

# BICULTURALISM AND COGNITIVE COMPLEXITY

## Expertise in Cultural Representations

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To explore the possible cognitive consequences of biculturalism, the authors examine the complexity of cultural representations in monocultural and bicultural individuals. Study 1 found that Chinese American biculturals' free descriptions of both American and Chinese cultures are higher in cognitive complexity than that of Anglo-American monoculturals, but the same effect was not apparent in descriptions of culturally neutral entities (landscapes). With the same procedures, Study 2 found that the cultural representations of biculturals with low levels of Bicultural Identity Integration (BII; or biculturals with conflicted cultural identities) are more cognitively complex than that of biculturals with high BII (biculturals with compatible cultural identities). This article shows that cultural frame switching and BII have meaningful cognitive consequences; furthermore, it suggests that exposure to more than one culture may increase individuals' ability to detect, process, and organize everyday cultural meaning, highlighting the potential benefits of multiculturalism.

**Keywords:** biculturalism; bicultural identity; cognitive complexity; Bicultural Identity Integration

**In today's increasingly diverse and mobile world,** growing numbers of individuals have internalized more than one culture and can be described as bicultural or multicultural. For example, one out of every four individuals in the United States has lived in another country before moving to the United States and presumably has been exposed to and is familiar with more than one culture (U.S. Census, 2002). Furthermore, there is a large number of U.S.-born ethnic and cultural minorities (e.g., second-generation and third-generation descendants of immigrants) for whom identification and involvement with their ethnic cultures, in addition to mainstream U.S. culture, is the norm (Phinney, 1996).

The prevalence and importance of multiculturalism and biculturalism has been acknowledged by a number of psychologists (e.g., Fowers & Richardson, 1996; Hermans & Kempen, 1998; LaFromboise, Coleman, & Gerton, 1993; Rudmin, 2003), but the phenomenon has rarely been investigated empirically.<sup>1</sup> John Berry, who conducted some of the early work on this topic (see Berry & Sam, 1996; for a review), identified biculturalism as one of four possible outcomes of the acculturation experience. Specifically, immigrants and ethnic minorities

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have to deal with two central issues: (a) the extent to which they are motivated or allowed to retain identification and involvement with the culture of origin or ethnic culture; and (b) the extent to which they are motivated or allowed to identify with and participate in the mainstream, dominant culture (Berry, 1990). The negotiation of these two central issues results in four distinct acculturation positions: assimilation (identification mostly with the dominant culture), integration or biculturalism (identification with both cultures), separation (identification largely with the ethnic culture), or marginalization (low identification with both). Recent studies have further shown that identification with ethnic and dominant cultures are largely orthogonal (particularly among second and older generation groups), such that individuals can highly identify with both cultures (Ryder, Alden, & Paulhus, 2000; Tsai, Ying, & Lee, 2000).

#### BICULTURALISM AND CULTURAL FRAME SWITCHING: COGNITIVE CONSEQUENCES

Building on this early, taxonomic acculturation research (Berry & Sam, 1996; LaFromboise et al., 1993), Benet-Martínez and her collaborators (Benet-Martínez, Leu, Lee, & Morris, 2002; Haritatos & Benet-Martínez, 2002; Hong, Benet-Martínez, Chiu, & Morris, 2003; Hong et al., 2000) empirically examined the dynamics of biculturalism, specifically the sociocognitive processes involved in the development and maintenance of a bicultural identity. For instance, Hong et al. (2000) provided the first empirical demonstration of *cultural frame switching* (CFS), a process in which biculturals have access to and apply two different cultural meaning systems in response to cultural cues. Specifically, Hong and her colleagues showed that Chinese American biculturals make more internal attributions, a characteristically Western attribution style (Morris & Peng, 1994), after being primed with American cues, but make more external attributions, a characteristically East Asian attribution style, after being primed with Chinese cues. Biculturals' CFS behavior has also been reported in the domains of self-construal and persuasion (Gardner, Gabriel, & Dean, 2004; Lau-Gesk, 2003), among others.

According to the dynamic constructivist approach to biculturalism (Hong et al., 2000), the process of CFS involves the application of different cultural interpretative frames or cultural meaning systems to the processing of and reaction to everyday social situations. The application of one or another frame is guided by the cultural cues that precede or define the particular social context in which the bicultural finds himself or herself. These cues may be blatant cultural symbols (e.g., flags, language, attire) or much more subtle and implicit features of the situation (e.g., roles, expectations, and goals embedded in a particular context). Given the increasing pervasiveness of cultural cues and complexity of cultural systems in today's world (Hermans & Kempen, 1998), one may wonder what cognitive consequences, if any, the repeated experience of CFS may have for biculturals. More specifically, are biculturals, by virtue of their frequent engagement in CFS (i.e., the cognitive-behavioral tasks of detecting, processing, and reacting differently to various cultural cues in the environment) cognitively different from individuals for whom CFS is not a common experience?

