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Effects of Explicit Instruction to “Be Creative” Across Domains and Cultures

ABSTRACT To explore whether the facilitation effects of an explicit instruction to “be creative” vary across cultures and types of tasks, 248 U.S. and 278 Chinese college students were administered a battery of tests of verbal, artistic, and mathematical creativity. Half of the participants were tested under the standard condition, and the other half under the explicit instruction condition. Results showed that the facilitation effects of the explicit instruction varied by domains of the creativity tasks (greater for artistic and mathematical creativity than for verbal creativity), but not across cultural and ethnic groups. The explicit instruction had a small “detrimental” effect on the clarity and grammar of story writing, but not on any other aspects of the technical quality of creative products. Methodological and theoretical implications of these findings are discussed.

INTRODUCTION Test performance is sensitive to testing instructions. One of the most consistent findings in the literature on creativity is the effect of the explicit instruction to “be creative” (shortened to EI hereafter) on performance. More than 20 studies have either directly examined or indirectly reported EI effects (Amabile, 1979; Baughman & Mumford, 1995; Carson & Carson, 1993; Chand & Runco, 1993; Chen, Kasof, Himsel, Greenberger, Dong, & Xue, 2002; Christensen, Guilford, & Wilson, 1957; Datta, 1963, 1964; Evans & Forbach, 1983; Gilchrist & Taft, 1972; Harrington, 1975; Johns & Morse, 1997; Katz & Poag, 1979; Manske & Davis, 1968; Niu & Sternberg, 2001, 2003; O’Hara & Sternberg, 2000-2001; Oziel, Oziel, & Cohen, 1972; Ridley & Birney, 1967; Runco & Okuda, 1991; Shalley, 1991, 1995; Speller & Schumacher, 1975; Taft, 1971; Tomlinson

& Wilson, 1973; Ward, Saunders, & Dodds, 1999; Wild, 1965). Almost all of these studies found significant facilitation effects of EI. The only exceptions were Johns and Morse (1997), who did not find a significant effect, and Niu and Sternberg (2001), who found a negative effect in one of their tests (collage making) and for one sample (the U.S. sample).

For example, in his classic study on the effects of EI on divergent thinking test scores, Harrington (1975) assigned about half of his 105 male research participants to the EI condition and the other half to the standard instruction condition. Results showed that research participants who were explicitly instructed to “be creative” generated significantly more creative uses on the Alternate Uses Test (a.k.a. Unusual Uses Test) than did participants who were simply given the standard instruction to generate as many uses as possible for selected common objects (e.g., a newspaper, a cork, and a button). Similarly, Katz and Poag (1979) and Baughman and Mumford (1995) found that explicit instructions raised the number of original responses to a divergent thinking test (i.e., category-exemplar generation problems, in which participants were asked to produce as many things as they could think of that fit into certain categories, such as “round” and “blue”). Chand and Runco (1993) also reported facilitation effects of EI on another divergent thinking task, one that involved “real world” problems such as those concerning work and school situations.

Although most studies on the EI effects used divergent thinking tests such as those mentioned above, several studies have explored such effects with other creativity tests. For example, significant effects have been found in collage making (Amabile, 1979; Niu & Sternberg, 2003), drawing (Chen et al., 2002; Niu & Steinberg, 2001), essay writing (O’Hara & Sternberg, 2000-2001), and business memo writing (Shalley, 1991, 1995).

There are various explanations of the EI effects. One interpretation of the EI effects is that explicit instruction elicits “maximal performance” (Harrington, 1975; Katz & Poag, 1979). It is assumed that every individual has a range of performances on creativity tasks, but EI results in an individual’s best or maximal performance. Runco and Okuda (1991) proposed that the EI effects might also be mediated by metacognitive and strategic skills. That is, explicit instructions “manipulate the choice of specific ideational strategies” (p. 439).

The EI effects can also be viewed as a special example of goal setting (O’Hara & Sternberg, 2000-2001; Shalley, 1991, 1995). According to Locke and Latham (2002), goal setting

affects performance because it can direct, boost, and sustain attention and effort toward goal-relevant activities (Garland, 1983, 1984, 1985; Garland & Adkinson, 1987; Locke, 1967, 1982; Lorenzi, 1988; Wolfe-Morrison & Weldon, 1990; cf., Meyer, Schacht-Cole, & Gellatly, 1988). These mechanisms probably work in the same way in the case of explicit instructions to be creative.

