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# Interactive Effects of Multicultural Experiences and Openness to Experience on Creative Potential

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Extensiveness of multicultural experiences and Openness to Experience were used to predict European American undergraduates' performance on two measures of creative potential: (a) generation of unusual uses of garbage bags and (b) retrieval of nonprototypical or normatively inaccessible exemplars in the conceptual domain of occupation. The results showed that having extensive multicultural experiences predicted better performance on both measures of creative potential only among participants who were open to experience. Among those who were not open, having more extensive multicultural experiences was associated with a lower level of creative potential. Implications of these findings for promoting creativity in schools are discussed.

The ability to generate novel and useful ideas and solutions to everyday problems is an important component of creativity (Amabile, 1996; Sternberg & O'Hara, 1999). This ability may be hampered if individuals hold onto some highly accessible knowledge in their own culture and resist relatively unfamiliar ideas from other cultures as possible intellectual resources for creative expansion. Thus, it is important to understand whether exposure to multicultural experiences can reduce individuals' reliance on culturally accessible knowledge and, hence, increase their levels of creative potential (Chiu & Hong, 2005; Leung & Chiu, in press).

There are reasons to believe that multicultural experiences can raise an individual's level of creative potential more if this individual is more open to new experience. When individuals are exposed to ideas from foreign cultures, those with higher Openness to Experience should be more receptive to these ideas and rely less on culturally accessible knowledge. Thus, they should be more prepared to retrieve from memory less prototypical ideas and generate unconventional uses of an ordinary

object (Ip, Chen, & Chiu, 2006). In contrast, when exposed to unfamiliar ideas from other cultures, those with lower Openness to Experience may be more inclined to find these ideas overwhelming, shocking, and even threatening. To manage these negative reactions to novel ideas from other cultures, these individuals may be more inclined to cling on to conventional ideas in their own culture (Chao, Chen, Roisman, & Hong, 2007). As a result, they may have a greater tendency to retrieve from memory prototypical or normatively accessible exemplars in a conceptual domain, and hence generate less creative ideas. In the current investigation, we tested the hypothesized interaction of multicultural experiences and Openness to Experience on two measures of creative potential: the Unusual Uses Test and the exemplar generation task. In the following sections, we flesh out the rationale for our hypothesis.

## MULTICULTURAL EXPERIENCES AND CREATIVE POTENTIAL

Some ideas are more prevalent or normatively accessible in one culture than in others (Ip et al., 2006). Thus, exposure to a foreign culture may afford valuable opportunities to be exposed to ideas that are prevalent

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in another culture, but unfamiliar to one's own culture. Recruiting and synthesizing such ideas in creative problem solving could result in creative outcomes. Indeed, some researchers (Benet-Martinez, Lee, & Leu, 2006; Gardner, Gabriel, & Dean, 2004; Simonton, 1997, 2000; Sorokin, 1969; Tadmor & Tetlock, 2006) have acknowledged the potential beneficial effects of multicultural experiences on creativity. Once individuals become receptive to new and unconventional ideas through their multicultural experiences, they may spontaneously access from memory knowledge that is normatively inaccessible in their own culture and generate creative ideas.

There is considerable evidence for the creative benefits of multicultural experiences. For instance, using both experimental and correlational studies, Leung and Chiu (in press) found that individuals with more extensive multicultural experiences were more receptive to ideas from foreign cultures and performed better on insight learning, creative metaphor generation, and creative story writing.

The creative benefits of multicultural experiences can be attributed to a number of factors. First, because multicultural individuals have acquired knowledge from more than one cultural tradition, they tend to have richer conceptual structures (Chiu & Hong, 2005; Hong, Morris, Chiu, & Benet-Martinez, 2000), and the increased cognitive complexity resulting from multicultural experiences has been linked to the ability to generate novel ideas (Tadmor & Tetlock, 2006). Second, the experience of interacting with unfamiliar ideas may increase an individual's psychological preparedness to accept novel, unconventional ideas. This may, in turn, facilitate the recruitment of unconventional ideas for creative problem solving (Leung & Chiu, in press). Finally, working with novel ideas from other cultures may generate new insights on the interrelations between these ideas and the conventional ones in one's own culture, and hence foster creative synthesis of ideas from various cultures (Chiu & Hong, 2005).

