

# Cultural Borders and Mental Barriers: The Relationship Between Living Abroad and Creativity

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Despite abundant anecdotal evidence that creativity is associated with living in foreign countries, there is currently little empirical evidence for this relationship. Five studies employing a multimethod approach systematically explored the link between living abroad and creativity. Using both individual and dyadic creativity tasks, Studies 1 and 2 provided initial demonstrations that time spent living abroad (but not time spent traveling abroad) showed a positive relationship with creativity. Study 3 demonstrated that priming foreign living experiences temporarily enhanced creative tendencies for participants who had previously lived abroad. In Study 4, the degree to which individuals had adapted to different cultures while living abroad mediated the link between foreign living experience and creativity. Study 5 found that priming the experience of adapting to a foreign culture temporarily enhanced creativity for participants who had previously lived abroad. The relationship between living abroad and creativity was consistent across a number of creativity measures (including those measuring insight, association, and generation), as well as with masters of business administration and undergraduate samples, both in the United States and Europe, demonstrating the robustness of this phenomenon.

*Keywords:* creativity, culture, living abroad, cognition, negotiations

Creativity, which is typically defined as the process of bringing into being something that is both novel and useful, is one of the most intriguing psychological phenomena. The definition of the word *create*—to cause to exist; to bring into being—implies something profound, almost godlike, which is perhaps the origin of the phrase “divine inspiration.” Although hard work, effort, and training are a significant part of the creative process (e.g., Amabile, 1996; Csikszentmihalyi, 1996; Sawyer, 2006; Simonton, 1997), there is an insight component that is critical as well, one that seems to work at an unconscious and inaccessible level (Schooler & Melcher, 1995). This moment of discovery is the magical “a-ha” moment, the point at which an idea leaps into consciousness, a moment that is sudden, abstract, and seemingly without logic.

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Despite the mysterious nature of creative insight, over the past several decades, researchers have managed to shed light on many of the psychological factors that are vital to the creative process. However, one of the most common lay assumptions regarding creativity—that living abroad is associated with creative insights—remains unstudied. In particular, living abroad is often seen as a necessary experience for aspiring artists, and there is abundant anecdotal evidence for the idea that some creative individuals produce their best known masterworks during or following a stint abroad (e.g., Vladimir Nabokov and his novel *Lolita*, Ernest Hemingway and his *The Sun Also Rises*). In fact, all four winners of the Nobel Prize in literature who are from Ireland (Yeats, Shaw, Beckett, and Heaney) spent significant portions of their lives abroad. In addition to writers, many famous painters, (e.g., Gauguin and Picasso) and composers (e.g., Handel, Prokofiev, Stravinsky, and Schoenberg) created many of their most admired works while living in foreign countries. Although certain locations and time periods (e.g., 20th century Paris) may be particularly stimulating for a creative mind, the diversity of these examples suggests that there may be an important link between living abroad and creative production. For example, Paul Gauguin, a Frenchman, painted his signature pieces in Tahiti; Vladimir Nabokov, a Russian, wrote his masterpieces in America; and George Handel, a German, composed his *Messiah* in England. The novelist Richard Stern noted the particular importance of living abroad for a creative mindset:

Once I went [abroad] it was extremely exciting for me to become a new personality, to be detached from everything that bound me, noticing everything that was different. That noticing of difference was very important. How things were said that were different, the different formulas . . . . So being abroad has been very important. (quoted in Csikszentmihalyi, 1996, p. 129)

All of these examples suggest that there may be something about the experience of living abroad that is important for the creative process, that spending time in new cultures can transform individuals into more creative beings. Of course, another way to look at these examples is that creative individuals are more likely to live abroad than are less creative people. Both directions are certainly possible, as well. Disentangling the causal direction of this effect is difficult, and in the current article, our goal is simply to provide the first empirical evidence for the link between experiences living in foreign countries and creativity. To do so, we conducted five studies in which we used a multimethod approach to test whether there is a positive and reliable relationship between living abroad and creativity.

### Psychological Variables Associated With Enhanced Creativity

Research has identified a number of personality and contextual factors related to the creative process, exploring how individual differences or the social context predict creative performance.

#### *Personality Characteristics*

Studies on creative personalities have consistently demonstrated that a number of personality traits tend to be found more often, or at higher levels, in creative than in noncreative individuals. Large-scale investigations of creative individuals and meta-analyses have found that above-average intelligence, tolerance of ambiguity, risk-taking, energy, self-confidence, intrinsic motivation, ambition, and cognitive flexibility are common traits in creative types (MacKinnon, 1978; for reviews, see Feist, 1998, 1999; Simonton, 2000, 2003). In addition, the Big Five personality variables (introversion, neuroticism, agreeableness, conscientiousness, openness to experience; e.g., McCrae & Costa, 1987) have all been shown to be associated with creativity (for reviews, see Feist, 1998, 1999), with openness to experience showing the most robust association (e.g., McCrae, 1987). Although a typical creative profile may vary somewhat across domain and industry (for example, creative artists tend to have somewhat different personality profiles than creative scientists; see Feist, 1998, 1999), there is broad consistency in what constitutes the creative personality.

#### *Contextual Variables*

In addition to personality factors, a number of contextual factors have been shown to facilitate creativity. Most notably, it is clear that individuals who pursue tasks for intrinsic, rather than extrinsic, purposes show enhanced creativity (e.g., Amabile, 1985; Amabile & Gitomer, 1984; for a review, see Amabile, 1996). In addition, temporarily activating a promotion-oriented regulatory focus can lead to enhanced creativity (R. S. Friedman & Förster, 2001). A distant future focus, compared with near future focus, can lead to more creative negotiation outcomes (Okhuysen, Galinsky, & Uptigrove, 2003) and to enhanced creative insight on individual problem-solving tasks (Förster, Friedman, & Liberman, 2004). And inducing a counterfactual mindset can also enhance insight (Galinsky & Moskowitz, 2000; Markman, Lindberg, Kray, & Galinsky, 2007), as can positive or ambiguous affective states (Amabile, Barsade, Mueller, & Staw, 2005; Fong, 2006; Fredrick-

son, 2001), a finding that belies the stereotype of the "starving artist."

### Diverse Experiences and Creativity

Directly relevant to the present investigation, empirical evidence suggests a general relationship between diverse experiences and enhanced creativity. For example, creativity is found at relatively high rates among first- or second-generation immigrants (Lambert, Tucker, & d'Anglejan, 1973; Simonton, 1994, 1997, 1999), among bilingual people (Nemeth & Kwan, 1987; Simonton, 1999), and within diverse groups (Guimera, Uzzi, Spiro, & Nunes Amaral, 2005; Levine & Moreland, 2004; Nemeth & Kwan, 1987; Simonton, 2003). Even civilizations become more creative after opening themselves to outside influences (Simonton, 1994, 1997).

Reviewing this and other research, Leung, Maddux, Galinsky, and Chiu (2008) concluded that the extant evidence suggests that certain types of multicultural exposure or experience can enhance creativity. For example, Leung and Chiu (in press) found that a composite measure of multicultural experience (including friends' and favorite musicians' ethnicities, preferences for ethnic food, family immigration history) predicted creative gift ideas. In addition, participants who were shown a slide show comparing American and Chinese cultures in the laboratory were subsequently more creative on a story-writing task than were participants who were simply shown slides about only American or only Chinese culture. Overall, then, diverse experiences and contexts, and certain types of multicultural experience or exposure, are associated with creativity.

#### The Association Between Living Abroad and Creativity

Although Leung et al.'s (2008) review suggested that different types of multicultural experience or exposure are related to creativity, no one has yet presented empirical evidence for our specific hypothesis that experiences living abroad may be related to creativity. It is important to note that although Leung and Chiu's (in press) measure of multicultural experience predicted creativity, this measure does not take into account any experiences in foreign countries, including living abroad. Thus, the major aim of the present research was to test systematically and for the first time whether the experience of living in a foreign country is associated with creativity.

It is noteworthy that foreign living experiences contain many of the critical elements necessary to stimulate the creative process (e.g., Ward, Smith, & Finke, 1999). First, living abroad can allow individuals access to a greater number of novel ideas and concepts, which can then act as inputs for the creative process. Second, living abroad may allow people to approach problems from different perspectives. For example, in some cultures (e.g., China), leaving food on one's plate is an implicit sign of appreciation, implying that the host has provided enough to eat (Seligman, 1999). In other countries (e.g., the United States) the same behavior may often be taken as an insult, a condemnation of the quality of the meal. Thus, those with experience living in foreign countries should be more likely to recognize that the same form (i.e., surface behavior) may have different functions (i.e., meanings) in different cultures. Third, experiences in foreign cultures can increase the psychological readiness to accept and recruit ideas from unfamiliar

sources, thus facilitating the processes of unconscious idea recombination (Schooler & Melcher, 1995) and conceptual expansion (Leung et al., 2008; Ward, 1994), which are important for the creative process. Thus, an individual who has lived abroad may be better able to generate and integrate ideas in novel ways.