Just as goal-setting may not have the same effects for everybody and in every situation (Locke & Latham, 1990), individual differences in the EI effects have been documented. Datta (1963, 1964) found that EI improved the performance of highly creative individuals according to on-the-job ratings of creativity. Greater facilitation effects also have been found for art students (presumably a creative group) than for non-art students (Wild, 1965), for students with high academic and intellectual competence (Taft, 1971), and for those with particular thinking styles (O'Hara & Sternberg, 2000-2001). However, Gilchrist and Taft (1972) found that the facilitation effects were not associated with the level of creativity or academic achievement.

To expand the literature base on the EI effects on creativity, the present study examines the following three issues: (a) whether there are cross-cultural differences in the facilitation effects, (b) whether facilitation effects depend on the types of creativity tasks, and (c) whether facilitation effects come at the expense of other aspects of performance on product-based creativity tests (e.g., technical quality of the work). These issues are important not only because of their methodological implications (e.g., how would one design a fair and valid test if the instruction effects vary across cultural groups?), but also because of their implications for theories of abilities, motivation, and performance (e.g., what role does an explicit instruction from others play in the connections between abilities, motivation, and performance?).

First, despite the importance of creativity research, there is still a scarcity of cross-cultural research in this area (Lubart, 1999; Raina, 1999), especially in product-based assessment of creativity (Chen et al., 2002). The limited empirical data showed little consistency in cross-cultural differences in creativity. For example, in studies that compared creativity and divergent thinking of Chinese and American subjects, researchers found no discernible pattern of differences, some favoring Chinese (Ball & Torrance, 1978; Huntsinger, Liaw, Schoeneman, & Ching, 1995; Rudowicz, Lok, & Kitto, 1995),

others favoring Americans (Jaquish & Ripple, 1984, 1984-1985; Niu & Sternberg, 2001; Rudowicz, Lok, & Kitto, 1995), and still others favoring neither group (Chen et al., 2002). There may be many reasons for this lack of consistent findings (e.g., problems with cross-cultural appropriateness of research instruments such as Torrance Divergent Thinking Test).

There are two possible reasons to expect potential cross-cultural variations in the EI effects. The first reason is that cultures vary in their emphasis on compliance, obedience, and authority on the one hand and autonomy, freedom, and independent thinking on the other. Given that EI is likely to elicit compliance behavior, cultures that emphasize compliance, obedience, and authority presumably ought to show greater EI effects. Compared with mainstream American culture, Chinese culture places greater emphasis on obedience to authority, and is less individualistic (Hofstede, 2001; Oyserman, Coon, & Kimmelmeier, 2002). Therefore, one would expect the EI effects to be greater for Chinese. Another reason to expect cross-cultural differences in the EI effects is related to the fact that levels of creativity may be constrained by the levels of necessary technical skills and abilities for specific domains. Good writing skills are prerequisite for creative writers, good painting skills for creative painters, and good mathematical knowledge for creative mathematicians. There is little research about national differences in writing and painting abilities, but evidence is abundant for cross-cultural differences in mathematical skills (e.g., Mullis et al., 2000). Specific to the two countries included in this study, the U.S. students have been found to show a lower level of mathematical performance than their Chinese counterparts (e.g., Stevenson et al., 1990).

So far, there have been only two comparative studies that have some data on the EI effects in different cultures. Contrary to the prediction, Chen et al. (2002) reported that European American and Chinese college students did not differ in the magnitude of facilitation effect in a drawing test. Similarly, Niu and Sternberg (2001) found that Chinese and American college students showed similar positive effects of EI on the drawing-an-alien task. However, as mentioned earlier, they found that EI had a negative effect on American students' creativity in collage making, but a positive effect for Chinese students. More research is needed to replicate and expand these findings. Other measures of creativity and other cultural/ethnic groups should be included.

In the present study, we included data from China as well as

European and Asian Americans in the U.S. Chinese and European Americans represent two distinct cultural orientations on the important cultural dimension of individualism and collectivism. As reported in Suh, Diener, Oishi, and Triandis (1998), the ratings for these cultures were 9.55 (United States) and 2.00 (China), where 1 = most collectivist and 10 = the most individualist. The addition of Asian Americans provides a group that differs from European Americans in cultural values but is otherwise approximately matched to European Americans (e.g., in level of education, language, living standards, political system, etc.).

