

## On the Cognitive Benefits of Cultural Experience: Exploring the Relationship between Studying Abroad and Creative Thinking

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*Summary:* Drawing from research that shows a positive relationship between multicultural experiences and creative cognition, the present study investigates creative thinking as a possible cognitive benefit gained from studying abroad. The domain generality and specificity of creative thinking is also explored. Undergraduate students completed a general measure and a culture specific measure of creative thinking. Performance on the two creative thinking tasks were compared between students who have studied abroad, students who are planning to study abroad, and students who have not and do not plan to study abroad. Results showed that students who studied abroad outperformed the two groups of students who did not study abroad on both the general and culture specific measures of creative thinking. Findings from this study provide evidence that studying abroad supports complex cognitive processes that underlie creative thinking in culture specific and domain general settings. Copyright © 2012 John Wiley & Sons, Ltd.

### INTRODUCTION

Student populations in American schools increasingly represent more ethnically and culturally diverse groups (McCabe, 2001). Currently, approximately 30% of the US population is made up of ethnic minorities, and this trend towards diversity is on the rise (U.S. Census Bureau, 2010). Consequently, developing students' awareness and understanding of different worldviews is of significant importance in order to prepare them with the knowledge and skills to meet the demands of today's globally connected world (Carlson & Widaman, 1988; McCabe, 2001). Although the need for cultural studies has been recognized for some time, the implementation of effective cultural development curricula has been limited (Kitsantas, 2004; McCabe, 2001). One area promoting the development of students' cultural awareness can be found in study abroad programs.

Study abroad programs constitute all educational programs that occur in a foreign country outside of the geographical boundaries of the country of origin, offering students the opportunity to earn academic credit through international experiences (Carlson & Widaman, 1988; Kitsantas, 2004). Researchers have found that study abroad programs benefit students in various ways, including increased international knowledge and understanding of global issues (Carlson & Widaman, 1988), a more mature and objective perception of their home and foreign countries (Cushner & Karim, 2004; Kitsantas, 2004), complex intercultural communication skills (Langley & Breese, 2005; Williams, 2005), and increased reflective thought, self-reliance, and self-confidence (McCabe, 1994; 2001).

Much of the work on the positive outcomes of study abroad programs has relied on students' self-reported affective benefits (e.g., feelings towards foreign countries and perceptions of personal well-being) and increase in intercultural awareness. In contrast, research exploring the relationship

between studying abroad and possible cognitive benefits remain largely underdeveloped. This link is important to study because the ability to engage in cognitively complex tasks with regard to cultural information is becoming an increasingly valuable skill to acquire in today's globally connected society. The purpose of this study is to empirically investigate the cognitive benefits of studying abroad, focusing specifically on the relationship between experiences in new cultures and general as well as culture specific creative thinking. The following section provides a brief overview of the field of creativity research, situating the present study in the creativity and multiculturalism literature.

### LITERATURE REVIEW

#### The creative press and the creative process

The rise in creativity research is often attributed to Guildford's (1950) presidential address to the American Psychological Association, in which he advocated for the scientific inquiry of topics related to creativity (Beghetto & Kaufman, 2007). Psychological research in creativity has been ongoing for over six decades, applied across a wide range of disciplines including developmental studies, education, business sectors, and clinical psychology (Plucker, Beghetto, & Dow, 2004). However, agreeing upon a precise, operational definition of creativity remains a challenge (Feldhusen & Goh, 1995; Plucker et al., 2004; Mumford & Gustafson, 1988). Although there is a general consensus among creativity researchers that creativity results in an idea or work that is both novel and practical, the manner in which the term creativity has been applied varies widely from study to study (Batey & Furnham, 2006; Mumford, 2003; Runco, 2004). For example, a content analysis of published definitions of creativity documents a wide range of standards including uniqueness, usefulness, artistic quality, and accessibility (Plucker et al., 2004). In general, research supports the view that creativity is a multidimensional construct for which many different definitions have been applied.

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In addition, research in creativity is multifaceted. Researchers have explored various aspects of creativity including but not limited to cognition (e.g., Finke, Ward, & Smith, 1992; Ward, Smith, & Finke, 1999; Ward, Smith, & Vaid, 1997), personality (e.g., Charmorro-Premuzic, 2006; MacKinnon & Hall, 1971), motivation (e.g., Amabile, 1996), and environment (e.g., Csikszentmihalyi, 1988) (see Barron & Harrington, 1981; Batey & Furnham, 2006; Runco, 2004; Simonton, 2000; Sternberg 2005, 2006 for reviews). Rhodes (1961/1987) developed a model that broadly organizes creativity research into four themes: the creative person (personality characteristics and motivational states), the creative process (creative thinking and production), the creative product (criteria for creative products), and the creative press (environmental influences). Although much of the existing creativity literature is segmented along these broad categories, contemporary creativity researchers are moving towards a more ecological approach of investigating the interactions between elements of creativity (Isaksen, Puccio, & Treffinger, 1993; Mumford *et al.*, 1991). Comprehensive theories conceptualizing the construct of creativity, such as Amabile's (1983) componential framework of creativity, Csikszentmihalyi's (1988) systems approach theory, and Sternberg and Lubart's (1991, 1996) Investment Theory of Creativity, highlight the complex interactions between various components of creativity. Common to these theories is the inclusion of the interactions between personal variables (e.g., domain relevant skills, cognitive ability, personality) and environmental factors (e.g., experiences, social institutions, historical events, cultural worldviews) that influence the development of creative production. With the ecological approach to studying creativity in mind, the present study is designed to investigate the relationship between the creative press and the creative process.