#### OPENNESS TO EXPERIENCE AND CREATIVE POTENTIAL

Openness to Experience has been singled out as the personality dimension most closely linked to creative behaviors (Costa & McCrae, 1992; Feist, 1998; McCrae & Costa, 1997). Individuals with high Openness to Experience are those who are appreciative of novel ideas and new experiences, receptive to a variety of perspectives and thoughts, and unafraid of recruiting unconventional ways to deal with problems at hand; they are also artistic, inventive, and curious (Costa & McCrae, 1992; McCrae & Costa, 1997). Although Openness to Experi-

ence predisposes people to learn from new cultural experiences and, hence, to become creative, individuals who are open to experience will benefit from multicultural learning only when they have the opportunities and experiences of learning in multicultural contexts. Thus, we predict that among individuals who are open to experience, the extent of multicultural experiences would be positively associated with the level of creative potential.

On the contrary, people exposed to multicultural experiences often report feelings of ambivalence and even culture shock (Hong, Wan, No, & Chiu, 2007). We submit that individuals who are not open to experience may appraise and experience multicultural encounters negatively. For example, they may appraise and experience unfamiliar ideas as overwhelming, threatening, and shocking. To manage these potential negative appraisals and feelings, these individuals may resist novel ideas and fall back on the conventionalized ideas in their own culture. Some recent research findings are consistent with this idea. For example, when open-minded Chinese undergraduates were presented with pictures of American culture (vs. control pictures), they spontaneously adopted American practices in managing conflict. However, when close-minded Chinese undergraduates were shown the same pictures (vs. control pictures), they resisted American cultural practices and held on strongly to Chinese conflict management strategies (Fu et al., 2007; see also Chiu, Morris, Hong, & Menon, 2000). Thus, we predict that among close-minded participants, having more multicultural experiences would be negatively associated with the level of creative potential.

#### ASSESSING CREATIVE POTENTIAL

Two measures of creative potential were used in this study: (a) retrieval from memory of nonprototypical or normatively inaccessible exemplars in a certain conceptual domain, and (b) generation of unconventional uses of a common object. The first task assesses people's ability to retrieve from memory exemplars in a certain conceptual domain that are normatively inaccessible in their own culture, whereas the second task measures performance on divergent thinking. Both processes are important creativity-supporting processes (Runco, 2003; Ward, Patterson, Sifonis, Dodds, & Saunders, 2002).

To elaborate, creative performance involves both generative processes undertaken to actively retrieve or generate a wealth of ideas and explorative processes undertaken to scrutinize a selective set of candidate ideas for further processing (e.g., transformation, expansion, and combination; Finke, Ward, & Smith, 1992). During the generative processes, if some typical, familiar, and

frequently used ideas are considered as candidate ideas, it is unlikely that the outcome sprang out from the creative activities would be novel. However, accessing atypical, unfamiliar, and infrequently used ideas is by no means easy; past research has shown that people engaging in creative activities tend to develop ideas that are structured in a predictable way by some existing conceptual categories or exemplars (Rubin & Kontis, 1983; Ward, 1994; Ward et al., 2002; Ward & Sifionis, 1997). For instance, when participants were told to design a novel coin, their designs looked very similar to an existing coin (Rubin & Kontis, 1983). In another study, when participants were instructed to draw novel instances of tools, animals, and fruits, the majority of the responses resembled known Earth examples in some ways (Ward et al., 2002). Thus, an important creativity-supporting cognitive process is to retrieve from memory nonprototypical or normatively inaccessible exemplars. Thus, we used an exemplar generation task as one measure of creative process.

