

## Cultural study and problem-solving gains: Effects of study abroad, openness, and choice

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### Summary

Past research indicates that foreign experience helps problem solving because the experience of adapting one's lifestyle imparts cognitive flexibility. We propose that an independent process involves studying cultural traditions and systems, which imparts foreign concepts that enable unconventional solutions. If so, advantages on unconventionality problems should be associated with experiences studying of another culture, such as typically occurs in study-abroad programs. The link should be especially strong for individuals with personalities high in openness and in contexts featuring choice. A survey of MBA students' past foreign stays found that greater study abroad was associated with more unconventional solutions and provided mixed support for the two moderating conditions. Study 2 experimentally varied the presence of choice before putting participants through a simulated foreign internship featuring study and situations demanding adaptation. Subsequent solutions to a product design problem were more conventionally Asian and (marginally) less conventionally American in the choice condition, and these effects were mediated by the amount of foreign knowledge acquisition. Implications for selecting employees and developing employees on the basis of foreign experiences are discussed. Copyright © 2015 John Wiley & Sons, Ltd.

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Globalization—the flow of business and people across national boundaries—has heightened competition in many industries, increasing the need for creative problem solving. Fortunately, globalization also presents a means of meeting this need by enabling exposure to foreign cultures. Foreign exposure is associated with better performance on several kinds of creativity problems, although mechanisms remain underexplored (Leung, Maddux, Galinsky, & Chiu, 2008). In order to understand how to cultivate particular kinds of creative problem solving through foreign experiences, research identifying the intervening processes is needed.

Most past research on intervening mechanisms has focused on the process of adapting: The experience of adapting one's ways of life and work when abroad imparts cognitive flexibility. Evidence for this mechanism has been found with studies using insight problems—respondents who have adapted more in past stays abroad are better able to solve puzzles that require shifts of perspective (Maddux & Galinsky, 2009). Insight problems resemble technological challenges that are well-structured problems in the sense that a solution can be tested by an objective criterion (Simon, 1973) but for which the methods are nonobvious or hidden, such as figuring out how to crack a code or disable a computer virus.

Other past research examined creativity challenges like new product development where the challenge is to generate “unconventional ideas” (Leung & Chiu, 2010, Study 2). These are ill-structured problems in that there are many possible solutions, the quality of which can only be evaluated through a subjective judgment. The psychological mechanism for a link between unconventionality and foreign exposure has not been theorized or investigated in detail, but it is thought to reflect foreign concept learning rather than cognitive flexibility. Indirect evidence comes from the finding that the link between foreign exposure and performance on this type of problem is higher for individuals high in openness, who have greater intellectual curiosity about foreign cultures (Leung & Chiu,

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2008). However, this openness moderation effect, by itself, does not go far to distinguish this mechanism from the adaptation mechanism, as high-openness individuals may also adapt more.

In the current research, we propose that some gains from foreign stays come from explicit study rather than the experience of cultural adaptation. Studying the conceptual systems of a cultural tradition imparts a stock of concepts that are useful upon returning home in that they provide the material for unconventional solutions. When one's goal is to generate novel examples in a domain, concepts from the foreign culture provide a means of escaping home-culture conventions. Studying another culture's language, history, politics, arts, architecture, cuisine, and other conceptual domains gives one concepts that are unknown to most of one's compatriots, so they provide the basis for generating unconventional solutions back home.

Cultural study and cultural adaptation are independent mechanisms through which people are changed by foreign stays. The former happens primarily in classrooms and involves explicit study and the acquisition of declarative knowledge; the latter happens through interpersonal interactions that provide feedback about cultural norms and consists largely of implicit, procedural knowledge (for a review of evidence for explicit versus implicit processes of second-culture learning, see Morris, Savani, Mor, & Cho, 2014). Some foreign stays are intensive in both cultural study and cultural adaptation, but this is not always the case. Some foreign stays that involve intensive adaptation (e.g., a Londoner working on sheep farm in rural Australia) may not involve much cultural study, and some stays that involve intensive cultural study (e.g., the same person studying French literature in Paris) may not involve much lifestyle adaptation.

Our first study surveys past experiences of study abroad and looks for a link to performance on unconventionality problems. Unlike past surveys that have aggregated across different types of past foreign stays, we measure the amount of study abroad and control for the amount of work abroad. As study abroad generally involves study of a foreign culture, we hypothesize that greater study abroad should be associated with greater problem-solving unconventionality. This effect should be especially strong for individuals high in openness (Leung & Chiu, 2008) as they are receptive to formal instruction and curious about foreign cultures. A situational factor that should similarly moderate the effect is presence of choice, which heightens receptiveness to formal instruction (Cordova & Lepper, 1996). Our second study is a laboratory experiment in which we manipulate the presence of choice in a foreign exposure experience and test which effects on unconventionality are mediated by acquisition of foreign knowledge from instruction.

Below, we introduce the literatures on creativity and foreign exposure and then develop our hypotheses in greater detail.

## Approaches to Creativity

Creativity refers to processes that create something novel and useful (Amabile, 1983, 1996). Researchers study creativity of different kinds with different problems. These problems capture different kinds of creative strengths that involve different kinds of novelty.

Much of the laboratory research in psychology involves insight problems. Creative insight is studied with puzzles that have a correct solution which can only be found through mental flexibility: conceptualizing objects or words in new ways. The widely used Duncker candle problem gives people a candle, a book of matches, and a box of tacks and challenges them to affix the candle to a corkboard wall in such a way that wax will not drip onto the floor. The solution requires using tacks to fix the candle to the box and the box to the wall, that is, seeing the box as not just a container for the tacks but also a potential candle holder. The solution comes from overcoming functional fixedness, from seeing that the box can be used in other ways than one is accustomed to.

Other insight problems require flexibility in thinking about words instead of objects. The problems on the remote associates test present three words (e.g., *shopping*, *washer*, and *picture*) and ask for a linking word associated with all three of them (*window*). As each stem word is associated with the answer in a different way, these puzzles challenge a person's cognitive flexibility. On insight problems, compared with other kinds of problems, people

are less able to metacognitively report when they are “getting warmer” (i.e., closer to the solution); the answer suddenly pops into the conscious mind—the “Aha!” experience (Metcalf, 1986). The novelty of these solutions is relative to the problem solver’s phenomenology.

Other research traditions focus on creativity problems amenable to multiple solutions. With these more open-ended problems, researchers tally how frequently different solutions are generated within a population to score some solutions as more novel than others (Ward, Patterson, Sifonis, Dodds, & Saunders, 2002). Here, the solution’s novelty is relative to the rest of the participants.

Organizational researchers more typically study creativity in the real tasks that employees encounter at their jobs, so their respondents are not all working on the same problem. The creativity of respondents’ work can be measured on a common metric such as supervisory ratings or patents received (Oldham & Cummings, 1996). Patent officers make their determinations based on evidence of novelty and usefulness, with novelty assessed relative to the “precedents of the field” (Perry-Smith & Shalley, 2003, p. 91). For example, titanium eyeglass frames were patentable because titanium was novel for opticians even though it was already conventional for dentists.

The notion that novelty in many kinds of real problem solving is judged relative to the professional field is elaborated in Csikszentmihalyi’s (1997) systems model of creativity. He argues that real-world creativity has to be understood as a social system: An individual creator introduces a solution to a domain, and then arbiters of the field (e.g., patent officers in technology, editors in science, and critics in art) judge whether it is novel relative to what is already familiar. Whether a work of art or science is creative depends on this comparison with the field, not on whether or not the creator had an “Aha!” experience when generating the idea. The systems model demystifies creativity by showing that creative contributions can arise from ordinary thought processes such as importing a technique or material from one field (e.g., dental) where it is conventional to another where it has not yet been used (e.g., optical). Creativity can depend more on occupying the position of spanning two fields than on high cognitive flexibility.

Because traditions and lifestyles differ across countries, practices and artifacts that are highly conventional in one country can be unconventional in another country. It has been proposed that expatriates and immigrants produce this kind of creative solution by bringing concepts from their origin country to the host country (Hempel & Sue-Chan, 2010). Consider Ang Lee’s Academy Award winning film *Crouching Tiger, Hidden Dragon*. Western reviewers accustomed to Hollywood productions found its romantic storyline and wire-based martial arts effects fresh and original. Chinese reviewers and audiences, tired of these themes and effects from decades of *wuxia* productions, found the movie derivative. In this example, Lee brought concepts from the Chinese cinematic tradition that he had studied to an American audience for whom they were unconventional. Similarly, we propose that expatriates returned home from studying abroad are in a position to draw upon foreign knowledge to generate solutions that will be appreciated as unconventional.

## Evidence for Mechanisms

Before developing the current hypotheses, it is worth reviewing the past evidence for the two mechanisms.