### Overview

In Studies 1 and 2, we measured living and traveling experiences in foreign countries as an individual difference and examined whether such experiences were associated with more creativity. In Study 3, we primed cognitions associated with living abroad and examined whether they can temporarily enhance creativity for a sample of individuals who had previously lived abroad. In Study 4, we explored whether adapting to foreign cultures while living abroad mediates the link between living in foreign countries and creativity. In Study 5, we explored whether activating the experience of adaptation among those who have lived abroad temporarily enhances creativity on an idea-generation task. Across all five studies, we consistently found that living (but not traveling) in and adapting to other cultures was associated with greater creativity.

#### Study 1: Predicting the Duncker Candle Problem From Foreign Experiences

Study 1 was an initial study designed as an exploratory test of our hypothesis. In this study, we simply measured amount of time living and traveling abroad as an individual difference and then examined how these experiences were related to participants' creative abilities.

#### Method

*Creativity task.* The creative task used in Study 1 was the Duncker candle problem (see Figure 1). In this problem, individuals are presented with a picture containing several objects on a

table: a candle, a pack of matches, and a box of tacks, all of which are next to a cardboard wall. The task is to figure out, using only the objects on the table, how to attach the candle to the wall so that the candle burns properly and does not drip wax on the table or the floor. The correct solution involves using the box of tacks as a candleholder: One should empty the box of tacks and then tack it to the wall placing the candle inside. The solution is considered a measure of insight creativity because it involves the ability to see objects as performing different functions from what is typical (i.e., the box is not just a repository for tacks but can also be used as a stand). In other words, there is a hidden solution to the problem that is inconsistent with preexisting associations and expectations (Duncker, 1945; Glucksberg & Weisberg, 1966).

*Participants.* Participants were 205 full-time masters of business administration (MBA) students at a large business school in the United States (127 men, 78 women) who participated as part of an exercise prior to a lecture on culture and communication. The average age of participants was 27.7 years ( $SD = 2.06$ ). One hundred fifty participants were American citizens, and 55 were citizens of foreign countries, including Bangladesh (1), Brazil (4), Canada (7), China (1), Ecuador (1), the Philippines (1), France (1), Germany (1), Hong Kong (1), Italy (1), Ireland (1), India (12), Japan (5), Korea (1), Mexico (1), Morocco (1), Pakistan (1), Peru (2), Puerto Rico (1), Russia (1), Singapore (1), Switzerland (1), Thailand (1), Taiwan (1), and the United Kingdom (5).

*Procedure.* The day before the lecture, participants were e-mailed and asked to complete an exercise ostensibly related to the lecture the following evening. Participants were instructed to follow a link to a website which presented the color picture of the Duncker candle problem shown in Figure 1. The instructions indicated that the task was to try to figure out how to attach the candle to the wall so that no wax would drip on the table or floor when the candle was lit. The instructions explicitly indicated that only the objects on the table could be used to solve the problem.

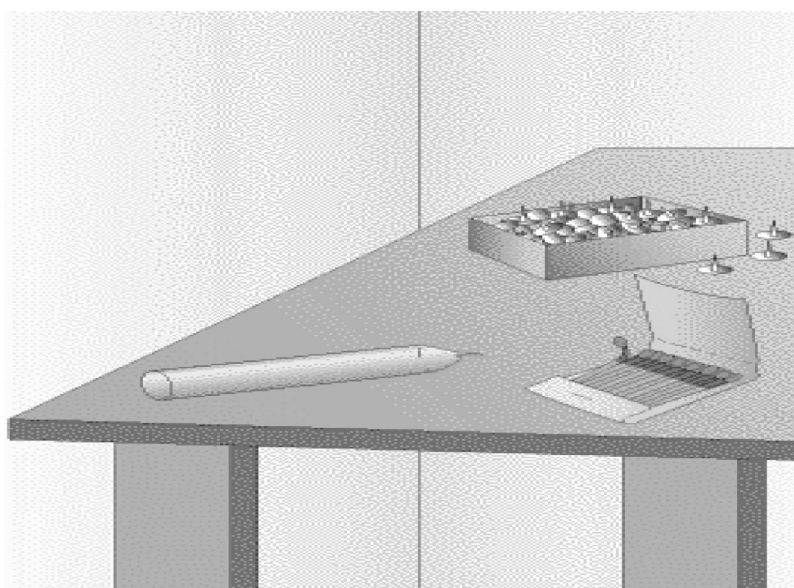


Figure 1. Duncker Candle Problem, Studies 1 and 4.

Participants were instructed to type their answer in a text box placed below the picture.

Participants next answered subsequent background questions that assessed their age, gender, nationality, and (a) whether they had lived in a foreign country (i.e., not their native country) previously, and if so, for how long, and, (b) whether they had traveled in a foreign country before, and if so, for how long. These measures of cross-cultural experience served as our main independent measures.

## Results and Discussion

*Percentage of participants with cross-cultural experience.* One hundred thirty-five of the 205 participants (66%) indicated that they had experience living in a foreign country or foreign countries ( $M = 2.98$  years;  $SD = 4.92$ ). Two hundred two out of the 205 participants (98.5%) said that they had traveled abroad previously ( $M = 32.59$  weeks;  $SD = 25.95$ ).

*Creative problem solving and relationship to cross-cultural experience.* Solutions were coded as correct or incorrect; to be considered correct, responses had to include the use of the box of tacks as a candleholder. Overall, 111 of the 205 participants solved the problem correctly (54.1%). A hierarchical, binary logistic regression was run as our main analysis, with age, gender, and nationality (U.S. citizen/foreign citizen) entered on the first block as control variables, and with time living and traveling abroad entered on the second block. After we controlled for age, gender, and nationality ( $R^2 = .018$ ), results from Step 2 of the regression indicated that the amount of time individuals had spent living abroad emerged as a significant positive predictor of creative solutions ( $B = .078$ ,  $SE = .038$ ,  $Wald = 4.26$ ,  $p = .039$ ,  $R^2 = .064$ ). By contrast, time spent traveling abroad showed a significant but negative relationship to creative solutions ( $B = -.004$ ,  $SE = .002$ ,  $Wald = 3.87$ ,  $p = .049$ ). Thus, the more time individuals had spent living abroad (but not traveling abroad), the more likely they were to solve the Duncker candle problem.

### Study 2: Predicting Creative Negotiation Deals From Foreign Experiences

The goals for Study 2 were twofold. First, we wished to replicate and extend the findings from Study 1 by using a very different type of creative context. To this end, we used an interpersonal creativity task—a one-on-one negotiation—in which a creative yet hidden solution was necessary to achieve an acceptable deal. Second, because Study 1 was designed as an initial demonstration of the hypothesized relationship between creativity and time spent living abroad, it did not control for many personality variables that might be related to both creativity and time spent living abroad. Thus, Study 1 results are open to self-selection concerns: As noted in the introduction, personality differences could lead people to both live abroad and be more creative. As a result, in Study 2, we controlled for a variety of personality variables, most notably the Big Five personality variables (e.g., McCrae & Costa, 1987), all of which have been previously linked to creativity (for reviews, see Feist, 1998, 1999). We also controlled for academic performance, gender, and nationality. Although controlling for such variables cannot rule out the possibility that creative people are more likely

to live abroad, it can give us more confidence that there is a unique relationship between living abroad and creativity.

## Method

*Creativity task.* Study 2 involved a negotiation over the sale of a gas station (see Galinsky, Maddux, Gilin, & White, 2008; Maddux, Mullen, & Galinsky, 2008). In this exercise, a deal based solely on sale price was impossible. Specifically, the buyer's reservation price (the maximum he or she was authorized to pay) was lower than the seller's reservation price (the minimum he or she was willing to accept), resulting in a "negative bargaining zone" for sale price. However, the two parties' underlying interests were compatible: The buyer wanted to hire managers to run the station, and the seller needed sufficient funds to finance a two-year sailboat trip while also needing employment for after the trip. Thus, the parties could agree to a sale price below the seller's reservation price, but with a stipulation of future employment, with the value of a future job allowing the seller to satisfy his/her interests despite going below their stated reservation price.

