaire was submitted to a three-factor confirmatory factor analysis based on Sternberg's theory of mental self-government, which includes the three functions: legislative, executive, and judicial (Sternberg, 1988). This analysis resulted in significant differences between estimated and obtained values for the model, χ^2 (255, $N = 105$) = 548, $p < .001$. The goodness-of-fit index was .71. Exploratory factor analyses were then conducted to see if other models provided better fits, but the three-factor model was the most interpretable. The principal-components method was selected because of its simplicity and freedom from assumptions about the underlying causal relations in the data. However, a common-factor solution was also examined. It accounted for 40% of the variance, versus 47% for principal components, and produced basically the same factor pattern as principal components.

An oblique rotation indicated that the interfactor correlations were less than .20 and that variable loadings were in basically the same pattern as in the orthogonal rotation, so the varimax rotation was selected to simplify reporting. Before rotation, the three factors accounted for 19.9%, 17.3%, and 9.8% of the variance, respectively, totaling 46.9%.

In the varimax-rotated factor matrix (see Table 1), variables loaded on the expected factors according to Sternberg and Wagner's (1991) scale items: executive, legislative, and judicial, except for two variables: No.

L6 "Before starting a task, I like to figure out for myself how I will do my work" and No. J2 "When faced with opposing ideas, I like to decide which is the right way to do something." The intention behind No. L6 may have been to focus on "figure out for myself," which would put the variable in the legislative group, but it could be that participants focused on the "Before starting a task," which led to its being grouped with the executive items. The intention behind No. J2 may have been "opposing ideas," which would put this variable in the judicial group, but it could be that participants focused on the "I like to decide," which led to its being grouped with the legislative items. In both cases, the items should be reworded to emphasize only the intended portions of the phrases.

Factor scores were computed by taking the mean of the standardized items that loaded at least .50 on the factor, thus producing an executive-style score based on eight items (alpha reliability = .85), a legislative-style score based on seven items (alpha reliability = .82), and a judicial-style score based on five items (alpha reliability = .79). In this way, problem items were not used in further analyses.

As a test of the validity of the expected relation between the three thinking style scores and creative, practical, and analytical performance, correlations of the thinking style scores and self-ratings of how well the words *creative, practical,* and *analytical* described oneself were examined. As shown in Table 2, the only significant correlations greater than .30 were for the expected pairs—creative and legislative style ($r = .44$), which was significantly different from both practical–legislative and analytical–legislative; practical and executive style ($r = .34$), which was significantly different from creative–executive but not from analytical–executive; and analytical and judicial style ($r = .31$), which was not significantly different from the other two pairings with judicial. Although these correlations are not very large and both measures were self-report paper-and-pencil questionnaire responses, they are important because no relation between thinking styles and abilities has been established before (Grigorenko & Sternberg, 1997). These correlations cannot be corrected for attenuation due to unreliability because the creative, practical, and analytical self-descriptions are single-item scales.

Neither the executive style nor any of its interactions with instruction groups was a significant predictor for any of the performance ratings, so it was dropped from further analysis. Only the results of the legislative and judicial thinking styles are discussed.

Hierarchical Regression Analyses

To retain the entire range of the continuous thinking style scores, analysis of the differences in performance by instruction group, thinking styles, and their interactions was conducted using a hierarchical multiple regression rather than splitting the thinking style scores into low- and high-categorical variables and performing an analysis of variance. Because essay-writing performance may be more related to general intellectual ability than to any instructions or thinking styles, SAT scores (combined Math and Verbal) were entered on the first step to account for as much variance as they could. Instruction groups, which were dummy-coded against the no-special-instructions control group, were entered second because it was expected that instructions would have the largest effect and because the effect of thinking styles may be different depending on the instruction group. Thinking styles were entered in the third block. Because any performance can be affected by motivation for the task, a measure of how much the participant enjoyed writing the essay was entered in the fourth step for the last main effect. After all

Table 2. *Correlations of Factor Scores and Self-Description Ratings*

	Legislative Factor	Executive Factor	Judicial Factor	Creative Self-Rating	Practical Self-Rating	Analytical Self-Rating
Legislative		–.16	.23*	.44**	.00	.05
Executive			.11	–.15	.34**	.18
Judicial				.22*	.21*	.31**
Creative					–.15	.16
Practical						.18*

*$p \le .05$. **$p \le .01$. ***$p \le .001$.

main effects were entered, all of the interactions between thinking styles and instruction groups were entered in one block. Summaries of the regressions for creative, practical, and analytical performance are presented in Tables 3, 4, and 5, respectively.