### **Creative cognition within the cultural domain**

The field of creative cognition focuses on identifying the fundamental cognitive processes underlying creative thought. Cognitive processes such as extending pre-existing concepts, considering diverse possibilities, synthesizing remote associations, and mentally manipulating ideas have been identified as important features of creative thought (Finke, 1990; Finke *et al.*, 1992; Ward *et al.*, 1997, 1999). Researchers in this field have also found that procedural (i.e., 'how to') and declarative (i.e., factual) knowledge support creative thinking by providing direction and requisite information to redefine problems, generate unconventional ideas, and evaluate and apply novel ideas (Brophy, 1998; Runco & Chand, 1995).

Researchers have identified a link between the accumulation of culturally relevant procedural and declarative knowledge and creative thinking processes. For example, Benet-Martinez, Lee, and Leu (2006) proposed a culture specific theory of creative thinking in which a process they refer to as cultural frame switching is believed to engage complex cognitive processes that enhance creative thinking. According to this theory, people who have adapted two or more cultures mentally navigate between different cultural knowledge

schemas. Cultural knowledge schemas or frames include learned practices (e.g., eating habits), values (e.g., laws, customs), and beliefs (e.g., religious or spiritual) that individuals habitually apply in a broad range of situations (Lubart, 1990; Tadmor & Tetlock, 2006). Cultural frame switching is believed to have meaningful cognitive consequences such as increasing people's mental flexibility in detecting, processing, and organizing everyday cultural information in more innovative ways (Benet-Martinez *et al.*, 2006).

Similarly, when immersed in an unfamiliar environment, the cultural scripts that are activated from a person's primary culture may not be applicable or even contradictory in the new setting (Tadmor & Tetlock, 2006). The cognitive dissonance experienced as a result of the conflict between one's familiar cultural script and the foreign cultural script prompts complex cognitive and behavioral modifications in order to adapt a new set of cultural knowledge and traditions (Leung & Chiu, 2010; Tadmor, Tetlock, & Peng, 2009). This process of adaptation has been linked to cognitive complexity and flexibility associated with creative thinking, including the ability to recognize, generate, and synthesize seemingly unrelated cultural information in novel ways (Leung & Chiu, 2010; Leung *et al.*, 2008; Tadmor & Tetlock, 2006; Tadmor, Tetlock, & Peng; 2009). In sum, because of their dual perspective, culturally diverse individuals are believed to have more complex and integrative cultural representations that support creative thinking in multicultural environments.

### **Multicultural experiences and creative thinking**

Multicultural experience is operationalized as time spent living abroad, and having extensive interactions with members of foreign cultures (Leung *et al.*, 2008). Multicultural experiences, such as studying abroad, are quantitatively and qualitatively different experiences when compared with travels or short visits, which provide only a superficial introduction to a new culture (Leung *et al.*, 2008).

Research investigating the relationship between multicultural experience and creativity shows that individuals who have lived or studied abroad demonstrate increased interest in travel, art, foreign languages, history, and architecture (Carsello & Greaser, 1976). These interests indicate a high valuation of esthetics, which is a frequently cited characteristic of creative individuals (Barron, 1953; Barron & Harrington, 1981; MacKinnon & Hall, 1971). More directly, researchers empirically examining the link between multicultural experiences and creativity have found that multicultural exposure is significantly related to greater creative performance. For example, watching a slideshow of fusion cultures (Leung & Chiu, 2010), reported interactions with family and friends from a different culture (Leung & Chiu, 2010), working in diverse groups or teams (McLeod, Lobel, & Cox, 1996), and learning a new language (Kessler & Quinn, 1987; Kharkhurin, 2007; Pearl & Lambert, 1962; Ricciardelli, 1992) have all been linked to producing more unconventional, complex, and original ideas on creativity tests. These findings indicate that exposure to different cultural worldviews support cognitive processes underlying creative thought, including the extension and combination of conceptual boundaries and flexibility in recruiting and synthesizing information from distally

related frameworks (Benet-Martinez et al., 2006; Leung & Chiu, 2010; Tadmor et al., 2009).

The purpose of the present study is to contribute to the body of research exploring the relationship between multicultural experiences and creative thinking. Our study is an extension of previous studies that have examined multicultural experiences through short-term and indirect methods (e.g., showing images that represent a different culture). In this study, we examined students who have studied abroad, which in contrast to previous methods, is a multicultural experience that involves an in-depth physical, cognitive, and affective immersion in a foreign culture over an extended period (Carlson & Widaman, 1988; McCabe, 2001). In addition, previous studies that showed a link between multiculturalism and creativity have focused on a sample of participants primarily from one ethnic background. By sampling from a group of students who have studied abroad, this study allows for the study of multicultural experiences and creativity among individuals from a broad range of ethnic backgrounds.

### Is creativity a domain general or a domain specific construct?

To fully explore the link between cultural experiences and creativity, a theoretical issue regarding the nature of creativity must also be considered. An ongoing debate in creativity research is whether creativity is best characterized as a domain general or a domain specific construct (Baer & Kaufman, 2005; Weisberg, 2006). Theorists who hold a domain general position believe that individuals' creativity in one context will generalize to other contexts. Much of the evidence for domain generality is based on psychometric studies of creativity that rely on a battery of commonly employed divergent thinking tests (e.g., the Consequences Test, Guilford, 1950; the Torrance Test for Creative Thinking; TTCT, Torrance, 1966). Divergent thinking tests require individuals to generate as many responses as possible to a specific stimulus (Plucker & Renzulli, 1999), which are scored along several dimensions such as fluency, originality, flexibility, and elaboration (Torrance, 1966). Self-report measures have also been employed to assess general creativity [e.g., Hocevar's (1976) self-report questionnaire]. Currently, psychometric studies of creativity form the foundation of our understanding of domain general creativity (Batey & Furnham, 2006; Plucker & Runco, 1998).