In line with the sociocognitive literature on expertise (e.g., Feltovich, Ford, & Hoffman, 1997; Hoffman, 1992), multitasking (e.g., Rubinstein, Meyer, & Evans, 2001), and self-relevant knowledge (e.g., Markus, 1977; Nowak, Vallacher, Tesser, & Borkowski, 2000), we propose in the present article that biculturals, because of their frequent CFS experiences, think about culture in more complex ways than monoculturals or individuals who have internalized only one culture. That is, we argue that cultural representations (ethnic and mainstream) held by biculturals embody more components and more relations among these components. Before elaborating on our hypothesis regarding the relationship

between biculturalism and complexity of cultural schemas, we briefly define the constructs of cognitive complexity and cultural representation.

*Cognitive complexity* is a broad individual difference variable that measures the degree of differentiation, articulation, and abstraction within a cognitive system (see Burlison & Caplan, 1998; for a review). Put more simply, cognitive complexity is the capacity to construe people, objects, and ideas in a multidimensional way (Schroder, Driver, & Streufert, 1967; Suedfeld, Tetlock, & Streufert, 1992).<sup>2</sup> Cognitive complexity is related to both content (properties and features) and underlying structure (relationships and dynamics). Higher level of cognitive complexity is indicated by greater information clustering (more differentiation and integration) and abstractness (less concrete and episodic descriptions; Klein & Loftus, 1988; Park & Hastie, 1987). Cognitive complexity has been examined in interpersonal (Burlison & Samter, 1990), political (Tetlock, 1983), and affective reasoning domains (Suedfeld & Pennebaker, 1997), and found to be related to a wide range of outcomes (e.g., adjustment, persuasion). In this article, we focus on the complexity of *cultural representations* or shared meaning regarding the essence and dynamics of a particular culture that is socially created through language, images, and practices (Hall, 1997). Psychologically, at the individual level, these cultural representations include the particular values, beliefs, practices, images, and artifacts an individual associates to a specific culture.

### **CFS and Cognitive Complexity: Expertise and Control Processes**

We propose that biculturals' more complex cultural representations are the result of accumulated experience at detecting and processing complex, ambiguous, and fast-changing cultural cues. According to the literature on expertise (Feltovich et al., 1997), repeated exposure to and practice in a particular domain leads to domain-relevant schemas that are more complex. Similarly, biculturals' repeated CFS experiences should lead to cultural schemas that are more organized, abstract, multidimensional, and integrated. Through constant CFS, biculturals are further cognizant that cultural norms vary and change depending on the context. In other words, CFS creates a perspective that grasps the relativism and multidimensionality of each cultural system (Gutierrez & Sameroff, 1990), leading to more complex representations of both cultures (e.g., ethnic and mainstream).

Note that we are not implying that monoculturals are culturally naive; most of these individuals identify with their culture and are familiar with the corresponding behavioral and attitudinal cultural norms. However, monocultural individuals may be less likely to recognize dominant cultural perceptions and beliefs as norms that may differ from other cultural groups (Gutierrez & Sameroff, 1990; Gutierrez, Sameroff, & Karrer, 1988).

A second functional explanation for biculturals' more complex cultural representations may rest in the particular type of cognitive processes involved in CFS. Work by Meyer and Kieras (1997) and Rubinstein et al. (2001) shows that when multiple action schemas are activated (e.g., as when performing multiple tasks simultaneously or consecutively), individuals use a "supervisory attention system" that monitors which schema should be used and when and as such engage in more deliberate and effortful cognitive processing of the cues that trigger or signal the appropriate action. The alternation between different cultural schemas and behavioral repertoires involved in the CFS process (e.g., switching between different languages and social scripts when interacting with ethnic vs. Anglo friends) may involve similar executive control processes or supervisory attention system and more deliberate and effortful processing of the cultural cues associated to each action schema (Rubinstein et al., 2001).<sup>3</sup> This more systematic and careful processing of cultural cues may in turn lead to the development

of cultural schemas that are more complex (e.g., richer in content, more differentiated and integrated).