Creative performance. As shown in Table 3, the final regression equation accounted for 49% of the variation in creative performance. Instruction groups contributed significantly to the change in R^2. The strongest predictor was "be creative" instructions. Surprisingly, "be practical" instructions were also a significant predictor, but the beta for "be creative" was significantly larger than for "be practical," $z = 2.57$, $p = .005$. No negative effects due to the controlling aspect of the "be creative" instructions or evaluation expectation (Amabile, 1983) were evident.

Although thinking styles' contribution to R^2 before taking into consideration the interactions did not reach significance, both styles were significant predictors in the final equation. The betas in the final equation represent the thinking style's unique contribution after all the interactions with instructions are accounted for. They indicate that without any special instructions, legislative thinking style had a positive effect and the judicial thinking style had a negative effect on creative performance, as expected. This interpretation of the final betas for the thinking styles is confirmed by an examination of the partial correlations for the control group, $pr = .36$ between creative performance and legislative style controlling for SAT and enjoyment, and $pr = -.27$ between creative performance and judicial style. These effects are most apparent by noting the slopes of the control group for the two thinking styles in Figure 2, which presents creativity ratings by instruction group for the legislative and judicial thinking styles.

The interaction terms as a group contributed significantly to the change in R^2. Although one might be concerned that with such a large number of variables, a few of the interaction terms may be significant predictors simply by chance, this risk is kept to the .05 level by entering the interactions as a group. If the group does not make a significant contribution to R^2, any interpretation of the individual interaction terms must be made with more caution. The "be creative" instructions were less beneficial for those with more of a legislative style than for those with less of a legislative style compared to the control group. For people with more of a legislative style, "be analytical" instructions depressed their performance in comparison to no spe-

Table 3. *Summary of Hierarchical Regression Analysis Predicting Creative Performance*

Variable	R^2	F	Significance of F	ΔR^2	Significance of ΔR^2	β on Entry	β End
Creative Performance From							
1. Total SAT Score	.05	5.78	.02	.05	.02	.23**	.27****
2. Instruction Group	.31	12.05	.00	.26	.00		
Be Creative						.53****	.57****
Be Practical						.28***	.24**
Be Analytical						–.01	.07
3. Thinking Style	.34	8.92	.00	.03	.12		
Legislative						.14*	.51***
Judicial						–.14*	–.40**
4. Enjoyment	.41	10.11	.00	.07	.00	.26****	.31****
5. Interactions	.49	7.12	.00	.08	.03		
Thinking Style × Instruction Group							
Legislative × Creative							–.34***
Legislative × Practical							–.10
Legislative × Analytical							–.30***
Judicial × Creative							.17
Judicial × Practical							.12
Judicial × Analytical							.11

Note: $N = 110$. ΔR^2 and the significance of ΔR^2 are shown for each of the five steps in the regression analysis in the order in which variables were entered.

*$p \leq .105$. **$p \leq .05$. ***$p \leq .01$. ****$p \leq .001$.