Second, most research on the EI effects has typically used only one measure of creativity (usually one of the divergent thinking tests). Little is known about whether the magnitude of facilitation effects varies across different domains of creativity tasks. The present study examines creativity tasks in three domains: verbal creativity (story writing, Haiku-type poems, and writing titles for photographs), artistic creativity (drawings and chair design), and mathematical creativity (geometric area partition). In addition, for the poem and title writing tasks, two types of stimuli were used: unusual vs. ordinary stimuli (e.g., “ear” vs. “hope” as a title for a poem). One possible reason that instruction effects may vary across creativity tests is that some tasks (e.g., writing a story) may inherently demand creativity, thus rendering the explicit instruction less effective, whereas other tasks (e.g., geometric area partition) may not necessarily require creative solutions which leave greater potential for the explicit instruction’s goal-setting effects. Furthermore, particular stimuli (e.g., unusual stimuli) may be more likely to elicit creative responses than ordinary or familiar stimuli (Johnson, 1956). We believe that inherently creative tasks and unusual stimuli represent implicit forms of “task demands” to be creative. We hypothesize that facilitation effects will be smaller for tasks that are inherently creative or use unusual stimuli.

Third, there is some empirical evidence that the facilitation effects of explicit instructions have “costs” (i.e., negative consequences) for task performance. For example, several studies (Carson & Carson, 1993; Gilchrist & Taft, 1972; Harrington, 1975; Manske & Davis, 1968; Runco & Okuda, 1991) have found that explicit instruction to be creative increases the originality scores on divergent thinking tests at the expense of lowered fluency scores (see Katz & Poag, 1979, for an exception). These results suggest that the explicit instruction to be

creative redirects participants' attention from generating a large number of responses to focusing on one aspect of the task. This sharpened focus can adversely affect other aspects of the task performance (e.g., fluency) that may or may not be an integral part of creativity. In fact, Runco and Okuda (1991) demonstrated that the "be original" instruction lowered scores on fluency and flexibility, and the "be flexible" instruction lowered scores on fluency and originality.

Such "costs" of the instruction are less clear about product-based assessment of creativity. For example, Amabile (1979) did not find a decrease in the technical quality of collages when creativity was the focus as compared to no-focus. Shalley (1991) also did not find a significant change in productivity in memo writing when creativity was the goal.

The current study aims to explore whether there are potential "costs" of EI on product-based creativity tests. Specifically, we examine whether the technical quality of the creative products in two verbal tasks (i.e., story and poem writing) and artistic tasks (i.e., drawings and chair design) suffer as a result of the emphasis on creativity. On the one hand, previous research reviewed above has found that explicit instruction to be creative or original adversely affects several types of divergent thinking scores such as fluency and flexibility. One would expect that by directing the attention to the creativity of the product, participants might have to ignore to some extent the technical quality aspects of the product. On the other hand, the one study on collage making (Amabile, 1979) revealed no adverse effects of EI on the quality of the collages. By expanding our investigation into more domains of creativity and more than one culture, we hope to shed light on this issue.

METHOD
Participants

Participants were 248 American (75% females) undergraduate students enrolled in a large public university in southern California and 278 Chinese undergraduate students (69% females) in a large university in Beijing. All students were social science majors. The mean ages were 22.05 years (s.d. = 4.34) for Americans and 21.69 years (s.d. = 1.08) for Chinese. American students came from diverse ethnic backgrounds: 74 (30%) European Americans, 96 (39%) Asian Americans/Pacific Islanders, 39 (16%) Hispanic Americans, 4 (2%) African Americans, and 35 (14%) other ethnic background (including bi-ethnic or multi-ethnic students or unknown). As mentioned in the Introduction, this study examined both cross-ethnic and cross-country differences in the EI effects. The

ethnic backgrounds of Chinese students were 90% Han Chinese and 10% ethnic minorities.

Procedure

Participants were randomly assigned to complete the creativity tasks with either the explicit instruction to be creative (EI) or the standard instructions. Under the EI condition, participants were explicitly asked to be creative and imaginative (but still appropriate) in their responses. For example, the specific instruction for the EI condition for drawing was titled "Drawing Creatively" and included the instruction: "This task involves drawing creatively. We want you to create drawings that are highly creative, imaginative. That is, please create drawings that are both original (novel, uncommon) and also appropriate (artistically effective) . . . And remember: Be as creative and imaginative as you can be!"

For verbal tasks, students were asked to write a creative story and poems with assigned titles and to write titles for photographs. For example, poetry instruction included: "We want you to be as creative as you can possibly be in writing a poem. That is, we want you to write a poem that is both highly *original* (unusual, uncommon, non-ordinary) and highly *appropriate* (sensible, poetically effective, beautifully written)." For the chair design and mathematical creativity tasks, the following sentence was used (in upper case): "Try to be as creative (original) as you can in solving the problem."