### *Cultural adaptation*

Adaptation refers to an expatriate changing habits of lifestyle and work in order to mesh with a host culture. Sojourners abroad vary in the degree to which they adapt, in part because some settings demand more adjustment than others. A female banker from New York moving to Riyadh would face more adaptation demands than one moving to London. Maddux and Galinsky (2009) argued that the experience of adapting makes expatriates more cognitively flexible. They found that business students who have had longer stays living abroad were more likely to solve the Duncker candle problem (Studies 1 and 2). Shorter-term stays of less than nine months did not help.

They argued that this is because only long-term stays require cultural adaptation, although they do so to varying degrees. In an influential study, participants rated the amount of adaptation in their past foreign stays and showed that it mediated the link between time abroad and performance on an insight problem (Study 3).

In subsequent work, Maddux, Adam, and Galinsky (2010) examined components of adaptation critical to functional fixedness; they primed memories of learning about the function of a practice in another culture and observed better performance on the remote associates test (Experiment 2) and the Duncker candle problem (Experiment 3) compared with control conditions. This research program provides converging evidence that adaptation is a mechanism through which foreign experience enables higher performance on insight problems.

### *Cultural study*

Cultural study refers to explicit instruction in the conceptual systems of cultural tradition, such as classes, tutorials, or reading. There is only indirect evidence from past research that cultural study improves unconventionality. Leung and Chiu (2008) compared American undergraduates on an index of exposure to other cultures incorporating study abroad as well as family background, languages studied, consumption of music and food, and friendship networks. Respondents higher on this index performed better at a problem asking for unconventional examples of a category, naming unusual occupations. A parallel study (Leung & Chiu, 2010; Study 2) found the same correlation with another unconventionality problem, proposing unusual ideas for a gift. While these correlations are suggestive, the index is a very general measure, incorporating cultural education but also other factors such as family background, so the correlations are consistent with our proposal but not incisive evidence for it.

Other studies have indirect evidence by showing that classes related to other cultures produced gains in capabilities related to cultural knowledge acquisition. Erez et al. (2013) found that a project-based class focused on developing a business idea for another country produced increases in cultural intelligence, one component of which is foreign conceptual knowledge.

Leung and Chiu (2008) also proposed that the effect of multicultural exposure on unconventional problem solving should be especially positive for participants high in openness, as they are curious about foreign cultures (McCrae, 1987). Indeed, their results showed that multicultural exposure predicted creativity for undergraduates high in openness but not those low in openness. However, their later study did not show this moderating relationship (Leung & Chiu, 2010; Study 2). So past work leaves it unclear exactly what kinds of foreign experience high-openness individuals are especially sensitive to.

However, the general point that learning from classes in foreign cultural contexts should depend on moderating conditions relevant to motivation has been suggested by several scholars. Research on cultural intelligence emphasizes that motivation to learn other cultures is a strength that determines success for expatriates (Earley & Ang, 2003). More specifically, Mosakowski, Calic, and Earley (2013) concluded from a qualitative study that gains from studying a foreign cultural group depend on the moral desirability of the group. In sum, acquisition of knowledge from study of other cultures may depend on properties of the student or of the context that motivate learning.

### *Current hypotheses*

Study abroad typically involves instruction in the language, history, and politics of the host country (Black & Duhon, 2006).<sup>1</sup> Past research on study abroad provides some indirect evidence for its relevance to creative problem solving. Norris and Gillespie (2009) surveyed 17 000 U.S. students who studied abroad between 1950 and 1999 and found that most could report instances in which the experience helped their career and that the amount mattered—ratings of career influence were higher for those who had studied abroad a full year rather than merely a semester.

<sup>1</sup>By contrast, work abroad generally involves little cultural instruction. When training about the broader cultural context is offered to in work assignments, it is typically limited to perfunctory 1-day briefing sessions (Bhagat & Prien, 1996; Deshpande & Viswesvaran, 1992; Littrell et al, 2006). The training for US soldiers being sent abroad on peacekeeping missions is often no more than a single lecture and wallet-ready “smart card” summarizing “dos” and “don’ts” (Abbe, 2008). Hence, the amount of work abroad is not expected to predict performance on unconventionality problems.

In one of the only studies to examine both study and work experiences, Peng (2006) found that Chinese students of a foreign language attained more cultural sensitivity than did Chinese workers at foreign companies. Watson and Wolfel (2015) investigated 32 study-abroad programs and found that the majority of classes are taught in the host language and students experience substantial gains in language proficiency. Consistent with the independence of cultural study and adaptation, these gains in foreign language proficiency were uncorrelated with self-reported levels of cultural adaptation.

The solutions that people generate to unconventionality problems can be scored for relatedness to cultures visited. If study abroad conveys concepts that are drawn upon when coming up with novel, nonconventional solutions, then more study abroad should be associated with solutions of greater relatedness to the cultures visited.

*Hypothesis 1:* Amount of cultural study is positively associated with problem-solving solutions higher in (a) unconventionality and (b) relatedness to one's foreign experiences.

The personality dimension of openness is associated with curiosity (McCrae, 1987) and more specifically with learning from education and instruction (Salgado, 1997). Barrick and Mount (1991) found a corrected correlation of .25 between openness and learning proficiency across five occupational groups. Cellar, Miller, Doverspike, and Klawsky (1996) found high openness was associated with more favorable training evaluations. Individuals higher in openness may be more receptive to cultural instruction, increasing the unconventionality and cultural relatedness of their problem-solving solutions. Hence, we posit the following.

*Hypothesis 2:* Individuals higher in openness will show a more positive association between amount of cultural study and the (a) unconventionality and (b) cultural relatedness of their solutions.

Another similar catalyst for learning from cultural instruction may be choice. Whereas organizations cannot control their employee's level of openness, they can control the amount of choice in the context of foreign assignments or trainings. Choice in an instructional experience heightens learning. Students offered choices about features of their instructional context showed greater depth of learning (Cordova & Lepper, 1996). Even choice that is incidental to a learning task enhances memory (Chatman, Sparrow, & McMahon, 2010; Cloutier & Macrae, 2008; Cunningham, Turk, Macdonald, & Macrae, 2008; Kesebir & Oishi, 2010; Turk, Cunningham, & Macrae, 2008). Thus, students exposed to cultural study that they have experienced as chosen should be especially likely to generate unconventional solutions and culturally related solutions. Hence, we posit the following.

*Hypothesis 3:* The presence of choice heightens the effect of cultural study on generating solutions high in (a) unconventionality and (b) relatedness to foreign experiences.

The same experience of cultural instruction in the presence of choice should result in the acquisition of more cultural knowledge and ultimately greater problem-solving unconventionality. This mechanism can be tested by measuring cultural knowledge acquisition and testing whether it mediates effects of choice on solutions to unconventionality problems. Hence, we posit the following.

*Hypothesis 4:* Amount of cultural knowledge acquisition from cultural study should mediate the effect of choice on (a) unconventionality and (b) relatedness to foreign experiences.

## Pilot Study

Following the design of Maddux and Galinsky (2009), we surveyed MBA students about past international experiences and the amount of adaptation involved, but we also measured the type of experience (study abroad or work

abroad) in order to isolate stays that involved cultural study. The survey presented unconventionality problems rather than insight problems to probe for the predicted effects.

## Method

### Participants

Ninety-six MBA students (male=61.5 percent; U.S. nationality=58.3 percent) at a competitive U.S. business school completed a voluntary, anonymous, uncompensated survey about their past international experiences that ended with a request for suggestions, which served as a problem-solving task. An email invite to the Web survey was sent to the 530 confirmed incoming students in the months before the start of school, implying a response rate of approximately 18 percent.<sup>2</sup> Twenty-nine respondents reported no stays abroad of one month or greater, whereas 67 reported foreign stays.

Self-reported openness to experience was measured with the Ten-item Personality Inventory scale (Gosling, Rentfrow, & Swann, 2003) in a course-related survey several months later. Higher scores are indexed by agreement with “open to new experiences, complex” and disagreement with “conventional, uncreative.” Citizenship and gender were also recorded.

### International experience survey

The online survey asked incoming students to list up to five past stays abroad of one month or longer. Participants were instructed to exclude countries in which they were primarily raised from consideration, as the survey pertained to experiencing foreign cultures. For each stay, participants were asked to describe its purpose, the country, and the number of months stayed. By summing the months of stays in each category, we calculated months studying abroad and working abroad. Study abroad ranged from 0 to 144 months ( $M=9.08$ ,  $SD=23.58$ ), while work abroad ranged from 0 to 120 months ( $M=10.17$ ,  $SD=21.54$ ). For each stay, participants rated the extent they adapted to the other culture (“How much did you adjust to the local culture’s norms and practices?”; 1 = *did not adjust whatsoever*, 5 = *fully adjusted*). Adaptation scores were created by summing ratings across trips (Maddux & Galinsky, 2009).

### Problem-solving task

Participants were told that the university customarily gives token gifts to visiting speakers. They were asked to suggest two objects that might work as university gifts. Two American graduate students familiar with American universities rated the unconventionality of these gift suggestions using a 5-point Likert scale (1 = *not at all*, 5 = *very much*; ICC = .82). For example, a gift box of specialty teas was rated highly unconventional, while a business card holder was not. Ratings of each participant’s two suggestions were averaged to create unconventionality scores.