Theorists who adopt a domain specific position posit that individuals' creativity in one context does not generalize to other contexts. Recent studies investigating creative ability in various domains provide evidence for this view (e.g., Baer, 1996, 1998; Feist, 2004; Hong & Milgram, 2010; Mumford et al., 2010). Findings from these studies show low correlations between ratings of creative products in different domains (Baer, 1996; Runco, 1989), selective increases in creative performance on tasks specific to the domain of training (Baer, 1996), a positive influence of knowledge and experience on divergent thinking tests that targeted the same domain (Rietzschel, Nijstad, & Stroebe, 2007; Runco, Gayle, & Smith, 2006), varying degrees of creativity depending on classes of domains (Silvia, Kaufman,

& Pretz, 2009), domain specificity in self-perceptions of creative abilities (Kaufman, 2006), and evidence for domain specific impacts of schooling and cultural experience on creative problem solving (Hong & Milgram, 2010; Mumford et al., 2010). Research on the development of expertise also supports the domain specific view. Studies comparing experts to novices show that superior creative performance across different domains is due to the selective accumulation of skills and knowledge acquired through deliberate practice (Chi, Feltovich, & Glaser, 1981; Ericsson & Charness, 1994; Rikers & Paas, 2005).<sup>1</sup>

Findings on whether the influence of cultural experience on creative thinking is domain general or domain specific are mixed. In a series of studies conducted by Leung and colleagues (2008, 2010), participants with greater multicultural experience demonstrated higher creativity on domain general creativity tasks (e.g., generating unusual uses for a garbage bag, unconventional gift-giving ideas, and exemplars of occupations) indicating a positive relationship between multicultural experience and general creativity. Research investigating biculturals, individuals who have internalized two cultural frameworks, have also found that biculturals demonstrate greater creative thinking abilities compared with their monocultural counterparts (Benet-Martinez et al., 2006; Hong & Chiu, 2001; Tadmor et al., 2009). However, in support for the domain specific view, findings from these studies also showed that the difference between biculturals and monoculturals were most pronounced on tasks that were specific to the cultural domain (e.g., written description of pictures of Chinese landscapes) (Benet-Martinez, et al., 2006; Tadmor et al., 2009). Altogether, the effects of cultural experiences on domain general and specific creative thinking remain unclear.

Finally, some theorists take a hybrid position on the debate of domain generality and specificity, arguing that creativity is both domain general and domain specific (Amabile, 1996; Baer & Kaufman, 2005; Sternberg & Lubart, 1991, 1996). Theorists who hold the hybrid position offer several propositions for this view. For example, it has been suggested that different abilities converge to produce creative outcomes (Gardner, 1983, 1999), creative potential is present in any domain but creative production occurs in the domain in which time and energy is committed (Plucker & Beghetto, 2004), and creativity is composed of separate domain general and domain specific abilities (Sternberg & Lubart, 1996). Even among domain general and domain specific theorists, it is recognized that some general abilities (e.g., intelligence, motivation) play a role in all creative pursuits, regardless of the field in which creativity is being expressed. (Baer & Kaufman, 2005). Therefore, in

<sup>1</sup> A point to note is that within the ongoing debate of domain generality and specificity, another issue that has yet to be resolved is the uncertainty surrounding the definition of a 'domain' (Baer & Kaufman, 2005). The term domain has been used in reference to multiple intelligences (Gardner, 1999), domains of mind (Feist, 2004), professional fields (e.g., engineering, psychology, music) (Leman, 2005; Simonton, 2000), and general thematic areas (Baer & Kaufman, 2005). Kaufman (2006) and colleagues have developed a self-report measure of creativity (i.e., Creativity Domain Questionnaire) in which they identified as many as 56 separate domains, including a domain called 'Travel/Interacting with Different Cultures' (p. 1082). In this study, the potential domain of cultural creativity is explored.

Table 1. Breakdown of gender, age, and ethnicity by condition

Condition ( <i>N</i> = 135, <i>n</i> = 45)	Gender		Age		Ethnicity				
	Male	Female	<i>M</i>	<i>SD</i>	White/Caucasian	Black/African American	Hispanic/Latino	Asian/Pacific Islander	Other
Study Abroad	12	33	21.02	3.79	22	4	9	8	2
Plan to Study	9	36	19.49	1.27	28	8	4	3	2
No Plan to Study	10	35	20.29	2.25	31	6	3	3	2
Total	31	104	20.27	2.44	81	18	16	14	6

addition to exploring the relationship between cultural experiences and creative thinking, the present study also aims to contribute to the ongoing discussion concerning the domain general versus domain specific nature of creativity.

Altogether, the present study integrates three separate but related fields of study: the benefits of study abroad programs, the relationship between cultural experiences and creative thinking, and the exploration of the domain general and domain specific nature of creative thinking. Specifically, we sought to investigate the link between cultural experiences gained from studying abroad and creative thinking on a domain general and a culture specific creativity task.

## HYPOTHESES

On the basis of the literature reviewed, the following three hypotheses were tested:

1. Students who have studied abroad will produce higher quality creative responses compared with students who have not studied abroad on the *Cultural Creativity Task* (CCT; Lee, Therriault, & Linderholm, 2011) (a cultural specific creativity task).
2. Students who have studied abroad will not produce higher quality creative responses on the *Abbreviated Torrance Test for Adults* (ATTA; Goff & Torrance, 2002) (a general creativity task) compared with students who have not studied abroad.
3. Students who have not studied abroad but plan to study abroad will not produce higher quality creative responses on the CCT, and the ATTA will not differ compared with students who have not and are also not planning to study abroad. This comparison accounts for the possible differences between students who are and students who are not interested in studying abroad that may influence their performance on the culture specific creativity task.