Under the standard condition, all references to the word "creativity" or related words (e.g., original, uncommon, etc.) were removed. For example, "Drawing Creatively" was replaced with "Visual Imagery" and "Writing Creative Poetry" with "The Poetry of Your Mind." Students completed these tasks in their classrooms for extra course credits.

Measures of Creativity

Verbal creativity. Each participant was asked to create one story, two poems, and two titles for photographs. For the story task, participants were given 15 minutes to write a story with the title "Beyond the Edge" (used in Sternberg & Lubart, 1992). The poem task, adapted from Amabile (1996), asked participants to write poems using the following format: Line 1 consists of one noun (i.e., the title) that is provided, Line 2 consists of two adjectives that describe the noun, Line 3 consists of three verbs that are related to the noun, Lines 4 and 5 can have any number of words and any grammatical type as long as they are related to the noun, Line 6 repeats the noun from Line 1. In the task for this study, we provided two commonplace titles ("Hope" and "Sunshine") and two unusual titles ("Ear" and "Window"). These title words were selected from a list of 100

words that are deemed to have universal meanings (Osgood, May, & Miron, 1975, p. 72). Half of the participants under each instruction condition responded to the two ordinary titles, whereas the other half responded to the two “unusual” titles. Participants were allowed 6 minutes to complete each poem.

Finally, each participant was asked to create titles for two of four black-and-white art photographs. Two photographs featured commonplace photographic subject matter (Ansel Adams’s realistic landscapes of a dead tree on a hilly pasture, “Tree, Sierra Foothills, CA, 1938,” and of a stream running through a field of tall grass, “Bear Track Cove, Alaska, 1948,” in De Cook, 1972, p. 43 and p. 48, respectively), and two photographs contained unusual imagery (Jerry Uelsmann’s photomontages featuring a hanging door suspended within a boulder and a human face superimposed upon a large rock, in Uelsmann, 1992, p. 65 and p. 111). Participants who had been assigned commonplace titles for the poetry tasks were now asked to create titles for the two photographs that featured commonplace stimuli, whereas the participants who had received unusual poetry titles now were asked to create titles for the two photographs of unusual stimuli. Participants were allowed 3 minutes to title each photograph.

Artistic creativity. Two types of tasks were used to measure artistic creativity. First, participants were given 10 minutes to create eight small drawings with the following titles (four geometric and four non-geometric): “circle,” “rectangle,” “triangle,” “oval,” “contrast,” “person,” “motion,” and “dream.” Second, participants were asked to use two triangles, two ovals, two rectangles, and three lines to design a chair. Each shape could be of any size, and each line could be of any length and need not be straight. If necessary, they could use one fewer than the nine components. Participants were allowed 8 minutes to complete this task.

Mathematical creativity. Two types of creativity tasks were employed to measure mathematical creativity: the “Cutting Rectangles Task” and “Nine-Dot Areas Task.” These tasks were modified from those used by Haylock (1987). Both tasks were designed to tap the ability to “break set” and demonstrate flexibility and originality in solving ambiguous mathematical problems. For the “Cutting Rectangles Task,” participants were asked to divide a rectangle into smaller rectangles by drawing straight lines. There were four rectangles, two to be cut into four smaller rectangles and two into nine smaller rectangles. The “Nine-Dot Areas Task” required participants to divide an

area of 4 square inches (bounded by the nine dots) into areas of 2 square inches by drawing straight lines and connecting the dots. There were three squares of nine dots. Participants were given 6 minutes to complete the "Cutting Rectangles Task" and 6 minutes to complete the "Nine-Dot Areas Task."

Three methods were used to assess the creativity of the products, depending on the nature of the tests.

Consensual assessment technique. The short story, poems, and drawings were judged following Amabile's (1982) consensual assessment technique. Various dimensions (e.g., creativity, uniqueness of idea, liking, technical quality, clarity, and overall aesthetic appeal) were used in the judgments. The current paper focuses on the creativity dimension and several dimensions related to technical quality. All judgments were made on 5-point Likert-type scales, ranging from, for example, 1 = "not at all creative/unique/clear/symmetrical/neat" to 5 = "highly creative/unique/clear/symmetrical/neat." Each judge rated the creative products in a different random order.