## Results

Two demographics that could be coded from public information about the students were citizenship and gender. Gender did not correlate with any hypothesis-relevant variables. By contrast, U.S. citizenship correlated with study abroad ( $r=-.25$ ,  $p=.042$ ), work abroad ( $r=-.52$ ,  $p<.001$ ), and adaptation ( $r=-.53$ ,  $p<.001$ ), so it was controlled when testing hypotheses.

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<sup>2</sup>As the months before school is a time when many admittees travel and change email addresses, we do not know what fraction of them received the invitation. While higher response rates are needed when comparing organizations or evaluating programs, our need was merely to get a representative sample of the population, which the gender and citizenship measures support. Recent analyses of the effects of response rates find that samples from after a single contact attempt (yielding a 25 percent response rate) produce results statistically indistinguishable from samples collected after intensive repeated contact (yielding a response rate of 50 percent, Keeter, Kennedy, Dimock, Best, & Craighill, 2006).

In a hierarchical multiple regression analysis, we tested hypotheses about predictors of unconventional solutions (Table 1). When unconventionality was regressed on U.S. citizenship, study abroad, work abroad, and openness, a positive effect was seen for study abroad,  $b = .27$ ,  $t(61) = 2.06$ ,  $p = .044$ . In Step 2, when interactions of openness with study and work abroad are added, the Study Abroad  $\times$  Openness interaction showed the predicted positive effect,  $b = .31$ ,  $t(59) = 1.73$ ,  $p = .086$ , albeit at marginal significance.

In Step 3, adaptation was added to test for mediation, but it did not predict the dependent variable or reduce other effects. When analyses are run for all 96 participants, by inputting values of zero to create adaptation scores for those without foreign stays, the same pattern of results appears.

## Discussion

The pilot study showed preliminary evidence for a link between study abroad and unconventional solutions (H1a). Results were directionally consistent with the predicted moderating effect of openness (H2a) but fell short of significance. To investigate these trends, we replicated the study the following year, adding more measures and using a more externally valid problem-solving task.

## Study 1

Incoming MBA students were surveyed about their past foreign stays, indicating whether they were study or work stays. In addition to rating their adaptation, participants also rated the degree of choice in each foreign stay. As in Study 1, personality scores on the openness dimension, collected at a separate time, were merged into the dataset. The goal was to test that study abroad is linked to unconventional problem solving (H1) and that this is especially true for individuals higher in openness (H2). We also sought to test the hypothesis that the link between study abroad and unconventionality would be especially strong in the context of choice (H3).

For increased external validity, we posed an actual problem faced by the organization—new destinations for MBA study trips. These are weeklong trips that groups of students take to another country or region, which consist

Table 1. Regression analyses (pilot study).

Variable	<i>N</i> = 67		
	Step 1	Step 2	Step 3
U.S. citizen	.33*	.30*	.29 <sup>†</sup>
Study abroad	.27*	.52**	.53**
Work abroad	.26 <sup>†</sup>	.25	.29
Openness	.01	-.01	-.01
Study Abroad $\times$ Openness		.31 <sup>†</sup>	.32 <sup>†</sup>
Work Abroad $\times$ Openness		-.19	-.20
Adaptation			-.07
<i>F</i>	2.07	2.28*	1.95 <sup>†</sup>
<i>R</i> <sup>2</sup>	.12	.19	.19
Adjusted <i>R</i> <sup>2</sup>	.06	.10	.09
$\Delta R^2$	.10 <sup>†</sup>	.07 <sup>†</sup>	.00

Note: *N* = 67 is after removing participants with no foreign stays. Estimates are standardized regression coefficients.  
<sup>†</sup> $p < .10$ ; \* $p < .05$ ; \*\* $p < .01$ .

of company visits mixed with some sightseeing and socializing. This way, solutions could be coded for unconventionality by experts in the problem domain (program officers at the school's international business center). Additionally, this task enabled a straightforward way to judge the relatedness of participants' solutions to their past stays.

## Method

### Participants

One hundred fifty MBA students (male=64 percent;  $M_{Age}=27.09$ ; 48 percent Americans) entering the same business school in a subsequent year completed a voluntary, anonymous, uncompensated survey. An email invitation to the Web survey was sent a month before the start of school to the ~530 confirmed incoming students, with a response rate around 28%, yielding a sample demographically similar to the population.

In order to focus the study on different types of foreign experience, the invitation asked for participation from incoming students with experiences of living abroad in the last decade. As amounts of time abroad were right skewed with a few extreme data points, participants with 3  $SD$  greater than mean length experience abroad were omitted ( $n=12$ ). Of the remaining participants, scores for openness, drawn from a class survey several months later were available for 103 participants. Five of those declined demographic questions about age, gender, or nationality, resulting in an  $N$  of 98 with complete data.

### International experience survey

The survey asked for participants to list up to three foreign stays (study/work/other), starting from their longest stay, counting only stays of at least one month in duration, excluding countries in which they were raised. For each stay, participants were asked to describe its purpose (i.e., study, work, or other), the country, and the number of months stayed. By summing the months of stays in each category, we calculated scores for the amount of study abroad and work abroad. Study-abroad time ranged from 0 to 73.50 months ( $M=8.70$ ,  $SD=13.83$ ), while work-abroad time ranged from 0 to 70.01 months ( $M=11.42$ ,  $SD=17.06$ ).

Participants were asked their perception of how much their stays were chosen (1 = *not at all my choice*; 5 = *fully my choice*). They were also asked to judge their degree of adaptation ("How much did you adapt to the local culture's norms and practices?"; 1 = *did not adapt whatsoever*, 5 = *fully adapted*).

### Problem-solving task

Finally, students were asked to propose destinations for MBA study trips sponsored by the school's international institute. MBA study trips are one-week inter-term trips featuring company visits and some tourism in the destination country. The instructions students received were as follows:

*The school's international business institute sponsors MBA study trips to different countries during academic breaks. Two recent trips have been to Japan and Mexico. Can you name two locations that would be good options?*

### Coding of problem solutions

To assess the unconventionality of participants' proposed destinations, we recruited two American program coordinators at the school's international center, each with more than five years' experience in their role—who could assess the unconventionality of the suggested travel destinations for their field. Naive to the study hypotheses, these experts evaluated the travel destinations that participants generated on several dimensions. Unconventionality was indexed by their ratings on the following two items: "This is a typical or traditional destination for study trips in American MBA programs" (reversed) and "This is an unconventional destination—one that would not occur to many American MBAs and business school personnel" (1 = *not at all*; 5 = *very much*;  $ICC_{\text{typical trip}} = .88$ ,

$ICC_{\text{unconventional}} = .78$ ). To cross-check the expert ratings of unconventionality, we also scored it following the method of Ward et al. (2002) for assessing output dominance in idea generation tasks.

Output dominance assesses the conventionality of a response relative to others in the sample.<sup>3</sup> As expected, rankings were negatively associated with expert ratings of unconventionality,  $r = -.73$ ,  $p < .001$ .

Another coding assessed the degree to which proposed destinations were related to the participant's past foreign stays. Two American graduate students naïve to the hypotheses assessed the degree of cultural relatedness between each proposed destination and the countries where the student had made past stays, rating for each destination and country the extent to which "This destination is culturally close to the country" (1 = *not at all*; 5 = *very much*;  $ICC_{\text{first idea}} = .83$ ,  $ICC_{\text{second idea}} = .75$ ). A cultural relatedness score for each proposed destination was computed as the maximum of its rated relatedness across the stays, as an idea need only be informed by one stay not by their aggregate. The cultural relatedness scores for the two proposed destinations were averaged to reach an overall score for the participant. The cultural relatedness score depicts whether the students drew on knowledge associated with their past experience.

## Results

The associations among attributes of participants and their past foreign experience are shown in Table 2. The three measured demographics (age, gender, and U.S. citizenship) all correlated with some of the hypothesis-relevant measures, so these demographic factors are controlled in our tests of hypotheses.

Hierarchical regressions were run to test hypotheses about predictors of unconventionality and relatedness (Table 3). In the model for unconventionality, when demographics and main effects were entered (Step 2), results showed a strong positive effect of study abroad as predicted by H1a. When interactions with openness are added (Step 3a), results showed the predicted interaction (H2a) of a more positive effect for those higher in openness, albeit at marginal significance (Step 3a). Adding interactions with choice (Step 3b) revealed no significant effects, contrary to the prediction that greater choice would foster learning from study and thus gains in unconventionality (H3a).

In the model for relatedness, when controls and main effects were entered (Step 2), the predicted positive effect of study abroad (H1b) appeared directionally but fell short of significance. When interactions with openness were entered (Step 3a), results revealed the predicted positive effect of Study Abroad  $\times$  Openness (H2b). As seen in Figure 1, the effect of study abroad was more positive for those higher in openness. When openness is high, the simple effect of study abroad is positive,  $b = .03$ ,  $t = 2.67$ ,  $p = .009$ , and when openness is low, it is not different from zero,  $b = -.00$ ,  $t = -0.15$ ,  $p = .883$ .