## METHOD

### Participants

A total of 135 students from a large southeastern university participated in the present study. The students were recruited from the university's International Center and Department of Tourism by means of the study abroad listserv as well as from an online research participant pool. On the basis of

Table 2. Breakdown of grade point average and Scholastic Achievement Test scores by condition

Condition ( <i>N</i> = 45, <i>n</i> = 15)	GPA		SAT	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Study Abroad	3.51	.53	1139	199
Plan to Study	3.19	.39	1198	126
No Plan to Study	3.48	.46	1269	87
Total	3.39	.48	1202	151

responses provided in the demographics questionnaire, 45 students who have studied abroad, 45 students who have not studied abroad but are planning on studying abroad, and 45 students who have not studied abroad and are not planning on studying abroad were categorized in a Study Abroad, Plan to Study, and No Plan to Study group, respectively. In order to control for possible pre-existing differences between the three conditions, additional comprehensive demographic data including participants' gender, age, and ethnicity were collected from 135 students. Table 1 presents a breakdown of these demographic data by condition. In addition, the grade point average (GPA) and Scholastic Achievement Test (SAT) scores were collected from 45 participants (15 in each group).<sup>2</sup> Table 2 presents the GPA and SAT scores by condition. Chi-square tests of independence showed that ethnicity and gender were not dependent on group membership,  $\chi^2(8, N=135)=5.99$ ,  $p=.65$ ,  $\chi^2(2, N=135)=.586$ ,  $p=.75$ , respectively. In addition, one-way ANOVAs did not reveal any significant differences in GPA [ $F(2, 42)=2.24$ ,  $p=.12$ ] or SAT scores [ $F(2, 42)=3.03$ ,  $p=.06$ ] across the three groups,  $p < .05$ . Taken together, these analyses indicate that the three groups did not differ significantly in regard to gender, ethnicity, and indices of academic achievement.

### Measures

Participants completed two measures of creativity and a demographics questionnaire. The ATTA (Goff & Torrance, 2002) was administered to assess domain general creative thinking, and the CCT (Lee, Therriault, & Linderholm, 2011) was administered to assess culture specific creative thinking. Previous studies have shown that when domain general divergent thinking tests are tailored to be more

<sup>2</sup> GPA and SAT scores were collected from an additional sample consisting of 45 participants.

domain specific, such tests improved the ability to detect creative ability within that domain (Barron & Harrington, 1981; Brophy, 1998). Therefore, the CCT was developed from the ATTA (Goff & Torrance, 2002), a widely used measure of divergent thinking, in order to assess creative thinking specific to the domain of cultural creativity.

*The Abbreviated Torrance Test for Adults (ATTA; Goff & Torrance, 2002)*

The ATTA is a measure for assessing general creativity adapted from the Torrance Tests of Creative Thinking (TTCT; Torrance, 1966). The TTCT has been reviewed and found to be a reliable and valid measure of creativity (Kim, 2006). The ATTA contains three 3-minute verbal and figural tasks from the TTCT. In the verbal task (Activity 1), participants are asked to identify the troubles they might encounter if they could walk on air or fly without being in an airplane or similar vehicle. In the picture completion task (Activity 2), participants are presented with two incomplete figures and asked to draw pictures with the figures. Finally, in the picture construction task (Activity 3), participants are presented with nine identical isosceles triangles arranged in a 3 × 3 matrix and asked to draw pictures using the triangles.

The ATTA is scored on four norm-referenced measures and 15 criterion-referenced indicators (Goff & Torrance, 2002). The four norm-referenced measures include fluency (number of pertinent ideas), originality (unconventionality or uniqueness of ideas), elaboration (details or embellishments of ideas), and flexibility (different representations of ideas). Each of the four norm-referenced measures is scored according to the ATTA manual developed by Goff and Torrance (2002). For scoring fluency on all three activities, one point is given for each pertinent response (Activity 1) or pertinent figure (Activities 2 and 3). For scoring originality on all three activities, participants' responses are compared with the manual's list of common responses (e.g., air sickness, get cold for Activity 1; hand, head of an animal for Activity 2; hat, pyramid, roof of a house for Activity 3). Each participant generated response that is not present on the list receives one point for originality. Similarly, for Activities 2 and 3, the criteria for awarding elaboration points are listed in the manual (Goff & Torrance, 2002). One elaboration point is given for each detail added to the original stimulus figure, such as shading (e.g., filling in pupils in eyes of a face), decoration (e.g., confetti falling on a party hat), variation of the design (e.g., drawing pants on a male stick figure and a dress on a female stick figure), and elaboration of the title beyond the minimum description (e.g., 'scary circus clown'). Finally, for scoring flexibility in Activity 3, one point is given every time a triangle is used differently (e.g., triangle defines object with no external appendages, with substantial appendage from one side, with appendage from one point). A total of 14 possible uses of the triangles are listed in the manual (Goff & Torrance, 2002). The fluency, originality, elaboration, and flexibility ratings are summed across the three tasks and converted on a scale that was developed using the conventional stanine scale consisting of a 9-point normalized standard score from 11 (*low*) to 19 (*high*), centered at 15 (Goff & Torrance, 2002). The normalized scaled scores are summed to produce a total scaled score. There are fifteen criterion-referenced creativity