### **CFS and Cognitive Complexity: Accessibility of Self-Relevant Information**

One could perhaps argue that the proposed differences between biculturals and monoculturals in their cultural representations are not reflective of differences in the complexity of the cultural schemas *per se* but rather reflect differences in the cognitive accessibility of cultural information. That is, perhaps biculturals think about their cultures (both ethnic and mainstream) in more complex ways not because they possess more complex cultural schemas but simply because they live in worlds where cultural cues are more prominent or available, and therefore, cultural knowledge is more easily accessible to them. However, the idea that the cultural cues themselves are different for biculturals and monoculturals seems highly implausible. Although the contexts in which biculturals and monoculturals live are likely to differ in terms of the variety of cultural cues available (i.e., biculturals may live in more multicultural environments where both mainstream and ethnic cultures are represented), there is no reason to think that the structure or essence of these cues is different for these two types of individuals. In other words, the symbols, institutions, and practices that make up a particular culture (mainstream and/or ethnic) exist independently of one's cultural identity (bicultural or monocultural), although, as stated earlier, biculturals probably have more complex representations of these cultural elements.

Still, cultural knowledge may be more accessible to biculturals than monoculturals, not because of differences in cultural cue availability but because cultural knowledge is likely an important part of biculturals' self-concepts. For biculturals, cultural information is highly self-relevant, and thus, like other types of self-knowledge (e.g., personality traits), highly accessible to memory (Markus, 1977; Nowak et al., 2000). Several aspects of the acculturation experience suggest that cultural knowledge may be highly central to biculturals' self-definitions. Many biculturals are immigrants who have spent considerable effort in understanding their new, host culture and the best way to adapt to it. These experiences may have become an important element of biculturals' biographical memories. Furthermore, many biculturals are perceived by others as different and distinct (because of their accent, skin color, and/or behavior) and this "token" status has been shown to be an important dimension of selfhood and identity (Frale, 1993; Sekaquaptewa & Thompson, 2003). Cultural information is thus more likely to be an important part of biculturals' self-concept, and like other types of self knowledge, be more accessible in memory and more richly elaborated (Markus, 1977; Nowak et al., 2000).

### **Cognitive Consequences of Biculturalism: Domain-General or Domain-Specific?**

Although we posit that biculturals would have more complex cultural representations than monoculturals, we do not expect this trend to be evident in culturally neutral domains. A few linguistic and developmental studies on biculturalism and bilingualism have reported cognitive advantages for these groups beyond the cultural and linguistic domains. For example, some studies have found biculturals to have relatively more complex parental reasoning about child development (Gutierrez & Sameroff, 1990), increased creativity (Carringer, 1974), and greater attentional control (Bialystok, 1999; Bialystok et al., 2004). We propose, however, that the higher levels of cognitive complexity shown by biculturals will be specific to representations and reasoning within the cultural domain. We base this argument on the sociocognitive literature on expertise, in which cognitive complexity is seen as a function of experience and

involvement with the objects in a particular phenomenal domain (Cantor & Kihlstrom, 1987; Woll, 2002).<sup>4</sup> Indeed, our three arguments for linking biculturals' CFS to cognitive complexity of cultural representations—namely, experience in dealing with cultural information, executive cognitive processing involved in CFS, and self-relevance of cultural knowledge—are processes limited to the processing cultural schemas and cultural cues. In other domains without explicit cultural references—such as nature or technology—there is no reason to think that biculturals would show higher expertise, controlled processing, or self-relevance. Accordingly, biculturals' reasoning about their cultures should be cognitively more complex than monoculturals, but this may not necessarily be evident in culturally neutral domains.

In conclusion, there are reasons to expect biculturals to have relatively more complex cultural representations than monoculturals, and that the same trend should not be evident in culturally neutral representations (Hypothesis 1). These predictions are tested in Study 1.

## STUDY 1

In this study, bicultural and monocultural individuals wrote statements about American culture, Chinese culture, or landscapes. These statements were then content coded for cognitive complexity. We hypothesize that biculturals will write more complex descriptions of the two cultures than monoculturals will and that these differences will not emerge in the landscape descriptions.

## METHOD

### PARTICIPANTS

Our sample included 179 participants (88 males, 91 females; mean age = 20.7 years) from a large public university on the West Coast of the United States. Participants were recruited through campus fliers and were paid for their participation. Of the participants, 79 were self-identified monocultural Anglo-Americans, and 100 were self-identified first-generation Chinese American biculturals.