In this exercise, dyads often reach impasses because they tend to focus only on the sale price of the station. Indeed, for many negotiators, even experienced ones, seeking overlap on monetary terms is often seen as the only way to achieve a deal in negotiations. Given that there is a hidden solution in this task that is inconsistent with previous associations and expectations (i.e., negotiators cannot achieve a deal via sale price alone), this task, like the Duncker candle problem in Study 1, is structured as an insight creativity task within a negotiation context. It is also important to note that such creative solutions were not explicitly suggested in the materials for this particular negotiation exercise: The sale price of the stations was presented as the only issue up for negotiation. Thus, participants had to discover such alternative solutions spontaneously during the course of the negotiation.

On the basis of a previously established coding scheme (Galinsky, Maddux, et al., 2008; Maddux et al., 2008), an outcome was considered an acceptable and creative deal if the terms involved (a) a sale price not greater than the buyer's reservation price or less than the seller's reservation price and (b) the addition to some type of extra issue(s), such as a job, where the value of the issue(s) could also help the seller meet his or her interests. Outcomes were considered unsuccessful if they (a) involved only the sale price of the station (which indicated a disregard for one of the parties' reservation prices), or (b) if parties reached an impasse.<sup>1</sup>

*Participants.* Participants were 108 full-time MBA students at a large business school in the United States (72 men, 36 women) who were enrolled in a negotiations class.<sup>2</sup> Seventy-two participants were U.S. citizens, and 36 were citizens of foreign countries, including Australia (2), Brazil (4), China (6), France (1), Italy (1), India (3), Indonesia (1), Japan (5), Korea (1), New Zealand (1), Romania (1), Peru (1), Pakistan (1), Thailand (5), and the United Kingdom (2). Participants participated in the study as part of an in-class exercise at the beginning of the academic quarter.

<sup>1</sup> We considered the actual terms of the deal of less importance than the presence of a creative deal itself.

<sup>2</sup> There was no overlap in participant samples in Study 1 and Study 2. Age was not recorded in this study.

*Procedure.* Participants were randomly assigned to dyads, with one playing the role of buyer and one the role of seller. One week prior to the negotiation, participants were given confidential role instructions for the *Texoil* negotiation (S. Goldberg, 2000) and told to prepare for their roles by themselves and not to exchange any information with their partner or classmates prior to the negotiation. During the regular class period, participants performed the face-to-face negotiation in separate and isolated rooms and were given 50 min to negotiate a deal.

*Control and independent variables.* To control for a number of important individual-difference variables, 1 week after the negotiation exercise, we gave participants a background questionnaire which assessed major aspects of personality: the Big Five personality traits (e.g., Costa & McCrae, 1985). The five-factor structure of personality has been replicated in a number of studies (for a review, see Goldberg, 1993) and represents one of the best validated personality frameworks (c.f. Saucier & Goldberg, 2001). Each factor (e.g., extroversion) captures several more specific facets (e.g., sociability), which, in turn, subsume a number of more specific traits and behaviors, some of which are also associated with creativity (i.e., openness to experience encompasses experimenting and independence, whereas emotional stability encompasses confidence; Johnson & Ostendorf, 1993). The Big Five include (1) extroversion (associated with sociability and the tendency to be gregarious), (2) agreeableness (associated with cooperation, trust, and tolerance), (3) emotional stability (associated with calmness, confidence, and lack of worry and insecurity), (4) conscientiousness (associated with order, self-discipline, and consistency), and (5) openness to experience (associated with creativity and curiosity). By controlling for these personality factors, all of which have been previously linked to creativity (Feist, 1998, 1999), we sought to demonstrate that experience living abroad has a unique association with creativity. At the end of the quarter, we collected final class grades as a control for academic ability,<sup>3</sup> and we recorded each participant's gender and whether they were a U.S. citizen. Finally, we assessed our main independent variables: whether participants had lived and traveled abroad (i.e., not in their native country) before and, if so, for how long.

## Results and Discussion

*Cross-cultural experience and percentage of deals.* Overall, 81 out of 108 participants (75%) indicated that they had experience living in a foreign country ( $M = 6.64$  years;  $SD = 7.81$ ). In addition, 106 out of 108 participants (98.1%) indicated having traveled in a foreign country or foreign countries ( $M = 11.90$  weeks;  $SD = 9.40$ ). Overall, 30 of the 54 dyads (55.6%) discovered a creative and acceptable solution within the parameters of this exercise.<sup>4</sup>

*Variables predicting whether a deal was reached.* We examined which of our independent and control variables predicted whether a successful deal had been struck. Our main analysis consisted of a hierarchical binary logistic regression with the following predictor variables calculated/coded at the dyadic level and entered on the first step of the regression: participant gender (coded as number of women in the dyad), nationality (coded as number of U.S. citizens in the dyad), final class grades, levels of extroversion, emotional stability, agreeableness, conscientiousness, and openness to experience (Step 1  $R^2 = .458$ ). On the

second step, we entered total time spent traveling abroad and total amount of time living abroad (Step 2  $R^2 = .553$ ). Our main dependent variable was whether or not an acceptable deal had been reached.

Results were consistent with those in Study 1 (see Table 1). Once again, the amount of time spent living abroad, but not traveling abroad, significantly predicted whether a deal was reached, even when we controlled for a variety of important personality and demographic factors. Openness to experience predicted creative deals, in line with previous research (McCrae, 1987); in addition, extroversion was significant, which makes sense given that sharing information about the seller's planned trip is crucial to discovering an acceptable deal. Agreeableness showed a significant negative relationship to deal-making, consistent with previous research (Feist, 1998, 1999) and work on empathy showing that negotiators who care too much about getting along with the other party can lose sight of their own interests and miss creative negotiation opportunities (e.g., Galinsky, Maddux, et al., 2008). It is important to note that, although other personality factors predicted the presence of a creative deal, experience living abroad once again showed a significant association with creativity over and above these other personality variables.

### Study 3: The Effect of Priming Foreign Experiences on the Remote Associates Test

Results from Studies 1 and 2 demonstrated that experience living abroad is a reliable predictor of creativity on both individual and dyadic tasks. Because we controlled for a number of important personality factors that have been linked to creativity in Study 2, we can have more confidence that there is a reliable relationship between living abroad and creativity. However, because correlational studies cannot definitively rule out self-selection as a possible alternative explanation, our goal in the next study was to provide experimental evidence for the idea that cognitions about one's experiences abroad can facilitate temporary increases in creativity. Thus, in Study 3, we asked a sample of participants, all of whom had lived abroad, to write about one of several experiences—either (a) living abroad, (b) traveling abroad, or (c) having one of two types of nonforeign experiences—and then assessed subsequent creativity. We expected that priming cognitions and experiences associated with living abroad would temporarily facilitate creative tendencies.

We sampled only participants who had lived abroad to ensure that all participants had concrete experiences available to make mentally accessible, providing the most direct analog to the actual experiences. There was also empirical justification for only using participants who had lived abroad: Other research has shown that the boosts in creativity after priming foreign culture experiences

<sup>3</sup> Class grades were made up of three components: participation, a final paper, and a final exam. Outcomes of negotiation exercises were not part of students' final grades. Thus, this variable was a relatively general measure of academic ability (ability to write and argue logically, memory for and application of course concepts), rather than negotiation prowess per se.

<sup>4</sup> Out of the 24 dyads that did not reach a successful and acceptable deal, 10 reached an agreement on only the sale price of the station, whereas 14 reached an impasse.

Table 1  
*Personality/Demographic Predictors of Whether a Deal Was Reached in the Negotiation, Study 2*

Personality/demographic variable	<i>B</i>	<i>SE</i>	Wald statistic	<i>p</i>
Time lived abroad	0.016	0.007	4.603	.032
Time traveling abroad	-0.001	0.056	0.000	.993
Gender	0.010	0.803	0.000	.990
Class grades	-0.028	0.108	0.067	.796
Nationality	1.266	0.687	3.392	.066
Agreeableness	-1.290	0.482	7.155	.007
Openness to experience	0.258	0.115	5.002	.025
Conscientiousness	-0.232	0.207	1.258	.262
Neuroticism	0.173	0.278	0.388	.533
Extraversion	0.578	0.216	7.140	.008

*Note.* Results presented are from Step 2 of the hierarchical regression. Variables are coded/calculated at the dyadic level. Beta coefficients are unstandardized.

occur only for individuals who have actually had the experience of living abroad. In a study conducted by Maddux, Adam, and Galinsky (2009), one group of participants was primed to think about an experience in which they learned something about a foreign culture before performing the Duncker candle task; another group of participants was in a control condition. Maddux et al. (2009) found an interaction between experimental primes and participant's experiences living abroad, with only those participants who had lived abroad showing an increased tendency to discover a creative solution after being primed with a foreign learning experience.