Adding interactions with choice (Step 3b) revealed the significant interaction effect predicted from H3b for study abroad,  $b = .38$ ,  $t(88) = 3.14$ ,  $p = .002$ . As illustrated in Figure 2, these reflect that the effect of time abroad was more positive for those whose stays were more chosen. When choice is high, there are positive simple effects of study abroad,  $b = .04$ ,  $t = 3.30$ ,  $p = .001$ . When choice is low, the simple effect of study abroad,  $b = -.01$ ,  $t = -1.32$ ,  $p = .191$ , is not different from zero. Overall, results provide clear evidence that higher choice is associated with more positive effects of study abroad on the cultural relatedness of solutions (H3b). This moderating effect of choice was the only one for which a parallel effect was observed with work abroad,  $b = .30$ ,  $t(88) = 2.76$ ,  $p = .007$ , again primarily reflecting a positive marginal simple effect under high choice,  $b = .01$ ,  $t = 1.81$ ,  $p = .075$ , but not under low choice,  $b = -.01$ ,  $t = -1.64$ ,  $p = .104$ .

As in the pilot study, we computed a measure of adaptation by summing ratings across trips, following Maddux and Galinsky (2009), and explored whether our effects of foreign experience could be accounted for by the degree of adaptation. Table 2 shows that this adaptation score is unrelated to unconventionality and hence cannot account for

<sup>3</sup>Nominations of a given destination are tallied, enabling rankings, with lower ranks indicating less conventional. In our sample, the lowest-ranked destinations were Egypt, Botswana, and Namibia, and the highest were Brazil, India, and China—the business press's "BRIC economies."

Table 2. Descriptive statistics and variable intercorrelations (Study 1).

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Age	27.11	1.83										
2. Female	—	—	-.36***									
3. U.S. citizen	8.70	13.83	.02	.03								
4. Study abroad	11.42	17.06	-.08	.06	-.19 <sup>†</sup>							
5. Work abroad	5.25	1.12	.30***	-.07	-.19 <sup>†</sup>	-.12						
6. Openness	10.14	5.20	.04	-.03	.15	-.06	.23*					
7. Adaptation sum	4.99	1.02	.01	-.05	-.27**	.29**	.19 <sup>†</sup>	.19 <sup>†</sup>				
8. Adaptation mean	4.44	0.86	.06	.03	-.20 <sup>†</sup>	.12	.19 <sup>†</sup>	.15	.43***			
9. Choice	2.12	1.02	-.26**	.17	.14	.02	-.15	.17	-.28**	.09		
10. Unconventionality	2.65	0.90	.08	.06	.08	.31**	.08	-.12	.02	.10	.06	
11. Relatedness			.02	-.22*	.09	.12	.03	.04	.29**	.10	.02	.20 <sup>†</sup>

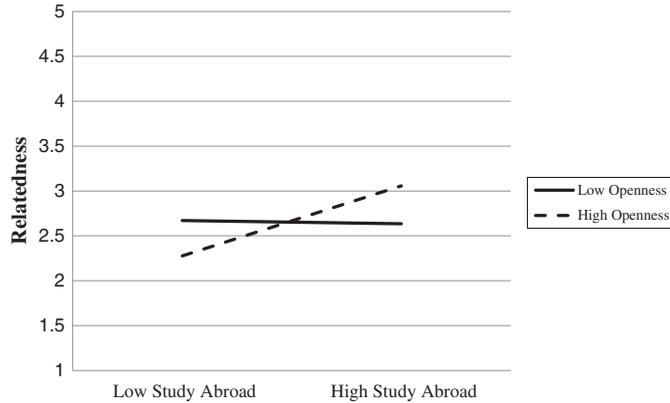
Note: *N* = 98.

<sup>†</sup>*p* < .10; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

Table 3. Regression analyses with unconventionality and relatedness as the dependent variables (Study 1).

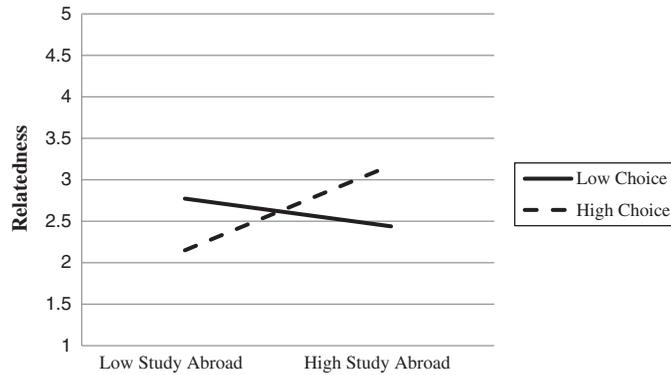
Variable	Unconventionality					Relatedness				
	Step 1	Step 2	Step 3a	Step 3b	Step 4	Step 1	Step 2	Step 3a	Step 3b	Step 4
Age	.11	.10	.09	.09	.10	-.08	-.09	-.11	-.12	-.13
Female	.10	.06	.04	.05	.05	-.25*	-.26*	-.29**	-.29**	-.30**
U.S. citizen	.07	.19 <sup>†</sup>	.22*	.21 <sup>†</sup>	.24*	.10	.15	.18	.19 <sup>†</sup>	.18 <sup>†</sup>
Study abroad		.36***	.40***	.37**	.34**		.16	.21 <sup>†</sup>	.27*	.26*
Work abroad		.18 <sup>†</sup>	.17	.16	.17		.09	.06	.02	.00
Openness		-.19 <sup>†</sup>	-.18 <sup>†</sup>	-.19 <sup>†</sup>	-.15		.00	.01	-.04	-.04
Choice		.10	.08	.07	-.03		.03	-.01	.04	.03
Study Abroad × Openness			.17 <sup>†</sup>	.07	.26 <sup>†</sup>			.23*		.03
Work Abroad × Openness			.06	.07	.05			.14		.10
Study Abroad × Choice				.13	-.15				.38**	.35*
Work Abroad × Choice				.07	.09				.30**	.28*
F	.62	2.84*	2.58*	2.37*	2.30*	2.09	1.30	1.76 <sup>†</sup>	2.70**	2.29*
R <sup>2</sup>	.02	.18	.21	.20	.23	.06	.09	.15	.22	.23
Adjusted R <sup>2</sup>	-.01	.12	.13	.11	.13	.03	.02	.07	.14	.13
ΔR <sup>2</sup>	.02	.16**	.03	.01	.02	.06	.03	.06*	.13**	.07*

Note: N = 98. Estimates are standardized regression coefficients.  
<sup>†</sup>p < .10; \*p < .05; \*\*p < .01; \*\*\*p < .001.



Note: Plots show adjusted means at 1 SD above and below the mean of Study Abroad months and Openness

Figure 1. Relatedness as a function of months of study abroad and openness (Study 1)



Note: Plots show adjusted means at 1 SD above and below the mean of the two time abroad variables (in months) and Choice

Figure 2. Interaction effects for Study Abroad x Choice (Study 1)

effects on this variable. Adaptation correlates with relatedness when scored as a sum, but not when scored as a mean, and in neither case mediates the effects of study abroad.<sup>4</sup>

### Discussion

Results of Study 1 showed strong support for a main effect of study abroad on problem-solving unconventionality (H1). When the correlations from the pilot study and Study 1 are combined meta-analytically ( $r = .25$ ), the result shows a significant relationship,  $Z = 3.30, p = .001$ .

<sup>4</sup>That said, it should be noted that correlations of this adaptation measure with time-abroad scores may reflect nothing other than variation across participants in the numbers of foreign stays (compared with a participant with three past stays abroad, a participant with only one would have lower time-abroad scores and a lower sum of adaptation ratings). We computed another adaptation score from the mean of participant's adaptation ratings across his or her stays. Notice that with this adaptation mean score, the association with openness is virtually unchanged, but the associations with study abroad and work abroad vanish, suggesting that adaptation cannot mediate the current effects. We tested this by running variants of Steps 2, 3a, and 3b with the addition of adaptation mean. In none of these models did adaptation mean predict the outcome variable or change the pattern of effects.

Evidence for interaction effect hypotheses was mixed. As in the pilot study, the moderating effect of openness on unconventionality was only marginally significant. But the moderating effect was observed for relatedness. Likewise, the moderating effect of choice was not supported for unconventionality but was supported for relatedness.

For the most part, our results point to consequences of study abroad that are not similarly associated with work abroad. The one exception is that high choice increased the link between time abroad and drawing on ideas related to the countries visited for both study abroad and work abroad. This may reflect that choice fosters not only learning from instruction but intrinsic motivation and engagement in work tasks as well (Gagné & Deci, 2005).