Another important creativity-supporting process involves the ability to contemplate a diverse set of ideas that people may not frequently encounter in their own culture. In the second measure of creative potential, we had the participants generate unusual uses for garbage bags. This served as a performance measure of divergent thinking. In summary, we hypothesize that extensive experiences with multiple cultures are positively related to the level of creative potential among individuals who are relatively open to experience, but are negatively associated with the level of creative potential among those who are less open.

## METHOD

### Participants

Sixty-five European American students (36 males, 29 females; mean age = 19.05 years) participated in the study in exchange for course credit. Participants first performed the Unusual Uses Test and then the exemplar generation task. Next, they filled out the Multicultural Experience Survey and the Openness to Experience scale.

### Measures

*The Unusual Uses Test.* Participants were given 10 minutes to complete an Unusual Uses Test (Guilford, 1959). The test measures the assessee's ability to generate a large number of ideas and to devise different strategies of using a common object (Torrance, 1974). The assessee is required to think of the uses of a common object, such as the use of garbage bags, cardboard boxes, or a brick (Bolen & Torrance, 1978; Glover, 1976; Hoff & Carlsson, 2002; Lissitz & Willhoft,

1985). Following the usual procedures in the previous studies, we instructed the participants in the current study to list as many uses for garbage bags as possible. The participants were told not to limit themselves to any kinds of garbage bag or to any uses they had seen or heard about before.

Responses on the Unusual Uses Test were coded on two dimensions. First, fluency or the ability to produce a larger number of unusual uses was measured by the total number of responses participants generated in the test after eliminating repetitive responses. Second, flexibility or the ability to generate different kinds of unusual uses was measured by the total number of categories of unusual uses generated. Two independent coders grouped the responses into different categories (e.g., containers, waterproof materials, arts, weapons, and furniture) and then counted the number of categories of unusual uses for each participant. The flexibility scores obtained from the coders were high in inter-judge reliability,  $r = .87$ ,  $p < .0001$ . Coding inconsistencies were resolved through discussion with the first author.

*Exemplar generation task.* The participants proceeded to complete the exemplar generation task after the Unusual Uses Test. In the exemplar generation task, the participants wrote down the first 20 occupations that came to their mind. Following Barsalou (1985) and Battig and Montague (1969), all responses were coded as distinct occupation exemplars except for those that reflect minor variations in inflection (e.g., policeman and policemen) and those that are close synonyms of each other (e.g., cab driver and taxi driver). The occupation exemplars generated in this study were assigned an output precedence index (described in the following) based on the occupation norm established in a recent study (Ip et al., 2006). Exemplars with high output precedence scores are exemplars that most undergraduates in the United States can readily retrieve from memory, and are therefore common, conventional, and not original (as opposed to novel and unconventional). In this study, as a measure of each participant's tendency to generate normatively accessible (vs. inaccessible) exemplars, for each participant, we took the mean of the output precedence scores of all the exemplars that participant generated.

Compilation of the exemplars' output precedence norm in the Ip et al. (2006) study took several steps (Ward et al., 2002). First, a sample of 147 European American students from the same student population as the present study took part in the exemplar generation task. Second, for each exemplar that appeared on a certain participant's list, it was assigned a score that corresponded to its reverse ordinal position on the list. For example, a certain participant who generated 20 exemplars listed the occupation *doctor* on the second position on her list. In this

case, *doctor* received a score of 19 (i.e., 21–2). Second, by taking the sum of the reverse ordinal positions of a certain exemplar (*doctor*) from all participants who listed this exemplar, the output precedence score of this exemplar was obtained. Thus, an exemplar's output precedence score indicated how frequently the exemplar was listed as well as how quickly it came to the mind of an average participant. Thus, this score can be used as a measure of normative accessibility (Barsalou, 1985). An exemplar with a high (low) output precedence score is one that is normatively accessible (inaccessible). The three most accessible occupations are doctor, lawyer, and teacher, and the three least accessible ones are dialect coach, optician, and knife maker.