It is also important to note that an abundance of research in social and cognitive psychology has conclusively demonstrated that temporarily activating (or priming) a psychological construct or mindset has the same psychological effects as when the construct is measured as a chronically accessible individual difference, but only when that mindset is available in memory (e.g., Bargh, Lombardi, & Higgins, 1988; Bruner, 1957; Higgins, 1996; Higgins, King, & Mavin, 1982; see Higgins, 1990, for an empirical and conceptual review). Specifically, Higgins (1990, p. 306) noted that, "chronic individual differences in construct accessibility function like temporary individual differences in construct accessibility." These temporary accessibility effects have also been found to specifically impact creativity. Directly relevant to the current investigation, R. S. Friedman and Förrester (2001, p. 1001) demonstrated that "individual differences in regulatory focus influence creative problem solving in a manner analogous to that of incidental promotion and prevention cues." In other words, although chronic individual differences in creative ability certainly exist, experimental manipulations that approximate these individual differences have also been shown to cause temporary boosts in creativity. The moderating effect of availability also explains why Maddux et al. (2009) found no effect of experimental priming on creativity when participants hadn't lived abroad: Without those experiences being available in memory, priming has little substantive impact on subsequent cognition (Higgins, 1996). Thus, we reasoned that activating a mindset involving the explicit consideration of the experience of living abroad among those who previously had such an experience would temporarily enhance

subsequent creativity, providing concrete experimental evidence for our hypothesis.

Finally, it is also important to point out that the experimental nature of this study, in particular randomly assigning participants to different conditions, effectively rules out self-selection concerns by distributing preexisting individual personality and experience differences evenly across conditions. This is arguably the most important aspect of experimental research design, and it allowed us to explore the causal impact of cognitions associated with living abroad on creativity (e.g., Abelson, 1995; Aronson, Wildon, & Brewer, 1998; Brewer, 2000).

### *Method*

*Creativity task.* The creative task in Study 3 was the Remote Associates Test (RAT; S. Mednick, 1962), a creative association test of convergent thinking. In this task, examinees are presented with three words and asked to come up with an additional word that can logically associate the three words. Participants were given two examples: For the triad of words "manners, round, tennis," participants were told that the correct answer was "table" (i.e., table manners, round table, table tennis). For the triad of words "playing, credit, report," the correct answer was "card" (i.e., playing card, credit card, report card). Participants were given 12 triads to solve, and the number of correct responses served as our main dependent measure of creativity.<sup>5</sup>

*Participants.* Sixty-five undergraduates at a large university in France (29 men, 34 women, 2 gender undisclosed) participated in exchange for a coupon for a free coffee. All participants were French nationals and native French speakers. It is important to note that the information about the experiment indicated that for participants to be eligible, they needed to have lived abroad (i.e., outside of France) previously. All participants in the final sample had such experience ( $M = 4.57$  years;  $SD = 5.61$ ).

*Experimental conditions.* Participants were randomly assigned to one of four experimental conditions in a between-subjects design. The cover story indicated that the first experiment was a cognitive generation experiment and that we were interested in participants' ability to mentally simulate certain events. In the *living abroad* condition, participants were asked to imagine living in a foreign country and, in particular, about the types of things that happen, how they feel and behave, and what they think during a particular day living abroad. They were then asked to think and write about this experience for several minutes. In the *traveling abroad* condition, participants were asked to imagine and write about a day traveling in a foreign country. A third condition

<sup>5</sup> All materials were translated into French from the English originals and were back-translated to check for accuracy and logic. Given the dependence on linguistic logic inherent in the RAT, however, we were particularly conservative in selecting items. For example, we began with a total of 18 items for initial translation, then pretested these items on several native French speakers to ensure equivalence. For example, (a) gold-stool-tender (answer: bar) and (b) hall-car-swimming (answer: pool) did not translate well or make sense in French according to our pretest sample and, thus, were cut. Examples of items that were kept were (a) blank-white-lines: PAPER (étagère-page-auteur: LIVRE) and (b) magic-plush-floor: CARPET (volant-sol-tisser: TAPIS). We settled on a final total of 12 items that were linguistically and semantically equivalent, and these triads were based on concept linkages, rather than linguistic linkages.

involved priming participants with cognitions associated with a nonforeign experience: a day in their life in their hometown. Finally, a control condition involved a prime in which participants were asked to recall and write about what happened the last time they went to the supermarket (Gruenfeld, Inesi, Magee, & Galinsky, 2008; Rucker & Galinsky, 2008).

After participants completed the priming task, they were asked to perform a second, separate experiment, ostensibly on cognitive ability. This second task was the RAT, consisting of 12 triads. After receiving two examples (see above), participants were instructed to solve as many triads as possible.

Because the RAT is related to verbal and language ability (M. T. Mednick & Andrews, 1967), we used postexperiment questions to assess English language ability and included a measure of exposure to Anglophone countries to rule out English-language familiarity or fluency as a confound of RAT ability. Participants were queried on their English language ability, where they had lived abroad previously, and for how long. Finally, to examine cultural distance or novelty as a potential moderator, we also asked participants how different the foreign countries in which they had lived or visited were from France. Participants were then debriefed, compensated, and thanked for their time.

## Results

Given results from Studies 1 and 2, we predicted that participants in the living-abroad prime condition would show more subsequent creativity than would participants in the other three conditions. To test this prediction, we submitted the number of correct RAT items to a one-way analysis of variance (ANOVA). This analysis revealed a significant effect for priming condition,  $F(3, 64) = 3.15, p = .031, \eta^2 = .134$ . Pair-wise mean comparisons indicated that participants in the living abroad condition ( $M = 7.07, SD = 2.84$ ) solved significantly more RAT problems correctly than did participants in the other three conditions: the traveling abroad condition ( $M = 4.69, SD = 3.46$ ),  $F(1, 30) = 4.35, p = .046, \eta^2 = .130$ ; the hometown condition ( $M = 4.79, SD = 2.68$ ),  $F(1, 30) = 5.79, p = .022, \eta^2 = .153$ ; and the control condition ( $M = 4.07, SD = 2.09$ ),  $F(1, 30) = 9.46, p = .005, \eta^2 = .252$ . No other mean differences were significant ( $ps > .42$ ; see Figure 2).

We ran subsequent analyses to examine the potential interaction between time spent living abroad and experimental condition. In particular, it stands to reason that the highest levels of creativity may be seen for those participants in the living-abroad prime condition who had lived abroad the longest. Thus, we ran a hierarchical linear regression with the main effects of experimental condition (comparing the living-abroad prime condition with the other three conditions) and time abroad entered on the first step and the interaction term entered on the second step. A significant Condition  $\times$  Time Abroad interaction emerged,  $\beta = .439, t(74) = .265, p = .010, \Delta R^2 = .088$ , with the highest levels of creativity occurring for those participants in the living-abroad prime condition who had the longest time living abroad.

We ran a similar analysis to examine the potential interaction between experimental condition and the question assessing how different participants' host countries were from France. However, a hierarchical linear regression with the main effects of experimental condition and cultural distance entered on the first step, and the interaction between condition and cultural distance entered on the second step, revealed a nonsignificant interaction between cultural distance and condition ( $\beta = -.076, p = .524, ns$ ). Thus, cultural distance was not an important moderator of the effect of priming foreign living experiences on creative association.

We conducted subsequent analyses to ensure that there were no confounding effects of participants' English language ability and whether participants had lived abroad in Anglophone countries previously. A chi-square analysis revealed no significant differential exposure to Anglophone countries across conditions,  $\chi^2(1, 75) = 2.85, p = .415, ns$ . A one-way ANOVA with condition as the independent variable and English language ability as the criterion variable also revealed no significant differences across conditions,  $F(1, 74) = 0.254, p = .858, ns$ , confirming that random assignment of participants to conditions did in fact equalize any preexisting individual differences, eliminating any potential advantages in solving RAT items.