The number of judges ranged from 6 to 8 for each task. Inter-judge reliability (i.e., Cronbach alpha) ranged from satisfactory to high for both countries, .69 to .97, with a mean of .88. All American products were judged by American undergraduate research assistants. All Chinese verbal products were judged by Chinese undergraduate research assistants. Drawings and chair designs by the Chinese participants were judged by American undergraduate research assistants because previous research showed high levels of cross-cultural similarity in consensual assessment of drawings (Chen et al., 2002). Undergraduate students have been found to be able to provide reliable and valid judgments of creative products (Amabile, 1996; Sternberg & Lubart, 1995). For example, Amabile (1983) concluded that "the level of expertise of the judges appears not to matter as much as might have been expected for these tasks. In the studies on artistic creativity, there is no clear superiority of artists over nonartists in average interjudge correlations. Moreover, it does not appear that nonartists or artists were subjectively defining creativity in very different ways" (p. 57).

Sorting method. For the chair design and titles for photographs, we adopted a simpler sorting method to assess creativity. Research assistants were asked to sort the designs and titles (which had been removed from the original test packets and were presented individually) into piles by their level of creativity. Following the consensual assessment technique, judges

were asked to use their own definition of creativity. First, judges looked through about 20 responses to form an impression of the range of creativity. Then, the creative products were randomly shuffled. After that, the judges sorted the products into three approximately equal piles labeled “low creativity,” “medium creativity,” and “high creativity.” Last, the judges further sorted the “low creativity” and “high creativity” piles each into two smaller piles. In the end, the products were sorted into five piles that approximated a normal distribution. Chair designs by Chinese students were also judged in their technical quality dimensions (i.e., neatness and symmetry).

Coding method. For the mathematical creativity tasks, trained undergraduate research assistants used objective coding schemes to code the creativity of each response. Based on Haylock (1987), a simple coding scheme was developed. For the Cutting Rectangles Task, any response that used only vertical or only horizontal lines (i.e., similar to the examples given on the tests) was coded as “low creativity.” Responses that included vertical and horizontal lines of different lengths to create rectangles of varying sizes were coded as showing “medium creativity.” The “high creativity” category included, among other examples, three-dimensional rectangles and imbedded rectangles.

For the Nine-Dot Areas Task, creativity was closely related to the use of spatial units (the smaller units allowed for more interesting and creative designs). Therefore, we used the main criterion of how small of a unit the research participants used to generate the 2-square-inch areas. For example, outlining one rectangle (i.e., half of the 4 square inches) was coded as low in creativity. When the area was created using the smallest possible unit by drawing straight lines across all the dots (i.e., a unit of one-sixteenth of the area), the response was coded as the most creative.¹ Two coders independently coded each response. The agreement rate was 85% or higher. All disagreements between the two coders were examined. Obvious coding errors were corrected by senior research staff, and genuine disagreement among two coders was resolved during a group meeting.

1. One piece of evidence for the validity of this coding scheme is the significant facilitation effect (see results section), because the explicit instruction to be creative can be viewed as a validity manipulation check. In other words, what the research participants considered as “creative” solutions were indeed coded as “creative” according to this scheme.

RESULTS The focus of the study was on the effects of explicit instructions to be creative (EI). Therefore, we standardized all creativity ratings within each country, and examined only the main effects of EI and its interaction with culture.² Table 1 shows the summary of two-way (country x instruction) ANOVA on the creativity measures. Consistent with previous research, we found clear facilitation effects of EI. The effects were significant for all creativity tasks, but the magnitude varied greatly, ranging from very small (accounting for 1% of variance in the cases of story writing and chair design) to very large (accounting for 30% of variance in geometric drawings). On both the geometric drawing and cutting-rectangles tasks, the differences between standard and EI conditions were about 1 standard deviation. In general, the effects were bigger for artistic and mathematical creativity than for verbal creativity.

EI effects were very similar for the two countries. The interaction term between instruction and country accounted for less than 1% variance (see Table 1). Only one of the interactions reached statistical significance. In drawings with non-geometric titles, the facilitation effect was larger in the U.S. than in China.

The facilitation effects were also similar between European and Asian Americans³ (see Table 2). None of the interaction terms between ethnicity and instruction was significant. Furthermore, the two groups did not differ in their mean levels of creativity on any of the creativity tests.