**Multicultural Experience Survey.** Upon completing the two measures of creative potential, the participants filled out the Multicultural Experience Survey (MES) that measured their extent of exposure to a broad range of multicultural experiences (for information about the psychometric properties of the MES, see Leung & Chiu, in press). Participants indicated in the survey if they spoke a foreign language (Item 1: *yes* or *no*), the percentage of their lifetime they had lived outside their home State (Item 2: 0–100%), whether their father and mother were born outside the United States (Items 3 and 4: *yes* or *no*). They also rated on an 11-point scale the extent of their exposure to a culture other than mainstream American culture (Item 5: 0–10). Next, they listed their 5 most favorite restaurants, 5 most favorite musicians, and their 5 closest friends. For each item listed, they indicated the kind of cuisine served in the restaurant (e.g., Thai) or nationality of the musician/friend. We tallied the number of the listed restaurants that served non-American cuisines (Item 6), the number of foreign musicians (Item 7), and the number of close friends from other countries (Item 8). To give equal weights to the eight items, we rescaled the items so that each ranged from 0 to 1. The sum of the rescaled items formed our measure of multicultural experiences.

**Openness To Experience Scale.** The 12-item Openness Scale in the NEO-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1992) was used to measure Openness to Experience. Participants indicated the extent to which they agreed or disagreed with each item on a 5-point scale, with higher scores representing higher levels of Openness to Experience (after reversing the scores of seven items). Two sample items are: "I often try new and foreign foods," and "I am intrigued by the patterns I found in art and nature." The scale had high reliability in the current study ( $\alpha = .83$ ; see McCrae & Costa, 1987, for other validity and reliability information).

## RESULTS

### Multicultural Experiences and Openness to Experience

There was a low and nonsignificant positive correlation between the extent of multicultural experiences and Openness to Experience,  $r = .20$ , *ns*. Although individuals who are open to experience may voluntarily seek out more multicultural experiences than those who are less open, some aspects of multicultural experiences assessed in the Multicultural Experience Survey are beyond personal control (e.g., parents' country of birth and the availability of foreign cultures in one's living environment). Thus, the correlation between extensiveness of multicultural experiences and Openness to Experience was found to be positive but not substantial.

### Generation of Novel Uses of a Garbage Bag

A multicultural experience (mean-centered)  $\times$  Openness to Experience (mean-centered) regression model was fitted to the fluency and flexibility scores obtained from the Unusual Uses Test. A significant multicultural experience  $\times$  Openness interaction was found for each dependent measure:  $F(1,59) = 6.11$ ,  $p = .02$ ,  $\Delta_p^2 = .09$ ,  $p_{rep} = .93$  for fluency;  $F(1,59) = 5.82$ ,  $p = .02$ ,  $\Delta_p^2 = .09$ ,  $p_{rep} = .93$  for flexibility.

Next, the Preacher, Curran, and Bauer's (2006) simple slope analysis procedures were used to identify the region of significance. Using these procedures, it is possible to estimate the levels of Openness to Experience at which the slope predicting idea fluency and flexibility from multicultural experiences would become significantly positive or negative. As shown in Figure 1 when Openness to Experience was 0.56 point or higher than the mean, the simple slope of multicultural experiences predicting idea fluency was positive (significantly  $>0$ ). However, when Openness to Experience was 0.68 point or higher below the mean, the slope became negative (significantly  $<0$ ). Similarly, as seen in Figure 2 when Openness to Experience was 0.23 point or higher above the mean, the simple slope of multicultural experiences predicting idea flexibility was positive (significantly  $>0$ ). However, when Openness to Experience was 1.44 points or higher below the mean, the slope became negative (significantly  $<0$ ).

In summary, among the relatively open participants, those with more extensive multicultural experiences performed better on the Unusual Uses Test. However, among the relatively close-minded participants, exposure to multicultural experiences was associated with poorer performance on the test.