Thus, in a sample of individuals who had all lived abroad previously, priming experiences associated with living abroad temporarily produced a significant enhancement in subsequent creativity compared with priming other foreign or nonforeign

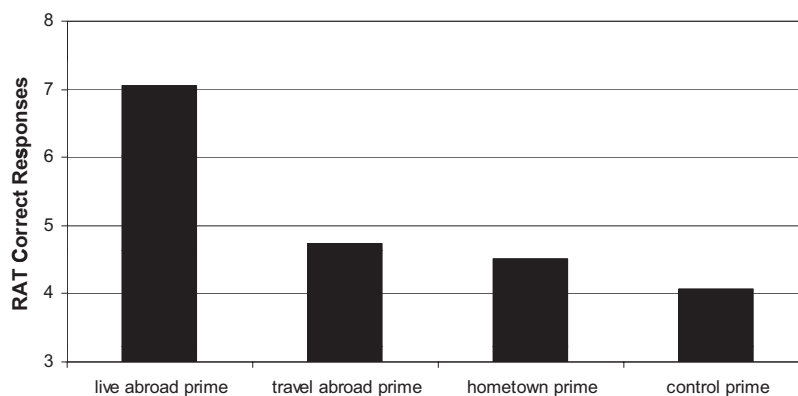


Figure 2. Mean number of correct responses on the Remote Associates Test (RAT; out of 12 total; S. Mednick, 1962) as a function of experimental condition, Study 3.

experiences.<sup>6</sup> In addition, this temporary facilitative effect of contemplating experiences living abroad was strongest for those participants who had lived abroad the longest.

#### Study 4: Adaptation as the Mediating Mechanism Behind the Foreign Culture Experiences–Creativity Link

Results from Studies 1–3 consistently demonstrated that experiences and cognitions associated with living abroad predicted or temporarily enhanced creative abilities. However, it remains unclear what underlying mechanism drives this link. Nevertheless, the pattern of results from Studies 1–3, as well as results from previous research, provides some suggestions. Because we found that only living abroad (rather than traveling abroad) is associated with higher levels of creativity, it is possible that immersive foreign experiences are particularly important. In addition, previous research suggests that simply exposing individuals to novel cultural elements is not enough to lead to enhanced creativity: At a minimum, individuals must actively compare multiple cultures and do some cognitive work exploring the differences and similarities between multiple cultures to get enhanced creativity (Leung & Chiu, in press). Thus, it seems likely that the association between living abroad and creativity would be weakest for those who remain aloof from their new culture (e.g., by associating only with expatriates or being unwilling or unable to adapt their behavior to different cultural contexts) and strongest for those who adapt themselves to a new culture by incorporating new modes of thinking and behaving.

Thus, we hypothesized that *adaptation* may be the key psychological element that explains why living abroad is associated with creativity. Because culture is such a pervasive force, impacting and shaping every aspect of one's life, adapting oneself to a new culture—learning how to behave and think in different way—may make individuals chronically aware of multiple perspectives and approaches when dealing with mundane and novel situations and, thus, may be associated with increased creativity. Going back to the example of leftover food on a plate from the introduction, an individual who has lived abroad can frame such a problem or behavior in multiple ways, understanding that it has multiple meanings depending on the cultural context (i.e., leftover food could serve either as a complement or a criticism). Thus, individuals who have adapted to multiple cultural contexts may be less susceptible to *functional fixedness*, the inability to see objects performing atypical or novel functions, as with the box of tacks in the Duncker candle task. In addition, adapting to and integrating a diverse set of ideas and behaviors may expose people to new ideas and allow for individuals to more easily go through the process of unconscious idea recombination (Schooler & Melcher, 1995), as well as conceptual expansion (Leung et al., 2008; Ward, 1994), making it easier to be creative.

As a result of this reasoning, the main goal for Study 4 was to obtain evidence that adaptation may be a critical underlying psychological mechanism responsible for driving the association between living abroad and creativity.

#### Method

**Creativity task.** As in Study 1, the Duncker candle task was used as our dependent measure.

**Participants.** One hundred thirty-three MBA students (94 men, 39 women) who were enrolled in an introductory leadership class at a large European business school participated as part of a class exercise during the first 2 weeks of class. Students in the sample represented 40 different nationalities, and 15 students indicated that they had dual nationalities. The most commonly represented countries were France (16), India (15), the United States (8), the United Kingdom (7), Italy (6), and Canada (6), with multiple students coming from China, Greece, Australia, Germany, Japan, Korea, Lebanon, the Netherlands, Spain, Taiwan, Brazil, Russia, Israel, and the Ukraine.

**Procedure.** Prior to the first class of the academic period, participants were asked to complete an online survey concerning their background experiences. Students were first asked about their nationality and the total amount of time they had spent living abroad (i.e., outside their native country), followed by questions assessing the specific countries in which they had lived previously. Students were provided with a maximum of three countries they could list (participants who had never lived abroad were told to skip this set of questions). Participants were then asked, vis-à-vis each of the foreign countries in which they had lived, the extent to which they had adapted themselves to the culture in each foreign country while living there. We then summed these responses to create an index of adaptation that took into account the extent and number of different times participants had adapted to a foreign culture. Subsequent questions assessed the Big Five personality traits, whether participants were native English speakers, the number of languages they spoke fluently, the number of countries in which they had lived, and their age and gender. At the end of the academic period, we obtained course grades and Graduate Man-

<sup>6</sup> Following the completion of the experiment, we wanted to rule out additional alternative explanations for differences across living and traveling conditions based on possible systematic differences in what participants wrote about following the living/traveling primes. Thus, we had two coders, blind to the experimental hypothesis, assess participants' written responses following the primes in terms of (a) novelty of the experience, (b) confidence in behaving, (c) positive and (d) negative affect experienced, and (e) mentions of speaking a foreign language. Coders also noted the (f) country mentioned (if any), (g) context mentioned, and (h) specific behaviors in which the participant engaged. Results revealed no systematic differences across the two conditions for novelty, confidence, affect, and language (all  $ps > .33$ ). No systematic differences were found with language: 2 of 14 people in the living condition mentioned speaking or learning a new/foreign language, whereas 3 of 15 people in the traveling condition mentioned it. No differences were noted in context: Relatively equal mentions in both conditions included being on the streets, in restaurants and cafes, at a university, or in no specific context. The only contextual differences not mentioned in both contexts were small: For the traveling condition, they included being at a movie (1), being at a museum (1), lying on a beach (1), and shopping (3), whereas for the living condition, they included being at home (3) or being in an office (2). Countries written about did not reveal consistently different patterns across condition. For the living condition, these included Australia (1), Brazil (1), Senegal (1), India (2) and the United States (1). For the traveling condition, these included China (2), the United Kingdom (1), Turkey (1), Thailand (1), and Vietnam (1). Spain was mentioned once in both conditions, and 7 people in each condition mentioned no specific country.



agement Admission Test scores to control for general cognitive ability.<sup>7</sup>

One week after the background questionnaire was presented, participants were asked to do a second (ostensibly unrelated) task as part of another class exercise. As in Study 1, students were provided with a link to a website where the Duncker candle problem was presented; students were asked to take a few minutes to try to solve the problem, and a text box was provided for them to type their answers. Answers were scored in the same manner as in Study 1.

### Results and Discussion

*Experience living abroad and creative solutions.* Overall, 109 out of 131 (83.2%) of students indicated that they had lived abroad (i.e., outside their home country) previously. Overall, 57 out of 131 participants (43.5%) solved the Duncker problem correctly.

We ran a hierarchical, binary logistic regression analysis as our main analysis, with Duncker candle solutions, coded as correct or not, as our dependent variable. On the first step, we entered our control variables: the Big Five, gender, age, class grades, Graduate Management Admission Test scores, languages spoken fluently, whether English was their native language, and number of countries in which they had lived (Step 1  $R^2 = .178$ ). On the second step, we added time lived abroad as our main independent variable (Step 1  $R^2 = .239$ ). Replicating previous effects, time spent living abroad significantly predicted creative solutions over and above other personality and individual difference variables ( $B = .010$ ,  $SE = .004$ ,  $Wald = 5.88$ ,  $p = .015$ ; see Table 2 for complete results).

*Mediational role of adaptation.* We then examined whether adaptation mediated the link between living abroad and creativity. Using the same control variables as above, we first established that time abroad was a significant predictor of adaptation,  $B = .012$ ,  $SE = .004$ ,  $t(131) = 3.33$ ,  $p = .001$ . We next ran a hierarchical binary logistic regression analysis with the control variables entered on the first step, time spent living abroad on the second step,

and the adaptation index entered on the third step (Step 3  $R^2 = .328$ ). Results from this analysis revealed that, as predicted, the extent to which participants had adapted themselves to the foreign countries emerged as a significant predictor of creativity in this analysis ( $B = .309$ ,  $SE = .103$ ,  $Wald = 8.96$ ,  $p = .003$ ), but the effect of time spent living abroad became nonsignificant ( $B = .006$ ,  $SE = .004$ ,  $Wald = 2.20$ ,  $p > .13$ ), demonstrating that adaptation did in fact mediate the effect between time abroad and creativity (see Figure 3). In addition, a Sobel's test (Sobel, 1982; Preacher & Leonardelli, 2003) indicated that the mediational effect of adaptation was in fact significant ( $z = 2.12$ ,  $p = .034$ ).