2. Cross-cultural comparisons of mean levels of creativity would have required use of the cross-cultural consensual assessment technique (Chen et al., 2002) in which judges from both countries judge all creative products by all the research participants. This technique becomes unwieldy with a combined sample size of more than 500 research participants. Existing evidence (Chen et al., 2002; Moneta & Siu, 2002; Niu & Sternberg, 2001) showed great similarity in how Chinese and Americans judged creative products. Nevertheless, because all creativity judgements were made within each country in the context of creative products from the same country, mean comparisons are not meaningful. The only exception was mathematical creativity, which was coded according to the same coding scheme in both countries. Results of *t*-tests showed that Chinese students scored significantly higher than the U.S. students in both the Cutting Rectangles Task (means/s.d. = 2.45/.74 for Chinese and 1.91/.89 for the U.S., $t [504] = 7.52, p < .001$) and the Nine-Dot Areas Task (means/s.d. = 3.66/1.05 for Chinese and 2.09/1.39 for the U.S., $t [512] = 14.65, p < .001$). Unlike between-country differences, ethnic differences could be (and were) tested (see Table 3 and related text).

3. The sample sizes of other ethnic groups were too small to allow for meaningful comparisons.

TABLE 1. Mean Z-Scores of Creativity by Country and Type of Instruction with Associated F-Statistics.

	United States			China			F-Statistics					
	Standard	EI	Standard	EI	Standard	EI	df	Instruction	eta ²	Instruction by country interaction	eta ²	
<i>Verbal creativity</i>												
Story	-.14	.13	-.07	.07			1,432	4.26*	.01	.33	.00	
Poems (ordinary stimuli)	-.32	.32	-.21	.20			1,253	18.56***	.07	.97	.00	
Poems (unusual stimuli)	-.25	.22	-.21	.20			1,250	13.37***	.05	.85	.00	
Titles (ordinary stimuli)	-.13	.13	-.22	.21			1,249	7.53**	.03	.49	.00	
Titles (unusual stimuli)	-.05	.05	-.26	.27			1,250	6.45*	.03	3.03	.01	
<i>Artistic creativity</i>												
Drawings (geometric)	-.59	.51	-.54	.53			1,507	212.21***	.30	.04	.00	
Drawings (non-geometric)	-.32	.29	-.09	.09			1,507	22.82***	.04	6.98**	.01	
Chair design	-.07	.07	-.11	.11			1,503	4.18*	.01	.63	.00	
<i>Mathematical creativity</i>												
Cutting rectangles	-.44	.44	-.47	.47			1,498	129.93***	.21	.15	.00	
Nine dots	-.28	.28	-.35	.35			1,506	55.34***	.10	.77	.00	

Note: Scores were standardized within country (and types of stimuli), thus there was no main effect of country.

* $p < .05$; ** $p < .01$; *** $p < .001$

TABLE 2. Mean Z-Scores of Creativity by Ethnicity and Type of Instruction with Associated F-Statistics.

	European Americans		Asian Americans		df	Ethnicity	eta ²	F-Statistics			
	Standard	EI	Standard	EI				Instruction	eta ²	Instruction by ethnicity interaction	eta ²
<i>Verbal creativity</i>											
Story	-.13	.33	-.08	.18	1,105	.06	.00	3.85	.04	.31	.00
Poems (ordinary stimuli)	-.04	.46	-.50	.22	1,80	2.62	.03	8.07**	.09	.25	.00
Poems (unusual stimuli)	-.10	.31	-.18	.03	1,75	.55	.01	1.71	.02	.19	.00
Titles (ordinary stimuli)	.03	.07	-.34	.25	1,77	.17	.00	1.81	.02	1.32	.02
Titles (unusual stimuli)	.24	.30	.13	-.13	1,75	1.43	.02	.19	.00	.49	.01
<i>Artistic creativity</i>											
Drawings (geometric)	-.75	.30	-.59	.57	1,159	2.74	.02	71.33***	.31	.71	.00
Drawings (non-geometric)	-.22	.21	-.41	.22	1,159	.45	.00	15.72***	.09	.53	.00
Chair design	-.03	.01	-.12	.28	1,156	.33	.00	1.98	.01	1.30	.01
<i>Mathematical creativity</i>											
Cutting rectangles	-.31	.67	-.44	.44	1,153	1.71	.01	44.20***	.22	.13	.00
Nine dots	-.16	.57	-.33	.43	1,159	1.06	.01	23.74***	.13	.01	.00

* $p < .05$; ** $p < .01$; *** $p < .001$.