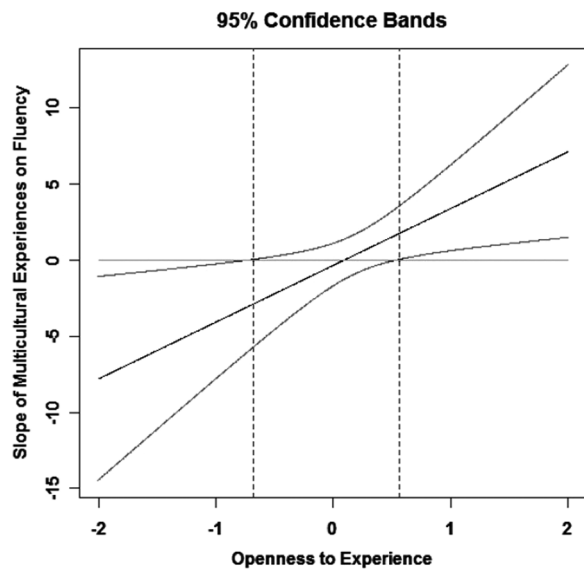


FIGURE 1 Simple slope of multicultural experiences (mean-centered) predicting idea fluency as a function of openness to experience (mean-centered). The straight line between the two curved lines represents the estimated simple slope of multicultural experiences predicting idea fluency at different values of openness to experience. The two curved lines indicate the 95% confidence band of the estimate. The estimated simple slope is significantly positive ( $>0$ ;  $\alpha = .05$ ) when the value of openness to experience was greater than 0.56 (the right dotted vertical line), and significantly negative ( $<0$ ) when the value of openness to experience was smaller than  $-0.68$  (the left vertical dotted line).

### Retrieval of Normatively Inaccessible Occupation Exemplars

A multicultural experience (mean-centered)  $\times$  Openness to Experience (mean-centered) regression model was fitted to the average output precedence index obtained from the exemplar generation task. Recall that a lower output precedence index was associated with a greater tendency to generate *normatively inaccessible* occupation exemplars. Consistent with our hypothesis, the multicultural experience  $\times$  Openness interaction was significant,  $F(1, 57) = 4.33$ ,  $p = .04$ ,  $\Delta_p^2 = .07$ ,  $p_{rep} = .89$ . No other effects were significant in this analysis,  $F_s < 2.62$ . Again, to understand this interaction, a simple slope analysis was performed to identify the region of significance. As seen in Figure 3 when Openness to Experience was at least 5.68 points above the mean, the simple slope of multicultural experiences predicting the output precedence index was negative (significantly  $<0$ ); that is, among the relatively open participants, having more multicultural experiences was associated with a greater tendency to generate normatively inaccessible exemplars. However, when Openness to Experience was at least 0.17 point below the mean, the slope became positive (significantly  $>0$ ); that is, among the relatively close-minded participants, having more multicultural

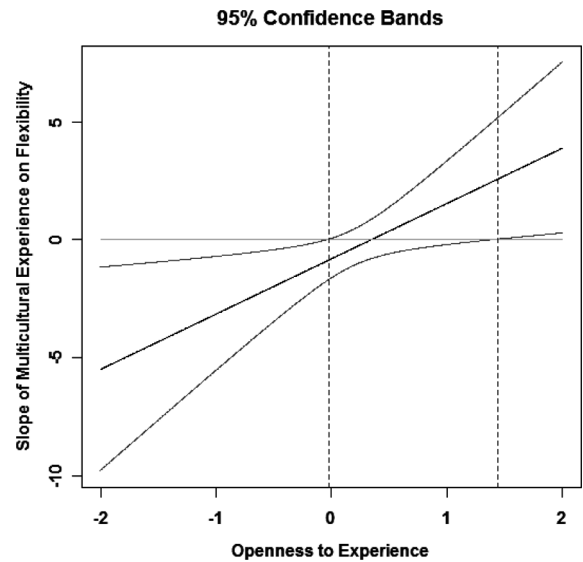


FIGURE 2 Simple slope of multicultural experiences (mean-centered) predicting idea flexibility as a function of openness to experience (mean-centered). See Figure 1 caption for the interpretation of this figure.

experiences was associated with a greater tendency to generate normatively accessible exemplars.