All the Chinese American participants were born in a Chinese country (People's Republic of China, Taiwan, Hong Kong, Macao, or Singapore) and have lived at least 5 years in both a Chinese country ( $M = 11.7$ ;  $SD = 5.6$ ) and the United States ( $M = 8.7$ ;  $SD = 4.4$ ). On a 1 to 6 scale, in which 6 indicated *very strongly identified*, Chinese-American participants' identification with Chinese and American cultures were 4.7 ( $SD = 1$ ) and 3.7 ( $SD = 1.2$ ), respectively. On a scale of 1 to 5, in which 5 indicated *perfectly fluent*, Chinese American participants' self-reported fluency in Chinese and English languages were 3.9 ( $SD = 1$ ) and 4.4 ( $SD = .7$ ). These means were all above the scale median, suggesting that our Chinese-American subsample is indeed bicultural and bilingual. All the Anglo-American participants were born in the United States, had lived in the United States all their lives, were Caucasian, and identified with American culture ( $M = 4.6$ ;  $SD = 1.2$ ) exclusively.<sup>5</sup>

### PROCEDURE

Study instructions and instruments were in English. Participants were randomly assigned to one of three experimental conditions: American, Chinese, or landscape. In the two cultural conditions, participants were told the following:

Suppose you are asked about American (Chinese) culture by someone who knows nothing about it: How would you describe American (Chinese) culture? Please write 10 statements to describe American (Chinese) culture. Before you start, we will show you some pictures strongly associated with this culture. These pictures may give you some ideas, but you don't need to use, describe, or even mention these pictures in your statements.

Participants in the landscape (or culturally-neutral) condition were told the following:

Suppose you are asked to introduce different kinds of natural landscapes in a geography class: How would you do so? Write 10 statements to describe different kinds of natural landscapes. Before you start, we will show you some pictures of different landscapes. These pictures may give you some ideas, but you don't need to use, describe, or even mention these pictures in your statements.

We had two reasons to present pictures in each condition. First, this method has been previously established as successful in facilitating participants' accessibility to their cultural schemas, whose complexity is the target variable in the present studies. Additionally, we reasoned that by showing the pictures, we would be able to explore the degree to which participants' cultural descriptions focused on the obvious and easy (i.e., writing statements mainly about the meaning conveyed by pictures; low complexity) versus abstract and not obvious qualities of the cultures the pictures represent (high complexity).

To rule out possible confounds related to the idiosyncratic characteristics of any one picture—for example, one might argue that a specific picture depicting U.S. culture might elicit more complex thinking than a specific picture depicting Chinese culture—we used 10 matched pictures representing ubiquitous cultural icons in each experimental condition. We matched the pictures in content so that both Chinese and American conditions would include landmarks (e.g., Great Wall of China and Mount Rushmore), mythical figures (e.g., Chinese goddess and Mickey Mouse), or symbolic icons (e.g., dragon and cowboy). These images have been shown in previous research to be effective in eliciting culturally relevant behaviors (Benet-Martínez et al., 2002; Hong et al., 2000). In the landscape condition, participants were shown 10 pictures of natural landscapes found both in the United States and in China (e.g., a waterfall, a desert, a snow-capped mountain, a stream, and a forest).

After seeing the pictures, participants were given 10 minutes to write their descriptions. Appendix A includes examples of the written statements provided by three different Chinese American participants (one from each experimental condition). Afterwards, participants completed a demographic questionnaire that included questions about sex, age, country of birth, cultural identification, and years lived in the United States. Chinese American biculturals also provided information about the number of years lived in a Chinese country and their proficiency and usage with English and Chinese languages.

### **Coding of Responses: Cognitive Complexity**

In past research, cognitive complexity was typically measured by coding-extended text dealing with moral or social issues such as speeches, interview transcripts, diplomatic documents, policy statements, or personal letters (Suedfeld & Bluck, 1993; Tetlock, 1983). The coding schemes used in these studies, however, were not appropriate for this study, as participants wrote multiple short sentences which, although topically connected, were separate semantically and grammatically (see Appendix A). Accordingly, we used a coding scheme tailored for shorter text while measuring the key dimensions of cognitive complexity: differentiation, abstractness, articulation, and integration (Burlinson & Caplan, 1998; Lee & Peterson, 1997).