### Study 5: Adaptation and Creative Generation of Alien Drawings

Although Study 4 provided evidence that adaptation is an important underlying psychological mechanism responsible for the association between living abroad and creativity, this study was again correlational, rather than experimental, in nature. Thus, in Study 5, we ran an experimental study, randomly assigning participants who had previously lived abroad to one of four experimental priming conditions (one of which involved adapting to a foreign culture), then assessed the impact of such cognitions on subsequent creativity in an unstructured creative generation task: an *alien drawing task* (see Galinsky, Magee, Gruenfeld, Whitson, & Liljenquist, 2008; Kray, Galinsky, & Wong, 2006; Ward, 1994). We predicted that people primed with cognitions about adapting to a new culture would be more likely to create alien creatures that were very different from those found on Earth.

### Method

*Creativity task.* We used a creative generation task that involves drawing an alien creature. Following the procedure of Ward (1994), we asked participants to imagine going to another galaxy in the universe, visiting a planet that is very different from Earth, and encountering an alien creature there. Participants were then asked to draw this alien they encountered.

*Participants.* One hundred two undergraduates at a large university in France (41 men, 61 women) participated in exchange for a free movie ticket. As in Study 3, information about the experiment indicated that, for participants to be eligible, they needed to have lived abroad previously and be fluent in French. All participants in the final sample had lived abroad ( $M = 2.61$  years;  $SD = 4.79$ ). Eighty-two were French citizens, whereas 20 were citizens of foreign countries, including Albania (2), Belgium, Cameroon (3), Columbia, Congo, Estonia, Germany (2), Italy, Lebanon, Mexico, Romania (2), Russia (2), Switzerland, and the United Kingdom.<sup>8</sup>

*Procedure.* As in Study 3, participants were asked to fill out two questionnaires that were (ostensibly) part of two separate experiments: a cognitive generation experiment (which constituted the priming task), and a cognitive ability task (which constituted

Table 2  
*Personality/Demographic Predictors of Correct Solution to the Duncker Candle Problem, Study 4*

Personality/demographic variable	<i>B</i>	<i>SE</i>	Wald statistic	<i>p</i>
Time lived abroad	0.010	0.004	5.912	.015
Gender	0.029	0.499	0.003	.954
Age	0.049	0.092	0.284	.594
Extroversion	0.052	0.113	0.209	.647
Emotional stability	-0.077	0.111	0.488	.485
Openness to experience	0.282	0.161	3.072	.080
Agreeableness	0.208	0.183	1.295	.255
Conscientiousness	-0.110	0.114	0.935	.333
No. languages fluent	-0.449	0.285	2.488	.115
English first language	0.040	0.511	0.006	.937
No. countries lived	0.091	0.133	0.469	.494
Grades	0.266	0.227	1.375	.241
GMAT scores	-0.013	0.007	4.205	.040

*Note.* GMAT = Graduate Management Admission Test. Results presented are from Step 2 of the hierarchical regression. Beta coefficients are unstandardized.

<sup>7</sup> As in Study 2, course grades were made up of three components: participation, a paper, and a final exam.

<sup>8</sup> Unlike Study 3, in which we limited participation to French nationals, in Study 5, the creativity task was not related to verbal ability. Thus, we included non-French individuals who were fluent in French in the final sample.

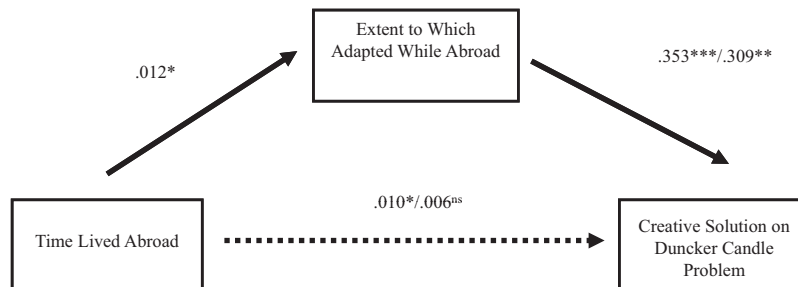


Figure 3. Mediation analyses, Study 4. Numbers represent unstandardized regression coefficients. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

our test of creativity). Participants in the control condition, however, received a separate cover story that the experiment was about cognitive ability; they did not receive the initial priming materials.

**Experimental conditions.** The cover story was identical to that in Study 3. Participants were randomly assigned to one of four experimental conditions. In the *adapt-prime* condition, participants were asked to imagine adapting themselves to a foreign culture and to write about the types of things that would happen, how they would feel and behave, and what they would think about during a particular day adapting themselves to a foreign culture. In the *observe-prime* condition, participants imagined and wrote about observing a foreign culture. We then added two different types of control conditions. In the *new sport-prime* condition, participants recalled and wrote about learning a new sport. This condition allowed us to present a condition that was similar to adaptation in novelty but that did not involve a foreign experience. In the *control* condition, participants received no priming materials, going straight to the drawing task.

Following the priming phase, participants were then asked to complete the alien drawing task. Finally, participants were asked a series of follow-up questions regarding their (a) confidence in completing the drawing task, (b) positive and (c) negative affect experienced, and (d) the extent to which they liked/disliked the drawing task. These questions were designed to further ensure that confidence, affect, and task-liking were not plausible alternative explanations for our final results. Finally, to empirically test whether other individual differences not explicitly measured in our correlational studies were plausible alternative explanations in this study, we asked participants to answer two items assessing their level of independence (e.g., “I tend to do my own thing”), two items assessing tolerance of ambiguity (e.g., “I don’t mind it when there’s not a clear answer”), two items assessing risk taking (e.g., “I tend to take risks”), 10 items assessing personal need for structure, which is negatively related to creativity (Neuberg & Newsom, 1993; e.g., “I don’t like situations that are uncertain”), four items assessing self-regulatory focus (e.g., “I focus on opportunities that will enhance my life”), and six items assessing intrinsic motivation (e.g., “What matters most to me is enjoying what I do”).

**Coding alien creativity.** Our main dependent measure was the creativity of the participants’ alien drawings. We had three coders, who were blind to the experimental hypothesis and priming condition, examine each of the aliens drawn and make independent judgments as to how creative the drawing was on a single unipolar scale, ranging from 1 (*not creative at all*) to 5 (*extremely creative*).

To capture specific aspects of creativity and novelty, we used a similar coding scheme to that used by Ward (1994) and Kray et al. (2006). The coders also made judgments as to (a) how similar the aliens were to Earth creatures, (b) the extent to which participants seemed to take known Earth creatures into account when making their drawings, and (c) the extent to which participants took general Earth animals into account when making their drawings. These responses were coded on 5-point unipolar scales, with options ranging from 1 (*not at all*) to 5 (*very much*). A second set of questions examined the extent to which aliens had atypical features. Following Ward (1994), we focused primarily on sensory organs (e.g., eyes, mouth, nose, ears), with atypicalities including (a) lacking a major sensory organ, (b) having atypical numbers of sensory organs (e.g., three eyes or two noses), (c) having an unusual configuration of the senses (e.g., eyes below the nose), (d) having an exaggerated or unusual ability (e.g., eyes acting as laser beams), and (e) having something that serves an atypical function (e.g., ears for protection).

Reliability between the three coders was acceptable across the different types of creativity ratings: overall alien creativity ratings ( $\alpha = .79$ ), atypicality of features (alphas between .86 and 1.0), and similarity to Earth creatures (alphas between .80 and .98; all  $ps < .001$ ). Thus, we collapsed ratings across the three coders to obtain overall estimates of creativity, similarity, and atypicality for use in subsequent analyses.

## Results

**Overall creativity of aliens.** To test whether the adaption prime temporarily facilitated creativity, we submitted overall creativity ratings to a one-way ANOVA and found the predicted significant main effect of experimental condition,  $F(3, 101) = 3.24, p = .025, \eta^2 = .090$ . Pair-wise mean comparisons indicated that participants in the *adapt-prime* condition ( $M = 3.55, SD = 0.71$ ) drew aliens that were significantly more creative than did participants in the other three conditions: the *observe-prime* condition ( $M = 2.81, SD = 1.05, F(1, 48) = 8.51, p = .005, \eta^2 = .153$ ); the *new sport-prime* condition ( $M = 2.96, SD = 0.88, F(1, 52) = 7.33, p = .009, \eta^2 = .126$ ); and the control condition ( $M = 3.04, SD = 0.97, F(1, 53) = 4.99, p = .030, \eta^2 = .088$ ). No other mean differences were significant (see Figures 4 and 5).