indicators (e.g., richness and colorfulness of imagery, expressions of feelings and emotions, movement and/or sound, abstractness of titles), each scored on a three-point scale: 0 (*absence*), 1 (*strong evidence*), and 2 (*stronger evidence*) (Goff & Torrance, 2002). Each criterion-referenced creativity indicator is defined and illustrated in the manual. For example, for scoring movement and/or sound in Activities 1 and 2, a score of 1 is given for one occurrence of movement and sound (e.g., running, kicking, screaming, cheering), and a score of 2 is given if there are two or more occurrences in the figures (Goff & Torrance, 2002). In another example, one point is given if there are two indications of richness and/or colorfulness of imagery (e.g., variety, vividness, liveliness, and intensity), and a score of 2 is given if there are three or more indications in the figures (Goff & Torrance, 2002). The composite of total scaled scores from the norm-referenced measures plus criterion-referenced indicators combine to yield a Creativity Index (CI) ranging from 44 to 106 points. The CI is rescaled, and reported as a creativity level ranging from 1 (*minimal*) to 7 (*substantial*) (Goff & Torrance, 2002). Evidence for the predictive and discriminant validity of the ATTA has been reported in recent studies (e.g., Althuizen, Wierenga, & Rossiter, 2010; Kharkhurin & Motalleebi, 2008). The norms reported in the ATTA manual are based upon adults who had completed the D-TTCT prior to the year 2000. The manual reports the Kuder-Richardson (KR21) reliability coefficient of .84 for the total raw score for the four creative abilities, and .90 for the total raw score plus the creativity indicators score. Interrater reliabilities range from .95 to .99 (Goff & Torrance, 2002). Interrater reliability for the CI scores in the present study was  $r = .98$ . Once all 135 ATTA were coded, the two coders met to discuss any remaining disagreements and determined a final score for the ATTA tasks.

*The Cultural Creativity Task (CCT; Lee, Therriault, & Linderholm, 2011)*

The CCT consists of five 3 minute culture specific activities (Appendix A). The instructions for the CCT were adapted from the verbal activity in the ATTA, which clearly direct participants to be creative in their responses. Including instructions to be creative have shown to enhance the validity of creativity scores (Harrington, 1975; Runco & Okuda, 1988; Silvia et al., 2008). Similar to self-developed culture specific creativity measures employed in previous studies (e.g., Benet-Martinez et al., 2006; Charmorro-Premuzic, 2006; Leung et al., 2008; Leung & Chiu, 2010; Taylor, Berry, & Block, 1958), the CCT requires participants to generate as many ideas as possible to an open-ended activity that targets culturally relevant knowledge and skills. The prompt for each activity was located at the top of an 8.5 × 11 in. piece of paper. The first activity was adapted from *The Tourism Problem* (Taylor et al., 1958), previously employed to study the relationship between ethnic diversity and creativity in small groups (McLeod, et al., 1996). The Tourism Problem was chosen because of the international focus of the task. The additional four activities were developed to provide a more comprehensive measure of culture specific creative thinking including activities that target various aspects of cultural knowledge and skills (international awareness, social and ethnic identity, food,

and entertainment). The four activities included generating responses to the following scenarios: waking up with a different skin color (Activity 2), demonstrating high social status (Activity 3), developing new dishes using exotic ingredients (Activity 4), and creating a product that will have universal appeal (Activity 5). The purpose of including the four activities in the CCT was to target creative thinking regarding values, practices, and artifacts of various cultures.

The activities in the CCT promote cognitive processes cited in the multiculturalism and creativity literature. For instance, the CCT includes activities that require participants to engage in cultural frame switching (Benet-Martinez *et al.*, 2006) (e.g., waking up with a different skin color). The CCT also requires conceptual expansion and combination (Leung *et al.*, 2008; Ward *et al.*, 1997, 1999), which involves retrieving, generating, and synthesizing culture specific procedural knowledge (e.g., how to cook foods from different cultures) and declarative knowledge (e.g., symbols of wealth, list of interesting ingredients, features of popular products around the world). Cronbach's alpha for the five culture specific items of the CCT was .69, providing evidence for the internal consistency of the measure across the scaled activities. In addition, the reliability analysis indicated that deleting any of the five items would decrease overall reliability (deleting items 1, 2, 3, 4, or 5 results in Cronbach's alpha = .671, .673, .612, .551, .651, respectively). The CCT was weakly correlated with the ATTA ( $r(145) = .19, p < .05$ ), providing evidence for the discriminant validity between the CCT and the ATTA.

A subjective scoring method was used to score the CCT. Subjective scoring methods have been proposed as an improved, more ecologically valid approach to assessing creative production in specific domains (Silvia *et al.*, 2008). The subjective scoring method was adapted from the widely used and validated consensual assessment technique (CAT; Amabile, 1982, 1996). In the CAT, judges score creative products on the basis of their implicit theories of creativity. There is evidence that people's implicit theories of creativity share common features (Plucker & Runco, 1998), and high interrater reliability (ranging from .70 to .90) among expert and non-expert judges using the CAT has been found (e.g., Amabile, 1996; Baer, Kaufman, & Gentile, 2004; Conti, Coon, & Amabile, 1996; Kaufman, Gentile, & Baer, 2005; Plucker & Runco, 1998). The CAT has been used to assess creativity in various domains and different levels of expertise (e.g., Baer, 1998; Conti *et al.*, 1996; Kaufman *et al.*, 2005) as well as in cross-cultural settings (e.g., Niu & Sternberg, 2001, 2002).

Together, the two coders determined the fluency score (tally of ideas generated) for each activity in the CCT. Redundant items (e.g., 'lower plane costs' and 'make traveling cheaper') were given one fluency point. Each response on the CCT was coded independently for originality on a 5-point Likert scale, 1 (*Not at all*), 2 (*Little*), 3 (*Somewhat*), 4 (*Much*), and 5 (*Very much*), on the basis of the coders' subjective definition of creativity. Appendix B provides examples of responses that were rated more or less original. Interrater reliability for the originality scores was  $r = .92$ . The final creativity score on the CCT was calculated by dividing the summed originality scores by the summed

fluency scores across the five activities. This average scoring method has been used in earlier studies employing the subjective scoring method, and recent studies show evidence for the reliability and validity of the average scoring method on traditional divergent thinking tasks (e.g., Unusual Uses Test, Guilford, Merrifield, & Wilson, 1958) (Silvia *et al.*, 2008), which have a very similar format to the CCT (i.e., generating as many responses as possible to an open-ended prompt within a 3-minute time limit). Given the high interrater reliability, the average of the two raters' final CCT scores was used for subsequent analyses (Table 3).