Two coders, one Anglo-American and one Chinese American, independently rated each of the 10 statements written by each participant on each of the following complexity dimensions (intercoder reliability is included in parentheses): (a) whether the statement contained multiple perspectives (.93), (b) whether the statement made comparisons between different objects or viewpoints (.85), (c) whether the statement contrasted objects or viewpoints (.70), (d) whether the statement was evaluative (.87), (e) whether the statement referred to something abstract (vs. concrete; .77), (f) whether the statement mentioned only implicitly or not at all any of the pictures shown in each condition (.99), (g) the overall complexity of the ideas or concepts contained in the statement (.81), (h) whether the statement referred to time (.83), (i) the number of words contained in each statement (.98), and (j) the number of distinct ideas (.77).<sup>6</sup> These ratings were done using a scale that ranged from 1 (*not at all*) to 5 (*very much so*). The two coders were blind to our hypothesis. Coders were trained together, and they conducted their ratings independently. Given that the coders were generally reliable, the ratings from the two coders were averaged.

## RESULTS

### Preliminary Considerations

For each participant, ratings on each complexity variable were averaged across the 10 statements to ensure independence of the sampling unit.<sup>7</sup> To identify the underlying structure of the complexity ratings, the aggregated ratings were then entered in a principal components analysis with Varimax rotation. An examination of the scree plot and different factor solutions indicated that a structure with three factors was the most plausible. This solution is reported in Table 1.

The first factor, which we called “density,” taps the number of words and distinct ideas contained in the statements, whether the statements mentioned time-related or dynamic trends, and the overall complexity of the statements (this factor explained 32% of the variance). Consider the two sets of statements provided by two of our participants in the American condition and reported in Appendix B. Averaged across their respective 10 statements, Participant A’s statements were lower in density than Participant B’s statements. On average, Participant A’s statements had fewer words, fewer distinct ideas, and were less likely to mention dynamic trends. In contrast, Participant B’s statements were longer and more likely to contain multiple ideas. For example, the statement “America schools are not too strict, providing people with more choices about college and career, such that everything is possible” arguably contains three distinct ideas—(a) American schools are not too strict, (b) Americans have more choices, and (c) everything is possible in America. Furthermore, Participant B’s statements, on average, were more likely to mention changes through time (for example, Statement 4 states that “Old America is different from modern America. . . .”) and stability through time (for example, Statement 10 states that “. . . it has been like this since the very beginning. . . .”).

The second factor, called “abstractness,” captures the evaluativeness and abstractness of the statements and the absence of explicit references to the pictures (22%). For example, looking at Appendix B, one can see that Participant A’s statements were less abstract in that the observations largely alluded to physical, concrete entities such as money, food, and sports. Relatedly, Participant A’s statements included more references to the pictures used to cue each culture—such as Mickey Mouse, the Statue of Liberty, and cowboy. In contrast, the statements of Participant B were not explicitly tied to the contents of the pictures. Also, Participant A’s statements did not have any evaluative content; the participant did not

**TABLE 1**  
**Study 1: Factor Structure of Content-Coding Variables**

<i>Coded Variables</i>	<i>Cognitive Complexity</i>		
	<i>Density</i>	<i>Abstractness</i>	<i>Differentiation-Integration</i>
Number of words	<b>0.92</b>	-0.14	0.00
Overall complexity	<b>0.91</b>	0.00	0.18
Number of ideas	<b>0.83</b>	0.15	0.05
Temporal reference	<b>0.67</b>	<b>-0.40</b>	0.02
Evaluation	0.13	<b>0.87</b>	0.05
Abstractness	0.02	<b>0.78</b>	0.08
Picture reference	<b>-0.34</b>	<b>0.68</b>	0.26
Multiple perspectives	0.16	0.02	<b>0.80</b>
Comparing	0.01	-0.04	<b>0.80</b>
Contrasting	<b>0.43</b>	0.23	<b>0.72</b>

NOTE:  $N = 100$  first-generation Chinese American biculturals and 79 Anglo-American monoculturals. Factor loadings equal or higher than 0.30 are set in bold.

state whether fast food, money, or the values of liberty are good or bad. Meanwhile, Participant B offered more evaluative judgments and opinions about American culture overall, such as stating that having a less strict school system may be an advantage in creating more opportunities and choices for Americans.

The third factor, named “differentiation-integration,” taps whether the statements included multiple perspectives and whether the statements compared and contrasted ideas (20%). Participant A’s statements, on average, were lower on this dimension. For example, Participant B’s statements often compared American to Chinese culture (Statements 3 to 5) or with other cultures in general (Statements 1 and 9).

Using these results from the principal components analysis, we created three composite measures of cognitive complexity (alphas in parenthesis): density (.90), differentiation/integration (.79), and abstractness (.81).