A caveat in interpreting all the Study 1 findings is that the results are correlational and thus vulnerable to the influence of uncontrolled “third variables.” Considering the interaction of study abroad and choice, it is possible that individuals with preexisting interest in a foreign culture are more likely to have chosen trips to that country; for example, sinophiles might be more likely to have chosen to study a year in China and might also be more likely to propose solutions that are culturally related to China (e.g., study trips to Hong Kong or Singapore) because of their preexisting interest in all things Chinese. To get around this limitation, our next study adopts the experimental method so as to randomly assign people to experiences with choice or no choice.

## Study 2: Laboratory Simulation

To test whether choice fosters the acquisition of foreign knowledge from cultural study and thereby enables unconventionality (H4), we experimentally manipulated the presence of choice in a laboratory simulation of a foreign internship involving language training. The simulation put participants in the role of a student experiencing the first day of an internship in Korea that involved cultural study as well as everyday activities such as transportation, meals, and exercise. All participants received the same training in the Korean language, and their vocabulary acquisition was tested before they moved on to an unconventionality problem. We predicted that choice would foster Korean concept learning and thereby boost performance on the unconventionality problem.

The unconventionality problem was proposing new beverage products. Coders evaluated the proposed products as to their similarity to conventional beverages in American culture and in East Asian cultures. These ratings provided our measures of solutions’ unconventionality (lower American conventionality) and cultural relatedness (higher Asian conventionality).

Our proposal is that choice has its effect by amplifying motivation to learn from cultural study. To check that its effect is distinctive to the cultural study mechanism, we also included measures of cultural adaptation and of insight problem solving.

### *Method*

#### **Participants and design**

Fifty-four individuals from a large East Coast University (22 men and 32 women;  $M_{\text{Age}} = 21.57$ ) participated in the experiment in return for monetary compensation. All participants were native English speakers who identified with an ethnicity other than Asian or Asian-American. They were invited for individual sessions in a simulation of office work. There was no mention in advance that it would be in another culture. Upon arriving, they were informed that they would simulate an internship in Korea featuring exposure to Korean language, cuisine, and customs. Six participants declined to participate at some part during the simulation and were excluded from analyses. Participants were randomly assigned to one of two conditions varying in whether or not they were given an initial choice between



Figure 3. Sample Korean stimuli and tasks administered in the Korean simulation (Study 2)

the two Korean cities (Busan on the coast or Daejeon in the mountains<sup>5</sup>). In sum, participants experienced a first day in a Korean internship, having either chosen their city or having had it imposed upon them.

**Procedure**

*Manipulation.* Participants were told to suppose that their university has launched a new internship program for students. In the choice condition, they were additionally told, “Please choose which of the following two cities in South Korea you would prefer to go to for your internship: Busan or Daejeon.” In the no-choice condition, they were told: “You cannot change your assignment. The city you have been assigned to work in is Busan (or Daejeon).” Some information about the attractions of the two sites, the coastal city of Busan and the mountain city of Daejeon, and pictures accompanied the instructions in both conditions. In order to keep the rates of Busan versus Daejeon constant, assignments in the no-choice condition mirrored the frequencies in the choice condition.<sup>6</sup>

*Cultural exposure.* After the manipulation, a Korean experimenter guided participants through the daily experience of an office worker in Korea. A computer presented pictures of a typical Korean house and the sound of a Korean morning radio show (Figure 3). Then they viewed pictures of neighborhood streets and sidewalks, searched a subway map to identify the route to their office, and then watched a video showing rush-hour subway commuting in Korea. Next, they were brought to a lab room presented as their Korean office, and they were asked to participate in morning *Taekwondo* exercises with their colleagues, a common start to a Korean workday. They were asked to follow the movements of the instructor in the taekwondo video presented on a large TV screen. Afterwards, they were given a snack featuring shrimp chips and an even more unfamiliar Korean rice drink, being told, “This is a gift from your boss.”

<sup>5</sup>A pilot experiment manipulated choice by asking participants in the choice condition to choose between an internship in Korea and one in Siberia. All students then experienced a simulated workday at a Korean internship, which involved some language training and a vocabulary assessment. Predicted effects that appeared in that choice induced more Korean learning and greater unconventionality of solutions on a beverage design problem. However, unexpectedly, not all the participants in the choice condition chose Korea. This created a problem for data analysis, as selecting solely those who chose Korea would bias us toward participants with a preexisting interest in Korea. Hence, the treatment was changed to choice of cities within Korea.

<sup>6</sup>Sites were assigned to match the frequencies with which they were chosen in the other condition. In the choice condition, 19.2 percent of participants chose to go to Busan. Thus, in the no-choice condition, 21.4 % participants were assigned to go to Busan.

Next, participants were given a Korean language tutorial so that they could later leave a voicemail for their boss. In a display akin to those in contemporary language instruction programs, such as Rosetta Stone, six words (*happy, friend, Hi, thank you, I am, and gift*) were presented aloud after an initial display of the English translation and a relevant picture (Figure 3). Participants were then asked to listen and practice each word.

*Measures.* Adaptation was measured with the self-rating measure used in Study 1. We also measured it behaviorally in terms of how much they followed the Korean experimenter's lead: how much of the unfamiliar rice drink the participant consumed, whether they removed their shoes before exercise, and whether they bowed upon departure.

Korean vocabulary learning was measured with a surprise recall quiz. Shown a picture and the English word, they were given three chances to pronounce the word in Korean, and their responses were audio recorded.

After the simulation, participants were given two kinds of problems to solve. First, they were asked to propose a new beverage product to appeal to college students. Participants were asked to come up with three novel product names and for each to describe its flavors and how it would be pitched in advertising.

Afterwards, they were given a test with 10 remote associate questions that tapped combinations of East Asian and Western cultural knowledge (adapted from Chua, 2013). For example, three words (*Condoleezza, cake, and white*) were given, and participants had to generate the one word associated with all three (*rice*).

After the problem-solving tasks, participants were asked several questions about their experience. Participants rated their mood (happy, calm, sad, anxious, vigorous, and helpless) using a 7-point scale (1 = *not at all*, 7 = *stronger than ever*). They also rated the extent to which they enjoyed their experiences in the lab (e.g., "To what extent did you enjoy the Korean learning task?"; 1 = *didn't enjoy at all*, 7 = *enjoyed a lot*) and how much effort they put into each task (e.g., "I put a lot of effort in memorizing the words in Korean."; 1 = *strongly disagree*, 7 = *strongly agree*). They were also given a manipulation check about the extent to which they felt they had a choice about their internship city in Korea ("To what extent did you feel you had a choice in going to Busan/Daejeon?"; 1 = *not at all my choice*, 7 = *fully my choice*).

## Results

The check indicated a successful manipulation of perceived choice. As may be seen in Table 4, participants in the choice condition perceived much greater choice than did participants in the no-choice condition,  $F(1, 52) = 172.49$ ,  $p < .001$ ,  $\eta^2 = .77$ . No significant differences were found across the two conditions in self-reported mood, enjoyment, or effort ( $p$ 's  $> .10$ ).

### Adaptation

The self-report of adaptation correlated with rice drink consumption ( $r = .27$ ,  $p = .048$ ), but not with the other two behavioral measures, shoe removal or bowing ( $p$ 's  $> .10$ ). We created an index of adaptation by averaging the two correlated variables, but it did not significantly differ by choice condition,  $F(1, 52) = 1.03$ ,  $p = .315$ ,  $\eta^2 = .02$ . Nor were any of the items higher in the choice condition than in the no-choice condition when tested individually.

Table 4. Means for key measures in Study 2.

Measures	Choice condition	No-choice condition	<i>F</i>	<i>p</i>
Perceived choice	5.69 (1.62)	1.32 (0.67)	172.49	.000
Adaptation index	-0.11 (0.78)	0.11 (0.82)	1.03	.315
Korean vocabulary acquisition	4.15 (1.93)	3.13 (2.06)	3.48	.068
American conventionality	3.13 (0.95)	3.52 (0.72)	3.01	.089
Asian conventionality	2.35 (0.91)	1.80 (0.58)	7.07	.010
Other conventionality	2.01 (0.59)	1.94 (0.44)	0.22	.640
Insight problem	4.46 (2.64)	4.11 (2.22)	0.29	.595

Note: Standard deviations are given in parentheses.

### Korean vocabulary learning

Two Korean research assistants scored audio recordings of the Korean vocabulary test (1 = *accurate*, 0 = *inaccurate*), and their codes (ICC = .99) were averaged for a Korean vocabulary learning score. An analysis of variance (ANOVA) [between-subjects factor: (choice, no choice)] revealed a marginal main effect of choice,  $F(1, 51) = 3.48$ ,  $p = .068$ ,  $\eta^2 = .06$ , 95% confidence interval (CI) [-0.08, 2.13].<sup>7</sup> Participants in the choice condition learned more Korean words ( $M = 4.15$ , 95% CI [3.37, 4.93]) than did participants in the no-choice condition ( $M = 3.13$ , 95% CI [2.31, 3.94]).