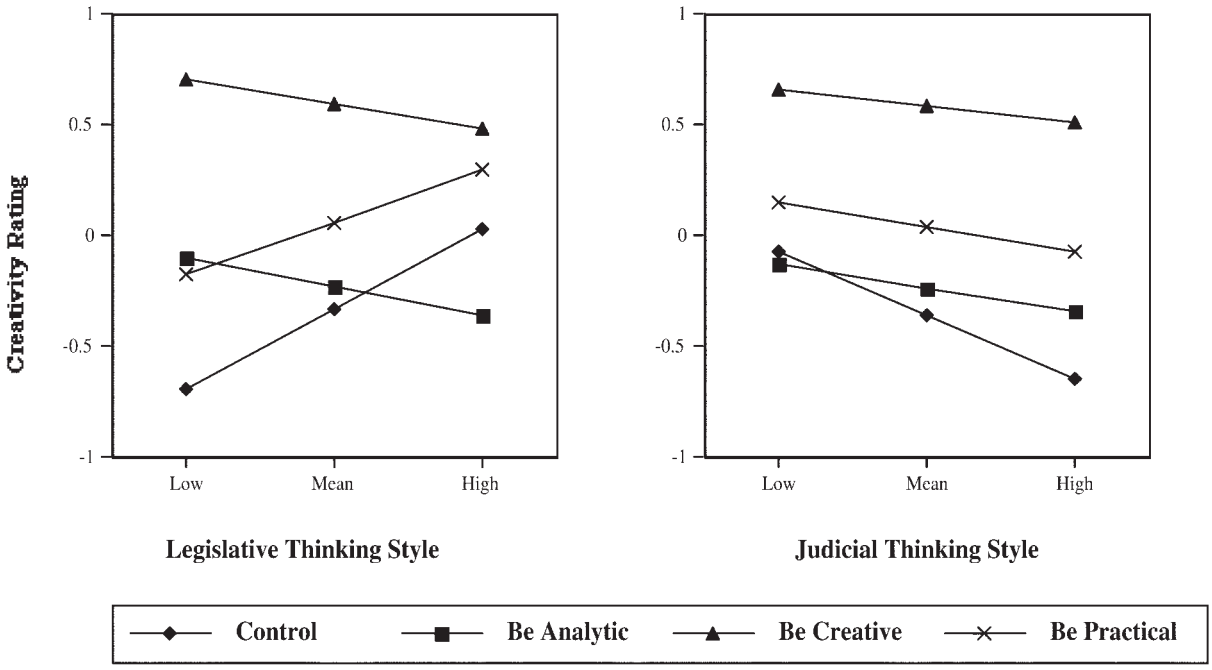

Figure 2. *Predicted standardized creativity ratings by instruction group for three levels of legislative (left panel) and judicial (right panel) thinking style scores. Low is 1 SD below the mean. High is 1 SD above the mean.*

cial instructions. If one is trying to encourage creative performance, the worst thing to do is to ask someone with a high legislative style to be analytical, something that probably happens in schools every day. Not surprisingly, level of enjoyment and SAT score were also significant positive predictors.

Practical performance. As shown in Table 4, only 22% of the variation in practical performance could be accounted for by the final regression equation. In contrast to creative performance, neither SAT scores nor enjoyment was a significant predictor. The "be practical" instructions had a positive effect but were much more dramatic for the night-shift essay than for the education essay. This result could be due to the lower familiarity with the night-shift topic, or it could be because it was very difficult to come up with practical solutions to the education problem. If the solution was so easy, the problem might not exist.

The significance of the contribution of the instruction groups to R^2 depended on whether instruction groups or thinking styles were entered first; $\Delta R^2 = .05$, $p = .13$, if instruction groups were entered before thinking styles and $\Delta R^2 = .07$, $p = .04$, if entered after. Thinking styles were significant contributors whether they were entered before or after instruction groups. ΔR^2 for the interaction terms as a group approached significance. A legislative style had a predominantly negative effect on practical performance, particularly a legislative style combined with "be analytical" instructions, as shown in Figure 3. Similar to creative performance, the legislative style paired with "be analytical" instructions is a detrimental combination. On the other hand, a judicial style combined with "be practical" instructions showed the highest practical performance.

Analytical performance. As shown in Table 5, the final equation accounted for 37% of the variation in analytical performance, with both instruction groups and thinking styles being significant contributors to R^2 and the interaction terms approaching significance, $p = .06$. The largest effect was "be analytical" instructions. Math SAT score was a significant predictor as well as "be practical" instructions. As shown in Figure 4, people with a legislative thinking style again appeared to show a reaction against the "be analytical" instructions,

Table 4. *Summary of Hierarchical Regression Analysis Predicting Practical Performance*