## RESULTS

### Factor analysis of the CCT

MPlus6 was used to perform a confirmatory factor analysis using maximum likelihood estimation on a one factor model of the CCT. All five activities were specified to load upon a single factor. Table 4 presents the inter-item correlations and factor loadings of the five CCT activities.

Goodness of fit indices for the one factor model of the CCT are presented in Table 5. The results indicate that the model fit the data adequately well;  $\chi^2 = 10.257, p = .07$ , root mean square error of approximation = .08, Tucker-Lewis index = .94, comparative fit index = .89, standardized root mean square residual = .05. Altogether, results support the one factor model of the CCT, and we present the CCT as an empirically tested and theoretically supported measure that provides a comprehensive assessment of culture specific creative thinking.

### Comparisons between the Study Abroad, Plan to Study, and No Plan to Study groups on the CCT and the ATTA

Analyses of covariance (ANCOVA) were conducted to compare the effect of cultural experiences on general and culture specific creative thinking between the Study Abroad, Plan to Study, and No Plan to Study groups. The dependent variables were students' performance on the CCT (culture specific creativity test) and students' performance on the ATTA (domain general creativity test). The independent variable, condition, included three levels: Study Abroad, Plan to Study, and No Plan to Study. Students' gender (two levels: male or female) and ethnicity (five levels: White/Caucasian, Black/African American, Hispanic/Latino, Asian/Pacific Islander, or Other) were included as fixed

Table 3. Means on the Abbreviated Torrance Test for Adults and the Cultural Creativity Task by condition

Condition ( $N = 135, n = 45$ )	Abbreviated Torrance Test for Adults (ATTA)		Cultural Creativity Task (CCT)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Study Abroad	4.47 <sub>ab</sub>	1.20	3.14 <sub>cd</sub>	.40
Plan to Study	3.93 <sub>a</sub>	.94	2.47 <sub>c</sub>	.36
No Plan to Study	3.84 <sub>b</sub>	1.30	2.44 <sub>d</sub>	.35
Total	4.08	1.18	2.68	.49

Subscript <sub>a</sub> = significant pairs at  $p < .05$ . Subscript <sub>b</sub> = significant pairs at  $p < .01$ . Subscripts <sub>c,d</sub> = significant pairs at  $p < .001$

Table 4. Inter-item correlations and factor loadings for the activities in the Cultural Creativity Task

CCT activities	1	2	3	4	5	Factor loadings
1. Tourism problem	1	.34**	.23**	.35**	.12	.41
2. Skin color		1	.24**	.25**	.18*	.36
3. Social status			1	.50**	.38**	.63
4. Unique dish				1	.47**	.81
5. Universal product					1	.57

Note.\* = significant at  $p < .05$ . \*\* = significant at  $p < .01$ .

factors. Where an overall omnibus  $F$  test was significant, pairwise comparisons using the Tukey post-hoc test were conducted. The criterion for significance was set at an alpha level of .05. Results are summarized in Table 3.

The scores on the CCT were used to assess participants' culture specific creativity. We hypothesized that the Study Abroad group would perform significantly better on the CCT compared with the Plan to Study and No Plan to Study groups (hypothesis 1). In line with our hypothesis, results showed that condition had a significant main effect on CCT scores,  $F(2, 127) = 45.14$ ,  $p < .001$ ,  $\eta_p^2 = .42$ . Gender and ethnicity did not have significant main effects on CCT scores,  $F(1, 127) = .018$ ,  $p = .893$ ,  $\eta_p^2 > .001$ , and  $F(4, 127) = 1.93$ ,  $p = .110$ ,  $\eta_p^2 = .057$ , respectively. The Tukey honestly significant difference (HSD) post-hoc analyses indicated that the Study Abroad group ( $M = 3.14$ ,  $SD = .40$ ) significantly outperformed the Plan to Study Abroad group ( $M = 2.47$ ,  $SD = .36$ ,  $p < .001$ ) as well as the No Plan to Study group ( $M = 2.43$ ,  $SD = .35$ ,  $p < .001$ ). In addition, there was no significant difference between the Plan to Study group and the No Plan to Study group on CCT scores ( $p = .915$ ) (hypothesis 3). Taken together, these results indicate that students who have studied abroad have greater culture specific creative thinking abilities compared with students who have not study abroad, including both those who plan and those who do not plan to study abroad in the future. ANCOVAs were also conducted to compare the effects of condition, gender, and ethnicity on the fluency and originality scores of the CCT separately. Results showed that only gender had a main effect on fluency scores,  $F(1, 127) = 4.04$ ,  $p = .047$ ,  $\eta_p^2 = .031$ , with females ( $M = 24.40$ ,  $SD = 7.75$ ) outperforming males ( $M = 20.58$ ,  $SD = 9.13$ ).<sup>3</sup> As expected, only condition had a main effect on originality scores,  $F(2, 127) = 10.55$ ,  $p < .001$ ,  $\eta_p^2 = .142$ . The Tukey HSD post-hoc analyses indicated that the Study Abroad group ( $M = 75.711$ ,  $SD = 25.45$ ) significantly outperformed both the Plan to Study group ( $M = 55.71$ ,  $SD = 22.52$ ,  $p < .001$ ) and the No Plan to Study group ( $M = 58.67$ ,  $SD = 24.82$ ,  $p = .002$ ). There was no significant difference between the Plan to Study and No Plan to Study groups ( $p = .816$ ) with respect to the CCT originality scores.