### Hypothesis Testing

A  $2 \times 3$  between-subjects analyses of variance were conducted with experimental condition (American, Chinese, landscape) and cultural identity (bicultural, monocultural) as independent variables, and density, differentiation-integration, and abstractness as dependent variables. As found in previous cognitive complexity studies (Burlinson & Caplan, 1998), the intercorrelations between the composite variables were low ( $r$ 's < .30); thus, separate analyses were conducted for each of the dependent variables. The means and standard errors for each condition are listed in Table 2.

Using density as the dependent variable, there was no main effect of cultural identity, as predicted. There was a marginally significant main effect for experimental condition,  $F(2, 177) = 2.47, p = .08$ , and  $\eta^2 = .16$ . Examination of the means showed that Chinese ( $M = 3.89$ ) and American ( $M = 3.94$ ) culture descriptions were more dense than landscape descriptions ( $M = 3.54$ ); a post hoc contrast to test this effect (using the weights +1 Chinese, +1 American, -2 landscape) was significant,  $F(1, 177) = 4.88, p = .03, \eta^2 = .16$ . The Cultural Identity  $\times$  Condition interaction was highly significant ( $F[2, 177] = 8.57, p = .0003, \eta^2 = .30$ ). As Table 2 shows, compared to the landscape condition, biculturals’ descriptions of Chinese and

**TABLE 2**  
**Study 1: Density and Abstractness Means by Cultural Identity and Condition**

Condition	Cognitive Complexity											
	Density						Abstractness					
	Chinese		American		Landscape		Chinese		American		Landscape	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Cultural identity												
Monocultural	3.33	0.94	3.49	0.76	4.21	1.03	2.69	0.67	2.99	0.46	1.49	0.61
Bicultural	4.31	1.29	3.69	0.90	3.71	1.02	2.85	0.50	3.04	0.43	1.21	0.34

NOTE:  $N = 100$  first-generation Chinese-American biculturals and 79 Anglo-American monoculturals.

American cultures were relatively higher in density than monoculturals' descriptions, supporting Hypothesis 1. A contrast to test this effect (using the contrast weights Chinese monocultural  $-1$ , Chinese bicultural  $+1$ ; American monocultural  $-1$ , American bicultural  $+1$ ; landscape monocultural  $+2$ , landscape bicultural  $-2$ ) was significant,  $F(1, 177) = 8.76$ ,  $p = .003$ ,  $\eta^2 = .21$ .

Similar results emerged when we examined abstractness as the dependent variable. There was no main effect for cultural identity. The main effect of condition was significant ( $F[2, 177] = 182.24$ ,  $p < .0001$ ,  $\eta^2 = .82$ ). Examination of the means showed that Chinese ( $M = 2.79$ ) and American ( $M = 3.02$ ) culture descriptions were more abstract than landscape descriptions ( $M = 1.33$ ); a post hoc contrast to test this effect (using the weights  $+1$  Chinese,  $+1$  American,  $-2$  landscape) was significant,  $F(1, 177) = 358.74$ ,  $p < .0001$ ,  $\eta^2 = .82$ . The Cultural Identity  $\times$  Condition interaction was significant ( $F[2, 177] = 3.00$ ,  $p = .05$ ,  $\eta^2 = .18$ ). As shown in Table 2, compared to descriptions of landscapes, biculturals' descriptions of Chinese and American cultures were relatively more abstract than those provided by monoculturals, supporting Hypothesis 1. A contrast to test this effect was significant,  $F(1, 177) = 3.66$ ,  $p = .057$ ,  $\eta^2 = .14$ .

Using differentiation-integration as the dependent variable, the condition main effect was not significant ( $p > .10$ ). We found a significant main effect for cultural identity, with biculturals' descriptions being more differentiated ( $M = 1.36$ ) than monoculturals' descriptions ( $M = 1.22$ ),  $F(1, 177) = 4.09$ ,  $p = .05$ ,  $\eta^2 = .15$ . The predicted Condition  $\times$  Cultural Identity interaction was not significant ( $p > .10$ ).