Variable	R^2	F	Significance of F	ΔR^2	Significance of ΔR^2	β on Entry	β End
Practical Performance From							
1. Total SAT Score	.00	0.01	.92	.00	.92	.01	–.03
2. Instruction Group	.05	1.45	.22	.05	.13		
Be Creative						.15	.15
Be Practical						.26**	.36***
Be Analytical						.07	.08
3. Thinking Style[a]	.13	2.56	.02	.08	.01		
Legislative						–.28***	.05
Judicial						.16*	–.04
4. Enjoyment	.13	2.24	.04	.00	.51	.06	.09
5. Interactions[b]	.22	2.07	.02	.09	.12		
Thinking Style × Instruction Group							
Legislative × Creative							–.19
Legislative × Practical							–.23
Legislative × Analytical							–.32**
Judicial × Creative							.03
Judicial × Practical							.29**
Judicial × Analytical							.11

Note: $N = 110$. ΔR^2 and the significance of ΔR^2 are shown for each of the five steps in the regression analysis in the order in which variables were entered.

[a]If thinking styles are entered before instruction groups, ΔR^2 for instruction groups is .07, $p = .04$, and ΔR^2 for thinking styles is .06, $p = .05$. [b]A significant interaction was noted between instruction group and essay, $\Delta R^2 = .12$, $p = .001$. Be practical instructions were more effective for the night-shift essay, $\beta = .47$, $p < .001$.

*$p \leq .105$. **$p \leq .05$. ***$p \leq .01$.

Table 5. *Summary of Hierarchical Regression Analysis Predicting Analytical Performance*

Variable	R^2	F	Significance of F	ΔR^2	Significance of ΔR^2	β on Entry	β End
Analytical Performance From							
1. Math SAT Score[a]	.06	7.32	.01	.06	.01	.25***	.30****
2. Instruction Group	.22	7.21	.00	.15	.00		
Be Creative						.10	.05
Be Practical						.29***	.29***
Be Analytical						.43****	.44****
3. Thinking Style	.27	6.49	.00	.06	.02		
Legislative						–.15*	.15
Judicial						.24***	–.01
4. Enjoyment	.28	5.80	.00	.01	.23	.10	.14
5. Interactions	.37	4.27	.00	.08	.06		
Thinking Style × Instruction Group							
Legislative × Creative							–.20
Legislative × Practical							–.05
Legislative × Analytical							–.31**
Judicial × Creative							.26*
Judicial × Practical							.08
Judicial × Analytical							.09

Note: $N = 110$. ΔR^2 and the significance of ΔR^2 are shown for each of the five steps in the regression analysis in the order in which variables were entered.

[a]Math SAT score was used because it was a better predictor for analytical performance than was the total SAT score.

*$p \leq .105$. **$p \leq .05$. ***$p \leq .01$. ****$p \leq .001$.