<sup>3</sup> Research examining gender differences in creativity show mixed results; some studies report no gender differences, while other report opposing findings regarding male versus female performance on verbal and figural creativity tasks (Kaufman, 2006). Some studies have shown that females score higher on verbal types of creativity tasks (e.g., Kaufman, Niu, Sexton, & Cole, 2010), which may explain the findings in the present study; however, the literature on the relationship between gender and creativity remains unclear.

Table 5. Goodness of fit indices for the one factor confirmatory factor analysis of the Cultural Creativity Task

$\chi^2$	$p$ -value	$df$	TLI	CFI	RMSEA	SRMR
10.26	.07	5	.89	.94	.08	.05

CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; TLI, Tucker–Lewis index.

The CI scores from the ATTA were used to assess participants' domain general creativity. We hypothesized that performance on the ATTA would not differ significantly across the three conditions (hypothesis 2). In contrast to our predictions, results showed that condition had a significant effect on CI scores,  $F(2, 127) = 3.82$ ,  $p = .025$ ,  $\eta_p^2 = .057$ . Gender and ethnicity did not have significant main effects on CI scores,  $F(1, 127) < .001$ ,  $p = .993$ ,  $\eta_p^2 > .001$ , and  $F(4, 127) = 1.12$ ,  $p = .351$ ,  $\eta_p^2 = .034$ , respectively. Post-hoc analyses showed that the Study Abroad group ( $M = 4.47$ ,  $SD = .20$ ) significantly outperformed the No Plan to Study group ( $M = 3.93$ ,  $SD = .94$ ) on the general creativity task ( $p = .03$ ). There was no significant difference between the Study Abroad group and the Plan to Study group ( $p = .08$ ), as well as between the Plan to Study group and the No Plan to Study group ( $M = 3.84$ ,  $SD = 1.30$ ,  $p = .93$ ).

Altogether, results indicate that students who studied abroad demonstrate superior creative thinking on both a culture specific and a domain general measure of creative thinking compared with students who have not studied abroad.

## DISCUSSION

Research examining the outcomes of study abroad programs shows that studying abroad leads to several positive affective gains [e.g., promoting students' cultural and personal development by providing experiences that facilitate international awareness, cross-cultural communication skills, and self-confidence (Carlson & Widaman, 1988; Carsello & Greaser, 1976; Cushner & Karim, 2004; Kitsantas, 2004)]. We present an experimental study that reveals benefits in creative thinking as a function of studying abroad. Results from the present study showed that students who studied abroad generated more original ideas on both a culture specific and a domain general creativity test compared with students who have not studied abroad. Based on our findings, we suggest that cultural experiences from living abroad have wide reaching benefits on students' creativity,

including the facilitation of complex cognitive processes that promote creative thinking in multiple settings.

In the present study, students who studied abroad recruited and combined intellectual resources from various cultural frameworks to generate ideas and solutions on the CCT that were richer in description, detail, and humor compared with students who had not studied abroad. One aim of our study was to investigate the long-standing debate regarding whether creativity is a domain general or domain specific construct. Many of the arguments have been theoretical in nature; however, recent researchers have begun to empirically examine specific domains in creativity including a cultural domain (e.g., Benet-Martinez *et al.*, 2006; Hong & Milgram, 2010; Kaufman, 2006; Tadmor & Tetlock, 2006; Tadmor *et al.*, 2009). In line with previous findings, our study suggests that a culture specific domain exists, and we present the CCT as an empirically tested measure of culture specific creative thinking. The difference found on this task between the students who studied abroad and those who did not supports claims from past studies that multicultural experiences facilitate cognitive capacities associated with creative thinking. Multicultural experiences involve the accumulation and integration of learned routines and conventional knowledge from a new culture, as well as practice mentally set switching between different cultural worldviews (Benet-Martinez *et al.*, 2006; Leung & Chiu, 2010; Tadmor & Tetlock, 2006). This process of juxtaposing and synthesizing cognitive elements from two or more cultures has been linked to increased creativity, which was demonstrated by the students who studied abroad in the present study. Our findings also support the literature on expertise that shows that the acquisition of knowledge and skills from frequent, in-depth experiences within a domain leads to the production of novel and appropriate ideas on complex problems specific to that domain (Chi *et al.*, 1981; Ericsson & Charness, 1994; Finke *et al.*, 1992; Rikers & Paas, 2005; Schraw, Dunkle, & Bendixen, 1995). The mounting evidence, that domain specific experiences influence creative thinking within that corresponding domain, has important implications for the conceptualization and assessment of creativity. A more accurate and comprehensive approach to measuring creative thinking may be to develop and employ field-specific tests of creativity. Contemporary creativity researchers are beginning to empirically explore creative thinking within distinct fields (e.g., Kaufman, 2006; Mumford *et al.*, 2010; Weisberg, 2006) and are finding promising results that demonstrate numerous unique expressions of creativity across domains.