## DISCUSSION

Study 1 found partial evidence for our hypothesis that Chinese American biculturals' representations of culture (Chinese or American) would be cognitively more complex than those of monoculturals. Consistent with Hypothesis 1, compared to culturally-neutral descriptions, biculturals' descriptions of cultural representations were higher in density and abstractness than those of monoculturals. However, Hypothesis 1 was not confirmed with the cognitive complexity component of differentiation-integration. One possible reason may be the low level of variance in this variable. In our present study, the standard deviations of the items in the differentiation/integration composite were relatively lower (.39 for multiple perspectives, .39 for contrast, .41 for compare) compared to the items in the abstractness composite

(1.04 for evaluation, .93 for abstractness) or the density composite (3.44 for number of words, 1.12 for overall complexity, .39 for number of ideas, .43 for time).<sup>8</sup> As Appendix A shows, most participants were guided by the pictures and wrote fairly short statements in all three conditions (e.g., “The desert is dry,” or “China has a long history”). It might have been difficult to achieve high differentiation and integration in such short sentences.

Despite the mixed findings, the present results are noteworthy for several reasons. First, this study provides the first quantitative evidence that bicultural individuals have more complex cultural representations than monoculturals do. This finding supports our argument that biculturals, because of their repeated CFS experiences (e.g., expertise in detecting, processing, and reacting to cultural cues in the environment) and the self-relevance of cultural information, think about culture in more complex ways. Second, the results support our argument that this effect is domain-specific—the higher levels of cognitive complexity in biculturals compared to monoculturals are largely specific to the cultural domain.

### **CFS and Cognitive Complexity: Role of Bicultural Identity Integration (BII)**

Although Study 1 focused on differences between biculturals and monoculturals, recent research suggests that not all biculturals negotiate and organize their multiple cultural identities or cultural meaning systems in the same way (Benet-Martínez et al., 2002; Haritatos & Benet-Martínez, 2002). Specifically, biculturals can differ in their level of BII or the extent to which they perceive their cultural identities as largely integrated and compatible (high BII) or dissociated and difficult to integrate (low BII). High and low BIIs tend to experience different kinds of acculturation experiences and stresses and react to cultural cues in the environment in different ways (Haritatos & Benet-Martínez, 2002). Specifically, although biculturals with low BII are also sensitive to cultural cues, they often respond to them in culturally incongruent ways; for instance, they provide external attributions after seeing American cues and internal attributions after seeing Chinese cues (Benet-Martínez et al., 2002).

A review of the sociocognitive literature suggests that perceptions of conflict, a characteristic of low BII, may be related to increased cognitive complexity. For instance, a classic study by Tripodi and Bieri (1966) found that individuals who projected more conflictual themes in stories about imaginary persons scored higher in cognitive complexity. Menasco (1976) also reported an association between decisional conflict and cognitive complexity. Suedfeld and his colleagues (Suedfeld, Bluck, Loewen, & Elkins, 1994; Suedfeld & Wallbaum, 1992) showed that conflict between desired but contradictory values (e.g., individual freedom and social equality) lead to more complex descriptions of each value. Similarly, Tetlock, Peterson, and Lerner (1996) found a positive relationship between conflict of core values and cognitive complexity. According to these studies, we may also find that biculturals who perceive their two cultural orientations as somewhat conflicting and incompatible (low BII) think in cognitively more complex ways about their cultures than do those who perceive their two cultural orientations as compatible (high BII).

Recent cognitive and brain-imaging research also suggests a possible mechanism to explain the relationship between perceived conflict and cognitive complexity. Botvinick and his colleagues (Botvinick et al., 2001; Botvinick, Nystrom, Fissell, Carter, & Cohen, 1999) have shown that during conflict in information processing (e.g., in the Stroop test, in which an individual is asked to read color words printed in different colors), the anterior cingulate cortex is activated. Similar to what happens during multitasking (Rubinstein et al., 2001), the activation of the anterior cingulate cortex, which functions as a conflict-monitoring device, leads to higher levels of cognitive processing (i.e., an increase in the attention and amount of information being processed). Thus, it is possible that biculturals that perceive

their two cultural orientations as conflicting (low BIIs) engage in similar types of higher levels of cognitive processing when exposed to cultural cues in the environment, as these cues may signal conflictual behaviors and interpretations. In other words, low BIIs may engage in more effortful encoding of cultural information. This more systematic and careful processing of cultural cues may in turn lead to the development of cultural schemas that are more complex (e.g., richer in content, more differentiated and integrated).

In conclusion, we expect more complex cultural representations among biculturals with low levels of BII (vs. high BIIs). Given that BII is an identity construct specific to the cultural domain, we further expect this effect to be evident only for cultural representations but negligible in noncultural domains. These predictions are tested in Study 2.

## STUDY 2

The procedure of Study 2 is similar to Study 1, except we only used a bicultural sample, and we measured individual differences in BII. We predict that biculturals with low BII will write more complex descriptions of their cultures than biculturals high on BII, and that these differences will not be apparent for descriptions of culturally neutral objects or entities (Hypothesis 2).