### Unconventionality problem

Two hypothesis-naïve research assistants experienced with both East Asian and Western cultures rated the extent to which participants' proposed beverage ideas resembled conventional American beverages (e.g., Berry Bliss) and the extent to which they resembled conventional East Asian beverages<sup>8</sup> (e.g., Rice-ola), as well as how much they resembled conventions of other foreign cultures (e.g., Crème-amelle) (1 = *not at all*, 5 = *very much*; ICC<sub>American</sub> = .75; ICC<sub>Asian</sub> = .71; ICC<sub>Other</sub> = .87).<sup>9</sup> In this study, unconventionality of solutions was operationalized as *lower* American conventionality; relatedness was operationalized by *higher* Asian conventionality. A one-way ANOVA [between-subjects factor: (choice, no choice)] revealed as predicted that American conventionality was marginally lower in the choice condition ( $M = 3.13$ , 95% CI [2.74, 3.51]) than in the no-choice condition ( $M = 3.52$ , 95% CI [3.24, 3.80]),  $F(1, 52) = 3.00$ ,  $p = .089$ ,  $\eta^2 = .06$ . Conversely, as predicted, Asian conventionality was higher in the choice ( $M = 2.35$ , 95% CI [1.98, 2.71]) than no-choice conditions ( $M = 1.80$ , 95% CI [1.57, 2.02]),  $F(1, 52) = 7.07$ ,  $p = .01$ ,  $\eta^2 = .12$ . Other-culture conventionality did not differ,  $F(1, 52) = .22$ ,  $p = .64$ ,  $\eta^2 = .00$ . Means for all three ratings across choice conditions may be seen in Figure 4.

### Mediation analyses

Korean vocabulary learning was correlated with American conventionality ( $r = -.30$ ,  $p = .03$ ) and Asian conventionality ( $r = .31$ ,  $p = .026$ ) in the expected directions, so we tested for indirect effects of choice on problem solving running through vocabulary learning using bootstrapping tests (Preacher & Hayes, 2008) appropriate for small sample sizes (Fritz & MacKinnon, 2007).

American conventionality was predicted by choice condition marginally ( $b = -.23$ ,  $p = .089$ , 95% CI [-0.85, 0.06]) and by vocabulary learning significantly ( $b = -.30$ ,  $p = .03$ , 95% CI [-0.24, -0.01]). When they were entered as simultaneous predictors, the choice effect ( $b = -.16$ ,  $p = .248$ , 95% CI [-0.74, 0.20]) decreased proportionally more than the learning effect ( $b = -.26$ ,  $p = .068$ , 95% CI [-0.22, 0.01]), and the bootstrapping test revealed an indirect effect, 5000 samples, 95% CI [-0.36, -0.00].

Asian conventionality was predicted by choice ( $b = .35$ ,  $p = .01$ , 95% CI [0.13, 0.96]) as well as by vocabulary learning ( $b = .31$ ,  $p = .026$ , 95% CI [0.02, 0.23]). When entered as simultaneous predictors, both the choice effect ( $b = .29$ ,  $p = .037$ , 95% CI [0.03, 0.88]) and the learning effect ( $b = .23$ ,  $p = .086$ , 95% CI [-0.01, 0.20]) decreased, and the bootstrapping test verified an indirect effect, 5000 samples, 95%, CI [0.00, 0.32] (Table 5).

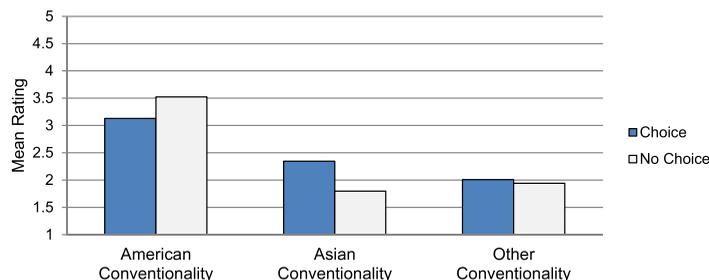
### Insight problem

On the remote associates test, there was no effect of the choice manipulation,  $F(1, 52) = 0.29$ ,  $p = .595$ ,  $\eta^2 = .01$ .

<sup>7</sup>One participant had a technical problem with the audio recording, and his responses were not recorded.

<sup>8</sup>Because participants integrated their new knowledge about Korean culture into more general categories, we asked coders to rate East Asian conventionality rather than strictly Korean conventionality.

<sup>9</sup>To check whether proposals differed across the three rounds of beverage suggestion, an analysis was run with round as a repeated-measure ANOVA [between-subjects factor: (choice, no choice); within-subjects factors: drink names 1, 2, and 3], which found no significant effects of round,  $F_{\text{American}}(2, 51) = 1.39$ ,  $p = .26$ ,  $\eta^2 = .05$ ;  $F_{\text{Asian}}(2, 51) = 1.39$ ,  $p = .26$ ,  $\eta^2 = .05$ ;  $F_{\text{Other}}(2, 51) = 0.90$ ,  $p = .41$ ,  $\eta^2 = .03$ , and no interactions with the choice condition,  $F_{\text{American}}(2, 51) = 0.02$ ,  $p = .99$ ,  $\eta^2 = .00$ ;  $F_{\text{Asian}}(2, 51) = 0.38$ ,  $p = .68$ ,  $\eta^2 = .02$ ;  $F_{\text{Other}}(2, 51) = 1.09$ ,  $p = .35$ ,  $\eta^2 = .04$ . Hence, hypotheses were tested on overall scores that aggregate across the three rounds.



Note. The Y axis represents the extent to which drink names represented conventional drink names in American, Asian, or Other cultures (1= Not At All Conventional, 5= Very Conventional).

Figure 4. Influence of American, Asian, and other cultural conventions on proposed drink names across choice conditions (Study 2)

Table 5. Mediating effects by bootstrapping in Study 2.

Variable	American conventionality		Asian conventionality	
	Step 1	Step 2	Step 1	Step 2
Choice condition ( <i>choice</i> = 1, <i>no choice</i> = 0)	-.23 <sup>†</sup>	-.16	.35*	.29*
Mediator				
Korean vocabulary acquisition		-.26 <sup>†</sup>		.23 <sup>†</sup>
<i>F</i>	3.01 <sup>†</sup>	3.18 <sup>†</sup>	7.07*	5.09*
<i>R</i> <sup>2</sup>	.06	.11	.12	.17
Indirect effects at 95% BC CI				
Effect		-.11		.09
[Lower, upper]		[-0.36, -0.00]		[0.00, 0.32]

Note: Estimates are standardized regression coefficients.

<sup>†</sup>*p* < .10; \**p* < .05.

## Discussion

Results provide support for hypothesized role of choice. Specifically, results showed indirect effects through cultural knowledge acquisition of choice on unconventionality (lower American conventionality) and cultural relatedness (higher Asian conventionality). There was no sign that the choice manipulation affected degree of adaptation or performance on insight problems, suggesting its relevance to benefits of foreign exposure is specific to the cultural study mechanism.

## General Discussion

Results of the current studies provide clear findings in support of our proposal about how creative problem solving is enhanced by studying a foreign culture. Our premise was that people solve unconventional problems—challenges to generate new and fresh examples of a category—by importing foreign knowledge acquired from cultural study. In a survey of MBA students about past stays abroad, Study 1 found greater study abroad predicted unconventional solutions (new destinations for MBA trips) in support of H1a. The predicted moderating effect of the personality

dimension openness on the relationship between study abroad and unconventionality (H2a) was supported marginally but not significantly. The predicted moderating effect of choice on unconventionality was not supported. By contrast, on the cultural relatedness of solutions (*vis-à-vis* the foreign cultures experienced), there were significant moderating effects of both openness and choice.

Study 2 used the complementary method of a laboratory experiment to enable more incisive tests of causal direction. While holding constant the amount of exposure to a foreign culture, we manipulated whether participants experienced choice or no choice related to the foreign stay. The presence of choice induced problem-solving solutions that were marginally higher in unconventionality (lower American conventionality) and significantly higher in cultural relatedness (higher Asian conventionality). Choice induced greater knowledge acquisition (Korean vocabulary learning) at a marginally significant level, and bootstrapping tests of mediation revealed indirect effects of choice through knowledge acquisition on unconventionality and cultural relatedness.

In sum, our hypotheses were partially supported, not always for both of the dependent variables, unconventionality and relatedness. We generally observed that studying another culture under motivating conditions is associated with subsequent problem-solving ideas that relate to the culture studied and that are unconventional relative to the home culture. More research is needed to identify when foreign-inspired ideas are deemed unconventional or creative. Perhaps the clearest theme across results from the two studies is that problem solvers are more likely to draw upon ideas from cultural study in the context of choice. Below, we discuss the conceptual and practical implications of this and other findings.