**Similarity to Earth creatures.** We next tested whether the experimental primes affected the similarity-to-Earth-creatures index and found the predicted significant effect for condition,  $F(3, 99) = 3.58, p = .017, \eta^2 = .101$ . Pair-wise mean comparisons

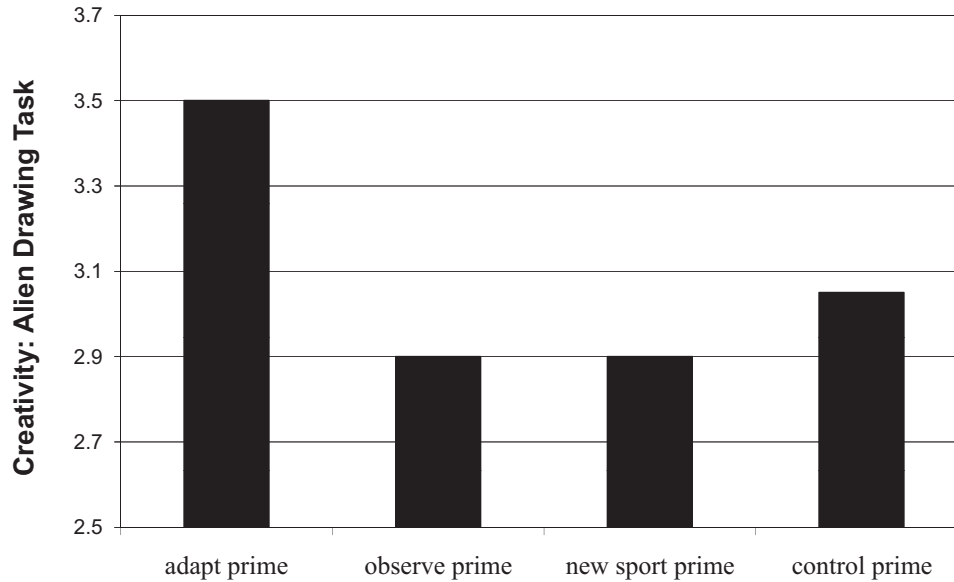


Figure 4. Mean creativity on the alien drawing task as a function of experimental condition, Study 5.

indicated that participants in the adapt-prime condition ( $M = 3.19$ ,  $SD = 1.32$ ) drew aliens that were significantly *less similar* to Earth creatures than did participants in the observe-prime condition ( $M = 4.48$ ,  $SD = 1.68$ ),  $F(1, 48) = 9.17$ ,  $p = .004$ ,  $\eta^2 = .163$ , and the control condition ( $M = 4.46$ ,  $SD = 1.80$ ),  $F(1, 52) = 8.75$ ,  $p = .005$ ,  $\eta^2 = .147$ . In addition, there was a marginal but nonsignificant difference between the adapt-prime condition and the new sport-prime condition ( $M = 3.85$ ,  $SD = 1.76$ ),  $F(1, 51) = 2.40$ ,  $p = .128$ ,  $\eta^2 = .046$ . No other mean differences were significant.

**Number of atypicalities.** A one-way ANOVA revealed that experimental primes affected the number of atypical features,  $F(3, 101) = 3.87$ ,  $p = .012$ ,  $\eta^2 = .106$ . Pair-wise mean comparisons indicated that participants in the adapt-prime condition ( $M = 2.77$ ,  $SD = 1.26$ ) drew aliens with a significantly larger number of atypicalities than did participants in the observe-prime condition ( $M = 1.70$ ,  $SD = 1.06$ ),  $F(1, 48) = 9.97$ ,  $p = .003$ ,  $\eta^2 = .175$ ; the sport-prime condition ( $M = 2.06$ ,  $SD = 1.22$ ),  $F(1, 52) = 4.23$ ,  $p = .045$ ,  $\eta^2 = .077$ ; and the control condition ( $M = 1.93$ ,  $SD = 1.16$ ),  $F(1, 53) = 6.51$ ,  $p = .014$ ,  $\eta^2 = .111$ . No other mean differences were significant.

**Posttest questions.** Finally, we assessed whether confidence, positive/negative affect, or task liking were systematically different across conditions. However, analyses revealed no systematic differences in any of these four variables across conditions (all  $ps > .26$ ). In addition, no differences emerged across condition with regard to participants' independence, risk seeking, tolerance of ambiguity, need for structure, regulatory focus, or intrinsic motivation (all  $ps > .27$ ), suggesting that random assignment of participants to conditions evenly distributed any preexisting differences across conditions.

Overall, then, creatures drawn by participants in the adapt-prime condition had more atypical sensory features, were less similar to Earth creatures, and were overall more creative than those drawn by participants in the other conditions, suggesting that recreating the adaptation experience temporarily facilitated creative generation.

## General Discussion

The current research explores a timely and important topic—whether living abroad is associated with creativity. Although previous research has made a case for the importance of multicultural experience and exposure for the creative process (Leung et al., 2008), the present research offers the first empirical evidence documenting the robust link between living abroad and creativity. We consistently found this relationship across five studies, using both correlational and experimental methods on four distinct measures of creativity, and across an array of participant samples, including MBA and undergraduate samples in both the United States and Europe.

The more time participants had spent living abroad, the more likely they were to find the hidden, correct solution to the Duncker candle problem (Studies 1 and 4) and the more likely they were to find a hidden but necessary solution in a negotiation task (Study 2). It is important to note that we found that living, but not traveling, abroad was associated with creativity, and this effect occurred independently of a number of personality variables and other possible confounding factors (e.g., cognitive ability). An experimental study (Study 3) provided evidence that mentally accessing the experience of living abroad in a priming paradigm temporarily enhanced creativity among those who had previously lived abroad. In addition, in this study, the highest levels of creativity were observed in the living-abroad prime condition for those who had lived abroad the longest. Studies 4 and 5 demonstrated the importance of adaptation in explaining this link. Study 4 found that the degree to which individuals reported adapting themselves to the local culture mediated the relationship between living abroad and creativity, and Study 5 showed that priming individuals who had lived abroad to think about adapting to a new country produced temporary enhancements in creative tendencies on a creative generation task. Overall, our results suggest that the experience of living abroad, as well as the specific attitudes and approaches

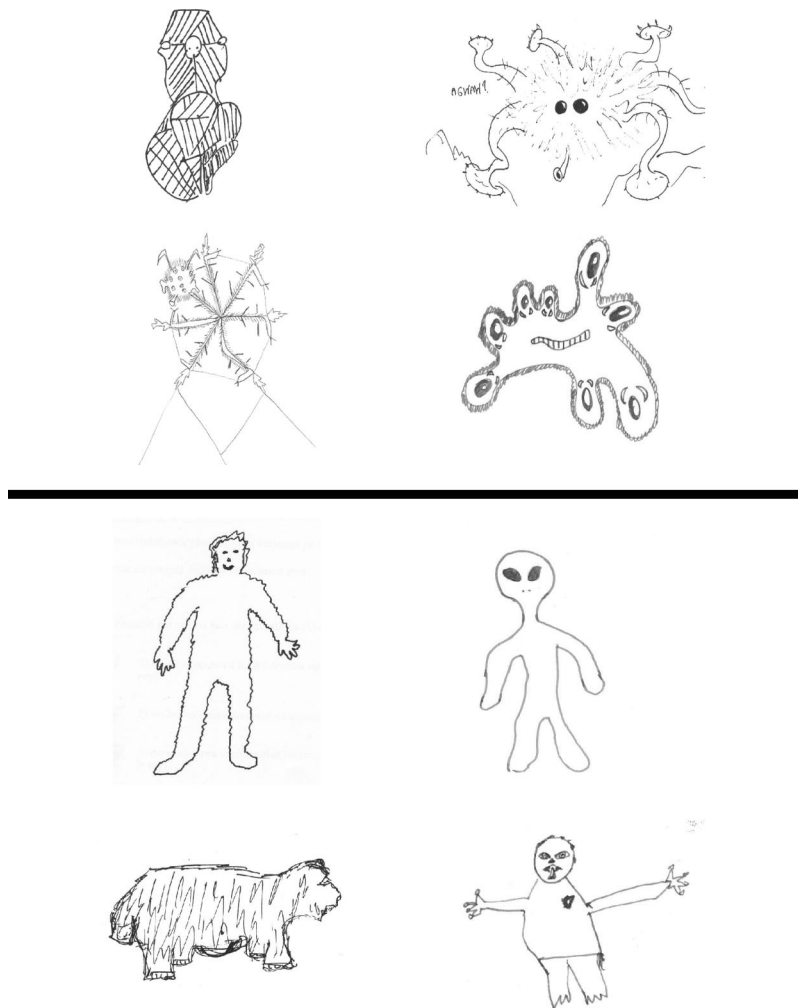


Figure 5. Examples of aliens, Study 5. Top panel includes aliens judged highly creative. Bottom panel includes aliens judged not creative.

individuals take during their foreign culture experiences, are significant predictors of creativity.