The ordinary and unusual stimuli generated about the same magnitude of facilitation effects. The interaction term between stimuli and instruction for either poems or titles was mostly non-significant for any of the cultural groups. The F values for poems were $F(1, 275) = .01, n.s.$, for Chinese; $F(1, 65) = .30, n.s.$, for European Americans; and $F(1, 91) = 1.50, n.s.$, for Asian Americans. The F values for titles were $F(1, 275) = .01, n.s.$, for Chinese; $F(1, 65) = .00, n.s.$, for European Americans; and $F(1, 91) = 4.00, p < .05$, for Asian Americans. As shown in Table 2, Asian Americans showed a facilitation effect for ordinary stimuli for titles, but a small reversed effect for unusual stimuli.

Finally, we examined the potential “costs” of EI. Table 3 shows the mean z-scores of several dimensions of technical quality by instruction. Because none of the culture \times instruc-

TABLE 3. Mean Z-scores for Technical Quality by Type of Instruction with Associated F -Statistics.

	<i>F-statistics</i>				
	Standard	EI	df	Instruction	eta ²
<i>Verbal creativity tasks</i>					
Story—clarity	.11	-.11	1,432	4.73*	.01
Story—grammar	.21	-.20	1,432	17.26***	.04
Poems—format	.03	-.03	1,507	.40	.00
Poems—grammar	.03	-.03	1,507	.50	.00
<i>Artistic creativity tasks</i>					
Drawings—technical quality	-.37	.36	1,507	80.02***	.14
Drawings—neatness	-.00	.01	1,507	.45	.00
Drawings—symmetry	-.01	.04	1,507	.31	.00
Chair design—tech. quality	-.03	.03	1,277	.23	.00
Chair design—neatness	-.04	.04	1,277	.38	.00
Chair design—symmetry	.04	-.04	1,277	.38	.00

Note: There were no significant country by instruction effects; thus only instruction effects are shown in the table. For the sake of simplicity, data for all drawings (geometric and non-geometric drawings) were combined, as were poems for ordinary and unusual titles. The technical dimensions for the chair design were judged only for the Chinese data; the chair design for the U.S. was judged only for levels of creativity.

* $p < .05$; ** $p < .01$; *** $p < .001$

tion interaction effects was significant, results are shown only for the whole sample. EI affected three aspects of the technical quality of verbal and artistic creative products. In story writing, EI resulted in lower ratings of clarity and grammatical correctness. In drawings, however, technical quality was actually higher under the EI condition than under the standard condition.

DISCUSSION Consistent with previous research, this study showed a general facilitation effect of explicit instruction to be creative (EI) across several creativity tasks in three domains and across cultural and ethnic groups. The nature of the tasks seemed to moderate the magnitude of the facilitation effects. As expected, naturally creative tasks (such as story writing) appeared to benefit the least from EI, whereas tasks that do not necessarily require creative responses (e.g., drawing geometric shapes and partitioning areas) appeared to benefit the most from EI. Students are familiar with the task demand of producing creative products when asked to write a story. Therefore, it made little difference to ask them to write creatively or to write a good story. For other tasks such as drawing geometric shapes, creative drawings may not have been the obvious choice. In this case, both creative and non-creative solutions exist and the explicit instruction to be creative may serve as goal-setting to direct one's attention to goal-relevant (i.e., be creative) activities (Locke & Latham, 2002). Such cross-task variation may also be understood in terms of "implicit" theories of creativity. Research into lay beliefs has revealed erroneous but common preconceptions that creativity is more closely linked to arts and literature than to mathematics and sciences (see Paulhus, Wehr, Harms, & Strasser, 2002; Runco, 1999). Given such assumptions, it seems likely that participants in our standard condition did not construe the Geometric Drawings, Cutting Rectangles, and Nine Dots Area tasks as germane to creativity, relative to the Poetry, Story, Title, Non-Geometric Drawing, and Chair Design tasks. The explicit instruction to be creative would, of course, override any such default assumptions, resulting in greater EI effect sizes for the former tasks than the latter tasks.

More important than domain-specificity in the EI effect is our finding that the instruction effects were uniform across cultural and ethnic groups. This finding has both methodological and theoretical implications. Methodologically, it puts to rest any concerns about whether the instructions should be

explicit when studying creativity in different cultures. The results of our study suggest that either instruction condition can be used as appropriate for the purpose of cross-cultural comparisons. Researchers' decision about whether to use explicit instruction or standard instruction may depend on other factors. For example, in some studies, explicit instructions may be needed to obtain data with better statistical properties (e.g., less skewed; see Chen et al., 2002). On the other hand, explicit instructions may interfere with particular research objectives. For example, when studying the effects of intrinsic motivation on creativity, one might want to avoid using explicit instructions lest it interacts with the effects of intrinsic motivation. In fact, Amabile (1983) went so far to argue that "the conceptual definition of creativity clearly disallows the consideration of the specific instructions task as 'creative'" (p. 109). According to Amabile, specific instructions about emphasizing specific dimensions (e.g., the novelty of the idea, the asymmetry in the design, and the complexity in the design) necessarily lead the research participants to adopt an algorithmic, not creative, approach to the task.