Moreover, we did not find differences between the two groups of students who have not studied abroad on the CCT, which strengthens our conclusion that cultural experiences gained from studying abroad is the variable that accounts for increased creative thinking in the cultural domain. Furthermore, there were no significant differences between students who studied abroad and those who did not study abroad on traditional indicators of academic achievement. These findings combined with the results that show superior creative thinking among students who studied abroad bolster our claim that studying abroad facilitates creative thinking. It has been argued that traditional

academic measures (e.g., SAT) and indicators (e.g., GPA) assess abilities related to linear, logical, and analytical processing, whereas creative thinking requires abilities related to divergent processing and open-ended problem solving (Mumford *et al.*, 2010; Runco & Chand, 1995; Sternberg & Lubart, 1996). In today's fast paced age of technology and global competition, this ability to generate and apply novel ideas is an increasingly important skill for students to develop. Our findings suggest that studying abroad provides one means of gaining creative thinking skills and abilities. The comparison between the Plan to Study and No Plan to Study groups was made to account for possible pre-existing group differences such as different levels of cultural knowledge, interest, and motivation, that may exist among individuals who have an affinity for cultural experiences compared with those who do not. For example, some research indicates that individuals who have studied abroad as well as individuals who are interested in studying abroad share a unique set of characteristics including lower levels of ethnocentrism and the acquisition of a foreign language (Goldstein & Kim, 2005). However, the present study indicates that the actual immersion in a foreign culture is related to superior creative thinking while interest in foreign cultures without the cultural experience is not.

Surprisingly, students who studied abroad also outperformed students who do not plan to study abroad on the domain-free creativity test, suggesting that cultural experiences lead to positive gains in cognitive processes associated with general creative thinking as well. In contrast to our expectations, these results indicate that increased creative thinking from studying abroad is not limited to culture specific activities but transfer to performance on culturally neutral activities as well. The positive relationship between studying abroad and general creative thinking found in the present study has important implications for the role of cultural experiences on individuals' overall cognitive capacities, as well as their approaches to creative problems. Recent creativity research suggests that general creative thinking engages executive processes (e.g., strategy employment, self-evaluation, inhibiting interference) that are closely linked to intelligence (e.g., Kaufman *et al.*, 2011; Nusbaum & Silvia, 2011). With these findings, it is possible that cultural experiences lead to creative thinking skills that not only promote the production of novel ideas and high quality innovations but also support higher-order reasoning and learning processes. Finally, creative thinking is also associated with tolerance for ambiguity in the face of open-ended problems (Runco, 2004; Sternberg & Lubart, 1996). In the present study, students who studied abroad were challenged to adapt their culturally familiar scripts in order to integrate new cultural experiences that contained foreign beliefs, attitudes, and behaviors. We suggest that positive outcomes of persevering through the cognitive, inter, and intrapersonal tensions involved during experiences in foreign cultures include significant gains in creative thinking capacities.

In summary, the present study highlights the value of cultural experiences for both culture specific and domain general creative thinking. Our findings indicate that studying abroad supports cognitive processes involved in developing innovative solutions in response to demands that arise in



culturally diverse environments. In addition, these benefits were present in students' overall (domain-free) creative thinking capacities as well. Finally, we present the CCT as an empirically tested and theoretically supported measure of culture specific creative thinking that we hope will benefit future work investigating creative thinking within the cultural domain.

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**APPENDIX A**  
**ACTIVITIES ON THE CULTURAL CREATIVITY TASK**

## Instructions:

The task you are about to take involves five activities. The activities will give you a chance to see how good you are at thinking up new ideas and solving problems. They will call for all of the imagination and thinking ability you have. For each of the prompts, list as many ideas as you can. You will be given 3 minutes to respond for each prompt.

Activity 1: *Each year a great many American tourists go to foreign countries to visit. But now suppose that our country wanted to get many more people from foreign countries to come to America during their vacations. What steps can you suggest that would get many more foreign people to come to this country as tourists?*

Activity 2: *Just suppose you wake up tomorrow with a different skin color. What changes might this create in your life? Provide as many examples as you can.*

Activity 3: *Just suppose you are at the top of the social ladder. What are different ways to exhibit your status in society? Provide as many examples as you can.*

Activity 4: *Just suppose you had access to any ingredient from all over the world. Describe the dishes you would create using a combination of the most unique and/or exotic ingredients you can think of. Provide as many examples as you can.*

Activity 5: *Just suppose you are part of a company that wants to create a product that will have universal appeal. What would be components of this product? Provide as many examples as you can.*

**APPENDIX B**  
**EXAMPLES OF RESPONSES LOW AND HIGH IN ORIGINALITY ON THE CULTURAL CREATIVITY TEST**

Low originality	High originality
<i>Tourism problem</i>	
Decrease cost of travel and lodging. Advertise theme parks. Offer hotel deals.	Offer personal translator package. Have festivals that celebrate other cultures. Create a theme park that connects all 50 states. Build Disney Alaska.
<i>Skin color</i>	
Confusion among friends and family. Be treated differently by others. People will stare. Wear different clothes.	Identity crisis due to learning values and practices of new race. Star in Star Wars II as a native alien. If others find out, doctors may turn me into a scientific experiment. Wearing a tie-dyed shirt with tie-dye skin might be too much tie-dye.
<i>Social status</i>	
Buy expensive jewelry, house clothes, cars, etc. Donate to charities. Own a private jet. Attend exclusive parties.	Fund the Arts program for public education. Help a small town get free WIFI. Give funding to state programs to help preserve wildlife.
<i>Unique dish</i>	
Breaded chicken.  Ice cream with chocolate and sprinkles. Pasta with fresh cheese. Baked fish with butter.	'Saturn Browndinskies'—ingredients from asteroid from Saturn mixed with flour, eggs, milk, and eggs. 'Sea Slug Yetti Bake'—sea slugs from the Atlantic mixed with yeti bits from the Himalayas with shake and bake. Lychee truffle risotto and dragon fruit sherbet.
<i>Universal product</i>	
Cheap and useful. Easy to use. Can do many things. Small in size.	Appeals to universal characteristics like emotions(e.g., music, smells). Sensitive to taboos of different cultures. Fun for all ages (e.g., adult humor mixed with sounds for babies).

Note. Statements in each column were provided by different participants.