### Contributions

We believe that one of the most significant contributions of the present research is to provide an important first step in a research domain that is highly relevant to the increasingly globalized and interconnected world of the 21st century. Internationalization and innovation are two of the topics most widely written about in the popular press today, with some arguing that increasing globalization or “flattening” of the world necessarily creates strong educational and economic incentives for individuals and nations to continuously innovate to stay competitive (T. L. Friedman, 2005). The link between multicultural experience and creativity has a number of important implications for education, business, and policy, as well as for a range of institutional practices such as study abroad programs and international assignments (Leung et al., 2008). The results from the current article offer the first empirical demonstrations of the association between living abroad and cre-

ativity, as well as evidence for the important role of adaptation. However, given the fact that these studies are the first to explore this phenomenon, future research is needed to fully appreciate the nature and consequences of this relationship and to resolve some important limitations inherent in the present studies (Maddux, Leung, Chiu, & Galinsky, 2009).

### Limitations and Directions for Future Research

We acknowledge that the current data do not demonstrate that living abroad causes permanent changes in trait-based creativity. The three correlational studies presented here only show a very reliable association between living abroad and creativity. In addition, although the two experimental studies suggest that recreating the living and adapting experiences via priming can temporarily enhance creativity (i.e., the state of being creative), it remains to be shown whether foreign living experiences directly enhance permanent changes in creative ability (i.e., the trait or disposition of being creative). Although some evidence exists that certain types

of immersive experiences, such as intensive learning, can actually change the way the brain is wired (e.g., Draganski et al., 2006; Maguire et al., 1999), other researchers posit that traits are biologically determined and may be constant throughout the life span (e.g., McCrae & Costa, 1999).

In addition, the current studies cannot rule out the reverse pathway: that creative people may be more likely to live abroad than noncreative people, a plausible possibility that we noted in the introduction. However, although we acknowledge that creative people may indeed be especially likely to live abroad, we believe that the effects of living abroad are not simply a proxy for creative personality, and that our results suggest the experience of living abroad seems to be important in and of itself. First, if creative people are more likely than noncreative people to live abroad, it stands to reason that they would also be more likely to travel abroad, but we found no positive relationships between travel abroad and creativity in any of our correlational or experimental studies. In addition, if living abroad was simply a proxy for creative personality, then Studies 3 and 5, in which living abroad and adaptation were primed, would have shown no effects across experimental conditions (because all participants had previously lived abroad and, thus, would possess creative personalities according to this explanation). Yet only participants primed with experiences of living and adapting abroad showed enhanced creativity, suggesting a unique link to actually living and adapting abroad. Finally, in Studies 2 and 4, we controlled for a number of personality factors found in creative individuals, and controlling for such factors (such as openness to experience) did not eliminate the relationship between time abroad and creativity.

To directly test whether living abroad causes permanent and enduring changes in creativity, however, will require new designs and methods. For example, a longitudinal study that measures creativity at Time 1, before individuals go abroad, and at Time 2, after individuals have lived abroad, while controlling for many important personality factors associated with creativity, would be an ideal method for testing this possibility. For these types of studies, researchers may seek organizations that allow employees to go on international assignments or educational institutions that have study abroad programs. Researchers may also seek out natural experiments, ones in which organizations randomly assign individuals to go abroad or not (e.g., the military), or in which only some individuals from a group of volunteers are assigned to go abroad while a second group of volunteers remains in their country of origin. Researchers could also examine whether there are any creative differences between individuals who have lived abroad voluntarily (e.g., on a student exchange) and those who did not choose to live abroad (e.g., because of a family move). Such comparisons could provide evidence for or against the possibility that creative people are more likely to live abroad and could better determine the strength of the association between living abroad and creativity. Overall, these studies will be able to pit the two alternatives directly against each other (does living abroad lead to creativity, are creative personality types simply more likely to live abroad, or are both correct?) and see what explanation best fits the data.

Another limitation is that the three correlational studies in the present paper did not control for some personality factors previously shown to be associated with creativity (e.g., risk-taking, ambition, confidence, and intrinsic motivation; see Feist, 1999;

Simonton, 2000). Future research should ensure that nonexperimental, correlational studies control for the full range of personality variables previously found to be associated with creativity. However, we believe that certain factors at least minimize this concern. First, our samples of students in the correlational studies were at elite graduate MBA institutions, suggesting likely ceiling effects for variables like confidence, ambition, risk-taking, and intrinsic motivation, which have been shown to be higher for MBAs than in the more general population (Whittingham, 2006). Second, previous research has demonstrated that the Big Five may actually subsume many of these unmeasured variables. For example, openness to experience encompasses experimenting and independence, whereas emotional stability encompasses confidence (Johnson & Ostendorf, 1993). Thus, measuring the Big Five at the least indirectly takes into account some of these personality variables. Third, the experimental nature of Studies 3 and 5 further minimizes such concerns, as any personality differences were equally distributed across conditions because of random assignment (which was empirically verified by measuring these variables in Study 5). Nevertheless, it is important for future researchers to continue to explicitly control for personality variables that have been previously shown to be associated with creativity to ensure the robustness of the current effects.

The current research also looked only at cultural differences across nations, and thus, it would also behoove researchers to look at creative enhancement for individuals who had lived in different cultural areas within the same country. Within a country like the United States, for example, it is possible that individuals who were raised in the southern United States within a "culture of honor" (e.g., Nisbett & Cohen, 1996) but who later lived in more northern areas of the United States may also benefit creatively from being exposed to different cultural traditions. In addition, researchers should also explicitly explore cultural distance as a potentially important component (e.g., how similar or different host cultures are from individuals' home cultures). It may be that the particular location, experience, and cultural differences present in the host culture compared with one's home culture are all critical to deriving a creative benefit from such experiences. However, we did not find any effect of cultural distance in Study 3, a result consistent with work in the organizational behavior literature that has typically found either a nonsignificant relationship or a significant but negative relationship of cultural distance/novelty on expatriate adjustment and success in international job assignments (e.g., Black, Mendenhall, & Oddou, 1991; Black & Gregersen, 1991a, 1991b; Gregersen & Stroh, 1997). Thus, the link between living abroad and creativity may be most apparent at lower or more moderate levels of cultural distance. In addition, cultural distance effects may depend on specific psychological dimensions of individuals' home and host cultures. For example, individuals from countries high on uncertainty avoidance (Hofstede, 1980) may do less well on foreign sojourns than individuals from countries low in uncertainty avoidance. Thus, researchers should examine cultural distance and different cultural dimensions of individuals' home and host countries more explicitly going forward.

Finally, it will be important for future researchers to explore the current phenomenon from an interactionist perspective, by explicitly taking into account the possible interactions between major personality variables and foreign experiences. Many theories of creativity posit that certain personality, intellectual, and situational

factors need to be present to maximally stimulate the creative process (e.g., Sternberg, 1985). It could be that personality and situational effects are additive, such that individuals with creative personalities are the ones who derive the most benefit from experiences living abroad. Alternatively, it is possible that future research may show that foreign experiences are most beneficial for those who are not already gifted creators. These investigations will yield a clearer picture of how foreign living experiences can enhance creativity.

### Conclusions

Although it is said that travel broadens the mind, in the current studies, we found a robust relationship between living in and adapting to foreign countries and creativity. This research provides a critical first step toward understanding how foreign living experiences are associated with creativity, with both experience abroad and creativity being particularly significant as the world becomes more globally oriented and interconnected. Indeed, in late 2008, a financial crisis that began with bad mortgages in the United States spread globally, sending stock markets plunging and leading centuries-old banks and at least one nation (Iceland) into insolvency. Such an event underlies the increasing need to find creative solutions to the unprecedented challenges of globalization. Thus, future research with more diverse and varied methodologies should continue to explore the relationship between living abroad and creativity. It may be that those critical months or years of turning cultural bewilderment into concrete understanding may instill not only the ability to “think outside the box” but also the capacity to realize that the box is more than a simple square, more than its simple form, but also a repository of many creative possibilities.

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