## DISCUSSION

This study is one of the first attempts to examine how the level of creative potential may vary as a function of the individuals' multicultural experiences and Openness to Experience. On a measure of idea fluency/flexibility and a measure of the tendency to generate normatively inaccessible exemplars (two creativity-supporting cognitive processes), we found that extensiveness of multicultural experiences was positively linked to the level of creative potential only among high openness participants. That is, among high openness participants, those with more multicultural experiences generated more novel ideas, more categories of novel ideas, and more normatively inaccessible exemplars in a conceptual category. In contrast, among participants who were not open to experience, having more experiences with other cultures was associated with a lower level of creative potential. One reason for this result is that when people are not psychologically prepared for new experiences, they may find experiences with foreign cultures overwhelming and shocking. To manage their shock experiences, they may resist new ideas from other cultures and fall back on culturally accessible ideas.

Some creativity researchers (Rhodes, 1987; Runco, 2004) emphasize the interaction of personal and contextual factors in predicting and enhancing creativity.

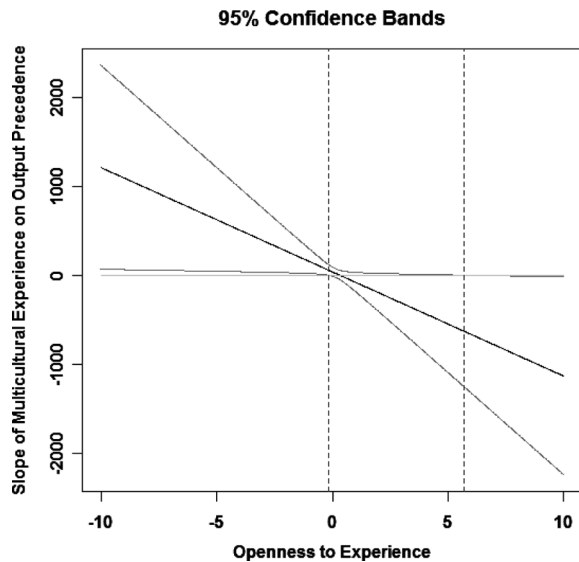


FIGURE 3. Simple slope of multicultural experiences (mean centered) predicting the average output precedence index as a function of openness to experience (mean centered). See Figure 1 caption for the interpretation of this figure.

Consistent with this view, our results illustrate how a personality disposition (Openness to Experience) interacts with a person's multicultural experiences to predict performance on two measures of creative potential. In the current study, both predictors of creative potential were measured rather than manipulated. Therefore, it is premature to conclude that Openness and multicultural experiences interact to determine the level of creative potential. In two separate studies (see Leung & Chiu, in press), multicultural experiences and Openness were manipulated. To manipulate multicultural experiences, or more appropriately, multicultural exposure, European American students with limited experiences with Asian cultures were exposed to different facets of Asian cultures. To manipulate Openness, time pressure was imposed during the study with the assumption that people under time pressure tend to be more close-minded (see Chiu et al., 2000). In these studies, both multicultural experiences and time pressure influenced creative performance. However, the joint effect of manipulated multicultural experiences and time pressure on creativity has not been investigated. Further studies that manipulate both variables in the same experiment and examine their interaction effect on the level of creative potential will provide further test of our hypothesis.

These findings have implications for promoting creativity in schools. Our results challenge the conventional wisdom that multicultural experiences, per se, are sufficient to raise students' levels of creative potential. For close-minded students, experiences with other cultures could be overwhelming, threatening, and even

shocking. To minimize culture shock, these students may resist new and unfamiliar ideas. Thus, a learning environment that affords multicultural experiences and promotes Openness would be most conducive to the development of creative potential.

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