Another factor in the decision about whether to use explicit instructions is the facets of creativity being measured (i.e., creativity as a personality trait vs. as an ability). Researchers studying creativity as a personality trait may want to use the standard instruction and tasks that are not obviously identifiable as creativity tests. To capture the personality trait of creativity, creativity tests should, like most personality tests, ensure that the person being assessed is ignorant, to the greatest extent possible, of the implications of particular responses. The addition of explicit instructions would be counterproductive. On the other hand, researchers who wish to study creativity as an *ability* should probably consider using explicit instructions. Most tests of abilities (e.g., intellectual and cognitive abilities) are objective in nature. When taking objective ability tests, the test-takers are fully aware of the importance of coming up with the "correct" answers. Explicit instructions direct the research participants away from the conventional answers and redirect them towards creative answers. There is some evidence that, as compared to the standard condition, the EI condition resulted in creativity scores that were more closely associated with other measures of creative ability (Katz & Poag, 1979). These results suggest that test scores from the EI condition are better indicators of creative ability than those obtained under the standard condition. It is likely that performance

under the EI condition is “maximal” (Katz & Poag, 1979), especially for the highly creative individuals. Future research needs to address not only concurrent but also predictive validity of both creative personality tests and creative ability tests under different conditions.

Regardless of the facets of creativity being measured (creative personality traits or creative ability), results of the current study are reassuring to cross-cultural researchers in that whether explicit instructions are included or not would not introduce systematic biases into cross-cultural comparisons. These results, of course, should be further replicated with other tests of creativity or divergent thinking and with other cultural groups.

Theoretically, a lack of cultural differences in the EI effects challenges the argument of all-encompassing effects of cultural orientations of individualism and collectivism. As a specific case involving a social request or command (i.e., “be creative”), research participants from individualistic (the U.S.) and collectivist cultures (China) appeared to show the same level of compliance. This is consistent with several previous studies that showed cross-cultural similarities in compliance behaviors (Cialdini, Wosinska, Barrett, Butner, & Gornik-Durose, 1999; Kilbourne, 1989), but in contrast with studies that showed higher conformity (based on Asch tasks) in collectivist cultures than in individualistic cultures (Bond & Smith, 1996). More research on compliance behaviors, and conformity behaviors with non-Asch tasks, is needed to clarify the role of culture in compliance and conformity.

The contrast between ordinary and unusual stimuli was generally not found to interact with the EI effects. One possible reason is that our unusual stimuli were not unusual enough to necessarily elicit creative responses. After all, our unusual stimuli are either common words such as “ear” and “window” (albeit unusual as titles of poems) or collages of photographs (not too unusual in the context of modern arts). Another reason for a lack of interaction between the EI effects and stimuli is that in general implicit “request” for creativity may be ineffective. Langer and Piper (1987) also found that divergent thinking was unaffected by whether the stimulus objects were commonplace or unusual. Goal-setting theory certainly relies on clear and explicit setting of goals. Future research needs to test a broader array of implicit requests including more unusual stimuli or even priming to see whether there could be powerful effects of some types of implicit requests.

Consistent with findings such as Amabile's (1983), explicit instructions generally did not incur a cost to the technical quality of a creative product. Perhaps this is due to the nature of product-based assessment of creativity. Unlike divergent thinking tests in which some goals (e.g., originality and fluency) may not be compatible with each other, product-based tests allow research participants to come up with the most original idea and turn that into the best quality product. Even the one exception to our general finding is subject to a different interpretation. Results showed that explicit instructions led to a lower level of clarity and more grammatical errors. There are certainly styles of writings (e.g., the styles of e e cummings or abstract poets) that pushed the envelope in terms of clear writing and correct usage of grammar. Given that we found little difference in mean level of creativity in story writing between the standard and EI conditions, one can interpret the lower "technical quality" of writings as research participants' failed attempt to be creative via fuzzy writing and incorrect usage of grammar. Finally, we found a facilitation effect of the explicit instruction to be creative on the technical quality of drawings. This makes sense when one thinks that those who know how to draw can excel under the EI condition. A creative idea can only come to life when it is also drawn with good techniques.

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