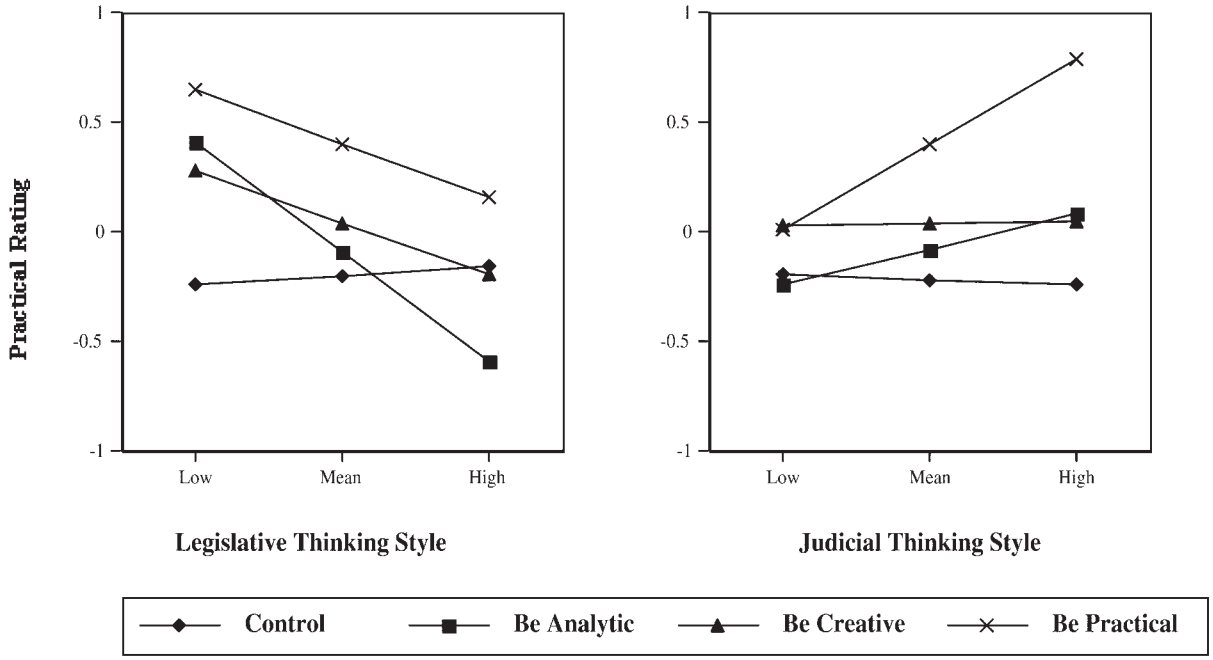

Figure 3. *Predicted standardized practical ratings by instruction group for three levels of legislative (left panel) and judicial (right panel) thinking style scores. Low is 1 SD below the mean. High is 1 SD above the mean.*

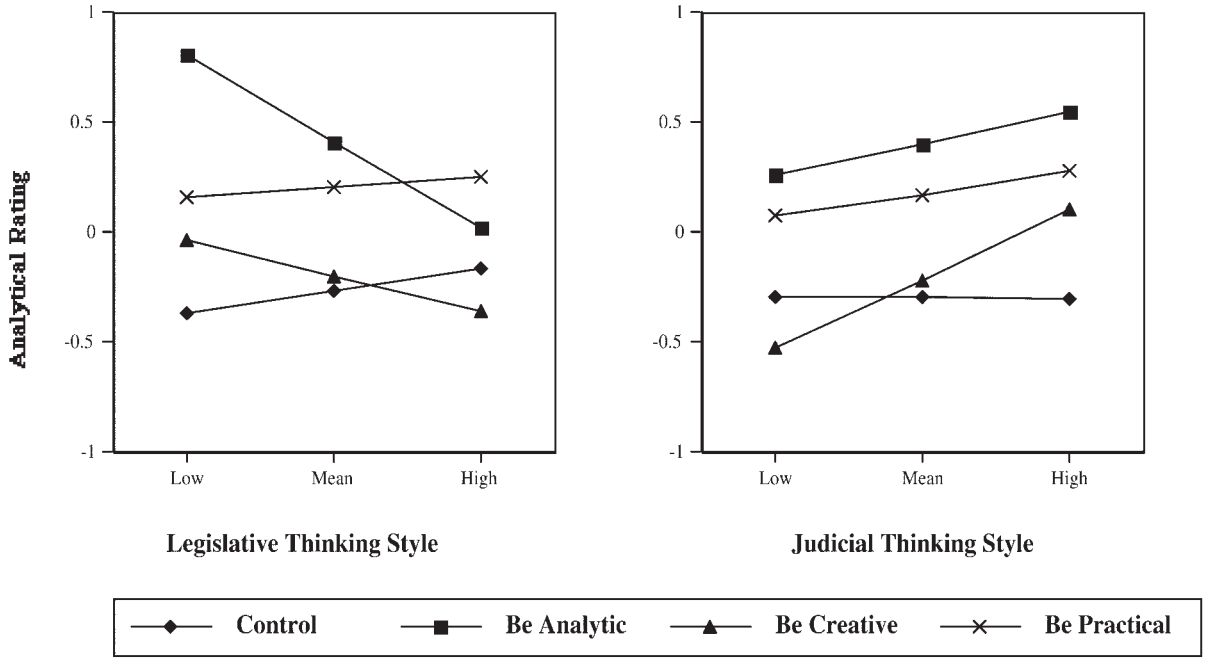

Figure 4. *Predicted standardized analytical ratings by instruction group for three levels of legislative (left panel) and judicial (right panel) thinking style scores. Low is 1 SD below the mean. High is 1 SD above the mean.*

but judicial thinking styles showed a generally positive effect. In contrast to creative performance but like practical performance, level of enjoyment was irrelevant to analytical performance.