### *Conceptual implications*

The current findings contribute to the burgeoning literature on effects of foreign exposure in several ways. While most past research has focused on the experience of adaptation as the critical mechanism in foreign exposure effects, the current research identifies cultural study as an aspect of foreign exposure with a distinctive set of consequences. Cultural study imparts a stock of foreign concepts that can be drawn upon to generate solutions that are unconventional (relative to home-culture expectations). This newly identified mechanism may have a different time course than the previously identified mechanism, as Maddux and Galinsky (2009) found that only stays longer than nine months contributed to performance on insight problems. Additionally, Godart, Maddux, Shipilov and Galinsky (2015) found that the length of creative directors' foreign work experience is a critical dimension that leads to creative output in comparison with other foreign experience dimensions (such as "breadth" and "cultural distance").

An implication of the current findings is that investigations of the effects of past foreign experience should distinguish study abroad from work abroad or measure more specifically the degree of cultural study experienced during the stay. This may explain the inconsistency in past findings about openness as a moderator of gains from foreign exposure (Leung & Chiu, 2008, 2010). Individuals high in openness thrive in educationally oriented experiences, but do not thrive in experiences lacking educational dimensions. Pagon et al. (2011) found that managers higher in openness do better at handling cultural diversity provided that their positions feature training opportunities, but not if the position does not involve training. Consider that openness among businesspeople is generally associated with lower salaries, perhaps because of sacrificing salary to sate curiosity (Seibert & Kraimer, 2001). Understanding the effects of openness requires distinguishing foreign exposure that involves formal study of ideas from other kinds of foreign exposure.

The current results also relate to the growing literature on personality and foreign cultural experience. In a longitudinal study of the study-abroad process, Zimmermann and Neyer (2013) found that openness was both a cause and effect of studying abroad. Pre-departure levels of extraversion and openness predicted long-term as opposed to short-term sojourning. Yet more surprisingly both short-term and long-term sojourning were associated with "increases in Openness and Agreeableness and a decrease in Neuroticism above and beyond the observed self-selection." An interesting question for future research would thus be whether the same is true for work-abroad

experiences; research with adults who are not expatriates has found that personality is quite stable in the middle-adult years (McAdams & Olson, 2010).

This is not to say, however, that study abroad produces greater gains in all kinds of problem solving. Study abroad and work aboard have been distinguished in the literature on expatriate adjustment, where researchers of serial expatriation find that expatriate adjustment is fostered by past work stays but not by past stays in nonwork domains such as study abroad (Takeuchi, Tesluk, Yun, & Lepak, 2005).

The current studies raise a number of questions for future research. Our insight task called upon knowledge of American and East Asian cultures. But does fusion of different cultural knowledge pools depend on integrating one's two cultural identities and networks (Cheng, Sanchez-Burks, & Lee, 2008; Chua, 2013). Integrating knowledge from different cultures may require more extended experience.

Would cultural study enhance only study-related performances? In Study 1, the MBA study trip problem would be relevant to knowledge that MBA students gained in past study abroad. Thus, the fit between types of cultural knowledge acquisition and problem domain should be explored.

Our measurement of knowledge acquisition was for reasons of convenience a vocabulary test. Is language the type of cultural study that plays the largest role in conferring an advantage on unconventional problems, or do other domains have effects parallel to the one seen in Study 2? This is another question calling for future research.

### *Methodological contributions*

In Study 1 and the pilot study, we replicated surveys of MBA students about past foreign stays with self-reported adaptation, summed across stays (Maddux & Galinsky, 2009). This measure produced interpretable patterns of associations. Consistent with conventional lore, U.S. citizenship (versus other) is associated with less cultural adaptation,  $r = -.27$ , during foreign stays, and adaptation was, not surprisingly, higher for those with greater study abroad,  $r = .29$ , and work abroad,  $r = .25$ . However, study and work abroad were not significantly correlated with an adaptation score as a mean. Given that the mean score of adaptation is a more conservative test because the sum of scores can gain a positive association with time abroad artifactually, future research on adaptation may be well advised to check both sum scores and mean scores.

Study 2 developed a new method of simulating foreign experience in a rich interactive laboratory procedure. Amount of cultural knowledge acquisition is hard to assess in surveys of past experiences, because people cannot accurately report on how much they learned. Objective tests of cultural knowledge do not provide a metric of learning in retrospective studies when the respondents have studied different subjects. Hence, knowledge acquisition as a function of moderating variables such as choice is better examined through the laboratory simulations that can hold constant the cultural study and test knowledge acquisition objectively.

For similar reasons, retrospective measures of stay characteristics such as chosenness and adaptation are limited. They may be outcome biased (a stay that turned out positive may be remembered as chosen and a stay that turned out bad may be reconstrued as externally imposed). Hence, there is methodological value in manipulating choice rather than relying solely on retrospective surveys.

On the other hand, a weakness of experimental simulations is that the causal relationship is assessed on a compressed timescale. We believe that the payoff for problem solving from cultural study persists across years, but we tested it within the same hour-long session. As an exploratory follow-up, we emailed participants one year later and asked them to answer an online survey involving questions about their memory of the simulation and another new beverage product design problem. About half responded (26: 11 men and 15 women;  $M_{\text{Age}} = 21.19$ ,  $SD_{\text{Age}} = 2.74$ ), 12 in the choice condition and 14 in the no-choice condition. Once again, product descriptions were coded by two research assistants blind to hypotheses and conditions, on three cultural conventionality dimensions (1 = *not at all*; 5 = *very much*;  $ICC_{\text{American}} = .90$ ;  $ICC_{\text{Asian}} = .89$ ;  $ICC_{\text{Other}} = .89$ ). Analysis revealed that American conventionality was marginally lower in the choice condition ( $M = 2.24$ , 95% CI [1.49, 2.99]) than in the no-choice

condition ( $M=3.17$ , 95% CI [2.46, 3.87]),  $F(1, 24)=3.88$ ,  $p=.061$ ,  $\eta^2=.14$ . Unlike in the experimental session, Asian conventionality did not differ between the choice and no-choice conditions,  $F(1, 24)=.38$ ,  $p=.544$ ,  $\eta^2=.02$ . Interestingly, other-culture conventionality was higher in the choice ( $M=2.36$ , 95% CI [1.76, 2.96]) than no-choice conditions ( $M=1.46$ , 95% CI [1.16, 1.77]),  $F(1, 24)=9.24$ ,  $p=.006$ ,  $\eta^2=.28$ . Memory measures showed greater memory of having chosen a Korean city in the choice condition,  $X^2(2)=11.69$ ,  $p<.001$ , but no differences in memory for Korean activities ( $F(1, 22)=.00$ ,  $p=.96$ ,  $\eta^2=.00$ ) or vocabulary ( $F(1, 24)=1.70$ ,  $p=.21$ ,  $\eta^2=.07$ ). While the low N cautions against definitive conclusion, these findings suggest that a longer-term effect of cultural study under the motivating condition of choice may be receptiveness to and incorporation of ideas from multiple cultures, not just the culture studied (as proposed by Leung & Chiu, 2010).

### *Practical implications*

Some tentative conclusions about practical matters can be drawn from the current results. Universities with study-abroad programs and corporations that offer foreign internships with cultural training would be well advised to offer more than one destination so that participants perceive themselves as having chosen their destination. An exposure to another culture can be experienced as annoying or as fascinating in part depending on the perception of choice. If space is limited, participants should be chosen based on manager-rated openness. While students can game self-rating scales, observer ratings of openness are nearly as valid as self-ratings (Mount, Barrick, & Strauss, 1994).

Work organizations also should design foreign assignments to develop employees' creative potential. Our results suggest that cultural study programs—in language, history, architecture, and so on—may not only ease employees' adjustment but also improve their long-term creative potential. Organizations cannot easily change the dispositional openness of their employees, but they can confer more choice in the context of foreign assignments. Organizations seeking to improve the creativity of rising managers may wish to require international rotations but not dictate who goes where, so that assignments abroad are not construed as externally imposed burdens (Kopp, 1994). Although foreign assignments are often dictated by business needs rather than solely for employee development, organizations should look for ways to offer choice, even if it is not choosing which country but just choosing which city or branch to be based in.

It is worth noting that the perception of choice is a function not only of the objective amount of choice in the situation but also of a person's proclivity to notice choice. People with an internal locus of control are predisposed to construe experiences as offering choice, which may be why they are more engaged than others by experiences with foreign cultures (Ward & Kennedy, 1992; Ward, Chang, & Lopez-Nerney, 1999). To the extent that organizations can select individuals who will most benefit from a foreign stay, they should look for candidates high in openness and an internal locus of control.

Finally, the results have implications for individuals' career planning. They suggest that options to engage in long-term study abroad and work abroad, while not always efficient in the short term, pay off in terms of problem-solving ability and creativity in the long run (Brimm, 2010).