Discussion

This study has both theoretical and practical points to make. First, it integrates two of Sternberg's theories—the triarchic theory of intelligence with the theory of mental self-government (Sternberg, 1985, 1988). Sternberg argued that intellectual ability comes in three forms—creative, practical, and analytical—and that our educational system favors analytical talent over the other two, resulting in a person–situation misfit for someone with more creative or practical abilities (Sternberg, 1996; Sternberg & Clinkenbeard, 1995). This study shows that misfits can occur with something as subtle as a thinking style preference. Thinking styles are preferences in using mental abilities, not mental abilities themselves. Nevertheless, people with more of a legislative style described themselves as relatively more creative and demonstrated generally higher creative performance and lower practical and analytical performance. People with more of a judicial style described themselves as more analytical and demonstrated higher analytical and practical performance and lower creative performance.

The practical point this study makes is that it does not hurt to ask—instructions to be creative have a positive effect on creative performance and appear to act similarly to instructions tailored to other types of performance; that is, practical or analytical. Although the "be creative" instructions were vague goals and did not say anything about how to be creative, these instructions appear to have helped students focus on the requested performance in line with goal-setting theory (Latham & Locke, 1991).

The instructions simply listed a number of synonyms for creative; that is, inventive, original, novel, and imaginative. Amabile (1979) explained the positive effects of specific creative instructions on collage performance by saying that the instructions made the task algorithmic; that is, they turned the task into an analog to a paint-by-numbers exercise rather than a real creativity exercise. That explanation cannot be applicable in this case, as no real information was provided beyond "be creative." Neither was any negative-evaluation effect noted in this study. No mention of evaluation was made to the control group, but a very explicit evaluation expectation ("Graduate students will rate the quality of your paper based on …") was established in the experimental groups. In no case did the experimental groups show lower performance than the control group. Of course, it may be that Yale undergraduates as a whole thrive under pressure and that these results would not be achieved with a more diverse group.

Besides replicating this study with other samples, including younger children and older adults, future research should cover other topics as this study was limited to only two topics. The education topic led to more creative responses overall than the night-shift topic, but the positive effect of the "be creative" instructions over no special instructions was greater for the night-shift topic. One explanation for this difference could be that the education topic was more familiar. The more knowledge one has about a topic, the better one can perform. But when confronted with an unfamiliar topic and given instructions to be creative, one has more freedom to be creative because one has fewer preconceived ideas about the topic. Or the "be creative" instructions might be more helpful with an unfamiliar topic because they provide some focus when the writer is unclear about how to handle the topic.

Nevertheless, it seems obvious that topics can differ in how much they inspire writers to be creative. For example, a group of 36 students similar to the students who participated in this study rated how creative they thought they could be in writing an essay on 30 different topics. The topic that they thought would lead them to be most creative was "If you could commit one crime and get away with it, what would you do?" The lowest rated topic was "What are the benefits of getting a flu shot?" Future research may shed light on what characteristics of topics lead to more or less creative responses. Another expansion of this study could be to explore the effects of instructions and thinking styles on business problem solving. If a business manager delegates a problem to his or her subordinate, are instructions to be creative helpful or too stressful? Does the answer depend on the subordinate's thinking style preference? Can thinking styles be predictive of job performance, satisfaction, or person–job fit?

People like to do different things with their bodies. Some like to dance; some play football; some sit and watch TV, whether or not they have any talent for these

activities. We all know someone who loves to sing who shouldn't. Similarly, regardless of the amount of intellectual talent they have, people like to do different things with their minds. Some people may like inventing new things, coming up with new ideas, and imagining unknown possibilities (legislative style). Others may like to compare things to evaluate the positives and negatives in ideas or courses of action (judicial style).

It is important to bear in mind the damaging effects the typical analytical focus in school has on people who prefer to do other things with their minds. Asking someone with a legislative style to be analytical potentially hurts not only their creative performance, which is not surprising; it also potentially hurts their practical and analytical performance. We would not ask a couch potato to play offensive tackle, but we ask people with a legislative style to fit into a judicial style school system all the time. As a result, a whole group of people are not getting to do their best.

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