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## References

- Abbe, A. (2008). Building cultural capability for full-spectrum operations. Report prepared by the United States Army Research Institute for the Behavioral and Social Sciences.
- Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, *45*(2), 357–376.
- Amabile, T. M. (1996). *Creativity in context: Update to the social psychology of creativity*. Boulder, CO: Westview Press.
- Barrick, M. R., & Mount, M. K. (1991). The Big Five personality dimensions and job performance: A meta-analysis. *Personnel Psychology*, *44*(1), 1–26.
- Bhagat, R., & Prien, K. O. (1996). Cross-cultural training in organizational contexts. In Landis, D., & Bhagat, R. S. (Eds.), *Handbook of intercultural training* (2nd ed., pp. 216 – 230). Thousand Oaks, CA: Sage.
- Black, H. T., & Duhon, D. L. (2006). Assessing the impact of business study abroad programs on cultural awareness and personal development. *Journal of Education for Business*, *81*(3), 140–144.
- Brimm, L. (2010). *Global cosmopolitans: The creative edge of difference*. New York: Palgrave Macmillan.
- Cellar, D. F., Miller, M. L., Doverspike, D. D., & Klawnsky, J. D. (1996). Comparison of factor structures and criterion-related validity coefficients for two measures of personality based on the Five Factor model. *Journal of Applied Psychology*, *81*(6), 694.
- Chatman, L., Sparrow, B., & McMahon, K. (2010). The effects of the feeling of choosing on memory. Poster presented at the APS Annual Convention Boston, MA.
- Cheng, C. Y., Sanchez-Burks, J., & Lee, F. (2008). Connecting the dots within creative performance and identity integration. *Psychological Science*, *19*(11), 1178–1184.
- Chua, R. Y. (2013). The costs of ambient cultural disharmony: Indirect intercultural conflicts in social environment undermine creativity. *Academy of Management Journal*, *56*(6), 1545–1577.
- Cloutier, J., & Macrae, C. N. (2008). The feeling of choosing: Self-involvement and the cognitive status of things past. *Consciousness and Cognition*, *17*, 125–135.
- Cordova, D., & Lepper, M. (1996). Intrinsic motivation and the process of learning: Beneficial effects of contextualization, personalization, and choice. *Journal of Educational Psychology*, *88*(4), 715–730.
- Csikszentmihalyi, M. (1997). *Flow and the psychology of discovery and invention*. New York: Harper Perennial.
- Cunningham, S. J., Turk, D. J., Macdonald, L. M., & Macrae, C. N. (2008). Yours or mine? Ownership and memory. *Consciousness and Cognition*, *17*(1), 312–318.
- Deshpande, S. P., & Viswesvaran, C. (1992). Is cross-cultural training of expatriate managers effective: A meta analysis. *International Journal of Intercultural Relations*, *16*, 295–310.
- Earley, P. C., & Ang, S. (2003). *Cultural intelligence: Individual interactions across cultures*. Palo Alto, CA: Stanford University Press.
- Erez, M., Lisak, A., Harush, R., Glikson, E., Nouri, R., & Shokef, E. (2013). Going global: Developing management students' cultural intelligence and global identity in virtual culturally diverse teams. *Academy of Management Learning & Education*, *12*(3), 330–355.
- Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science*, *18*(3), 233–239.

- Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26(4), 331–362.
- Godart, F., Maddux, W., Shipilov, A., & Galinsky, A. (2015). Fashion with a foreign flair: Professional experiences abroad facilitate the creative innovations of organizations. *Academy of Management Journal*, 58(1), 195–220.
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B. Jr. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality*, 37(6), 504–528.
- Hempel, P. S., & Sue-Chan, C. (2010). Culture and the assessment of creativity. *Management and Organization Review*, 6(3), 415–435.
- Keeter, S., Kennedy, C., Dimock, M., Best, J., & Craighill, P. (2006). Gauging the impact of growing nonresponse on estimates from a national RDD telephone survey. *Public Opinion Quarterly*, 70(5), 759–779.
- Kesebir, S., & Oishi, S. (2010). A spontaneous self-reference effect in memory. *Psychological Science*, 21(9), 1–7.
- Kopp, R. (1994). International human resource policies and practices in Japanese, European, and United States multinationals. *Human Resource Management*, 33(4), 581–599.
- Leung, A. K., & Chiu, C. (2008). Interactive effects of multicultural experiences and openness to experience on creative potential. *Creativity Research Journal*, 20(4), 376–382.
- Leung, A. K., & Chiu, C. (2010). Multicultural experience, idea receptiveness, and creativity. *Journal of Cross-Cultural Psychology*, 41(5–6), 723–741.
- Leung, A. K., Maddux, W. W., Galinsky, A. D., & Chiu, C. (2008). Multicultural experience enhances creativity: The when and how. *American Psychologist*, 63(3), 169–181.
- Littrell, L. N., Salas, E., Hess, K. P., Paley, M., & Riedel, S. (2006). Expatriate preparation: A critical analysis of 25 years of cross-cultural training research. *Human Resource Development Review*, 5(3), 355–388.
- Maddux, W. W., & Galinsky, A. D. (2009). Cultural borders and mental barriers: The relationship between living abroad and creativity. *Journal of Personality and Social Psychology*, 96(5), 1047–1061.
- Maddux, W. W., Adam, H., & Galinsky, A. D. (2010). When in Rome ... Learn why the Romans do what they do: How multicultural learning experiences facilitate creativity. *Personality and Social Psychology Bulletin*, 36(6), 731–741.
- McAdams, D., & Olson, B. (2010). Personality development: Continuity and change over the life course. *Annual Review of Psychology*, 61, 517–542.
- McCrae, R. R. (1987). Creativity, divergent thinking, and openness to experience. *Journal of Personality and Social Psychology*, 52(6), 1258–1265.
- Metcalfe, J. (1986). Feeling of knowing in memory and problem solving. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 12(2), 288–294.
- Morris, M. W., Savani, K., Mor, S., & Cho, J. (2014). When in Rome: Intercultural learning and implications for training. *Research in Organizational Behavior*, 34, 189–215.
- Mosakowski, E., Calic, G., & Earley, P. C. (2013). Cultures as learning laboratories: What makes some more effective than others? *Academy of Management Learning & Education*, 12(3), 512–526.
- Mount, M. K., Barrick, M. R., & Strauss, J. P. (1994). Validity of observer ratings of the Big Five personality factors. *Journal of Applied Psychology*, 79(2), 272–280.
- Norris, E. M., & Gillespie, J. (2009). How study abroad shapes global careers evidence from the United States. *Journal of Studies in International Education*, 13(3), 382–397.
- Oldham, G. R., & Cummings, A. (1996). Employee creativity: Personal and contextual factors at work. *Academy of Management Journal*, 39(3), 607–634.
- Pagon, M., Banutai, E., & Bizjak, U. (2011). On-the-job management training and multicultural skills: The moderating effect of openness to experience. *European Journal of Cross-Cultural Competence and Management*, 2(1), 45–53.
- Peng, S. Y. (2006). A comparative perspective of intercultural sensitivity between college students and multinational employees in China. *Multicultural Perspectives*, 8(3), 38–45.
- Perry-Smith, J. E., & Shalley, C. E. (2003). The social side of creativity: A static and dynamic social network perspective. *Academy of Management Review*, 28(1), 89–106.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891.
- Salgado, J. F. (1997). The Five Factor model of personality and job performance in the European community. *Journal of Applied Psychology*, 82(1), 30–43.
- Seibert, S. E., & Kraimer, M. L. (2001). The Five-Factor model of personality and career success. *Journal of Vocational Behavior*, 58(1), 1–21.
- Simon, H. A. (1973). The structure of ill structured problems. *Artificial Intelligence*, 4, 181–201.
- Takeuchi, R., Tesluk, P. E., Yun, S., & Lepak, D. P. (2005). An integrative view of international experience. *Academy of Management Journal*, 48(1), 85–100.

- Turk, D. J., Cunningham, S. J., & Macrae, C. N. (2008). Self-memory biases in explicit and incidental encoding of trait adjectives. *Consciousness and Cognition, 17*(3), 1040–1045.
- Ward, C., Chang, W., & Lopez-Nerney, S. (1999). Psychological and sociocultural adjustment of Filipina domestic workers in Singapore. In Lasry, J. C., Adair, J., & Dion, K. (Eds.), *Latest contributions to cultural psychology*, pp. 118 – 134). Lisse, The Netherlands: Swets and Zeitlinger.
- Ward, C., & Kennedy, A. (1992). Locus of control, mood disturbance, and social difficulty during cross-cultural transitions. *International Journal of Intercultural Relations, 16*(2), 175–194.
- Ward, T. B., Patterson, M. J., Sifonis, C. M., Dodds, R. A., & Saunders, K. N. (2002). The role of graded category structure in imaginative thought. *Memory & Cognition, 30*(2), 199–216.
- Watson, J. R., & Wolfel, R. (2015). The intersection of language and culture in study abroad: Assessment and analysis of study abroad outcomes. *Frontiers: The Interdisciplinary Journal of Study Abroad, 25*, 57–72.
- Zimmermann, J., & Neyer, F. J. (2013). Do we become a different person when hitting the road? Personality development of sojourners. *Journal of Personality and Social Psychology, 105*(3), 515–530.