## METHOD

### PARTICIPANTS

Our sample included 261 Chinese-American biculturals (126 males, 135 females; mean age = 21.6 years) drawn from a large public university in the midwestern United States. As in Study 1, all participants were born in a Chinese country (People's Republic of China, Taiwan, Hong Kong, Macao, or Singapore) and had lived at least 5 years in both a Chinese country ( $M = 11.5$ ,  $SD = 6$ ) and the United States ( $M = 8.5$ ,  $SD = 4$ ). Some participants were recruited through campus fliers and were paid for their participation; the rest were recruited through the Introductory Psychology participant pool and received partial credit for their participation.

Using Cultural Identification and Language Ability Scales similar to Study 1, participants' mean levels of identification with Chinese and American cultures were 4.6 ( $SD = .9$ ) and 4.1 ( $SD = 1.1$ ), respectively; self-reported levels of fluency in Chinese and English languages were 3.6 ( $SD = 0.7$ ) and 3.7 ( $SD = 0.7$ ), respectively. These descriptive means suggest that this sample was bicultural and bilingual.

### Procedure

The procedure was similar to Study 1: Participants were randomly assigned to one of three conditions (American, Chinese, or landscape) and asked to write 10 statements describing American culture, Chinese culture, or natural landscapes. Before writing the descriptions, participants were given the same instructions and shown the same pictures in each condition as in Study 1.

After writing the descriptions, participants completed the Bicultural Identity Integration Scale–Preliminary (BIIS-P; Benet-Martínez et al., 2002). This instrument assesses perceived opposition between Chinese and American cultural identities in a multistatement vignette that reads as follows:

I am a bicultural who keeps American and Chinese cultures separate and feels conflicted about these two cultures. I am mostly just a Chinese who lives in America (vs. a Chinese American), and I feel as someone who is caught between two cultures.<sup>9</sup>

Using a scale that ranged from 1 (*definitely not true*) to 5 (*definitely true*), participants rated how well the above paragraph described their own experiences as a Chinese American. Participants also completed Berry, Kim, Power, Young, and Bujaki's (1989) 20-item measure of the four acculturation strategies: assimilation, integration (or biculturalism), separation, and marginalization. Endorsement of each strategy is measured across five domains: marriage (e.g., "I would rather marry a Chinese than an American" [separation]), cultural traditions (e.g., "I feel that the Chinese should adapt to American cultural traditions and not maintain their own" [assimilation]), language (e.g., "It's important to me to be fluent in both Chinese and English" [integration]), social activities (e.g., "I prefer social activities that involve neither Americans nor Chinese" [marginalization]), and friends (e.g., "I prefer to have both Chinese and American friends" [integration]). Each item was rated with a scale that ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). We also collected demographic information regarding sex, age, country of birth, years lived in the United States and in a Chinese country, English and Chinese language proficiency and usage, and cultural identification.

### Cognitive Complexity Coding

The statements written by the participants in each condition were coded using the same method as Study 1. Using a scale that ranged from 1 (*not at all*) to 5 (*very much so*), two coders independently rated each statement on the following cognitive complexity variables (intercoder reliability is included in parentheses): whether the statement contained multiple perspectives (.93), made comparisons between multiple viewpoints (.91), contrasted objects or viewpoints (.82), referred to time (.83), was evaluative (.93), contained abstract judgments (.86), mentioned only implicitly or not at all any of the pictures shown in each condition (.99), overall complexity of the ideas or concepts contained in the statement (.87), number of words contained in each statement (.99), and the number of distinct ideas (.87). Ratings from the two coders were averaged given the reliability across all variables. Similar to Study 1, ratings were further collapsed across the 10 statements to ensure independence of sampling units. Factor analyses of these ratings with Varimax rotation yielded a three-dimensional structure similar to the one found in Study 1. Cognitive complexity composites identical to the ones created in Study 1 were then computed (alphas in parenthesis): density (.89), differentiation-integration (.91), and abstractness (.79).

## RESULTS

### Preliminary Considerations

Participants were classified into high BII ( $N = 148$ ) or low BII ( $N = 113$ ) groups by performing a median split on the BIIS-P ratings. Table 3 reports the descriptive statistics for low and high BII groups. Note that compared to high BIIs, low BII individuals were relatively less involved with American culture and more involved with Chinese culture, as shown by the significant differences in language use, cultural identification, and years lived in the United States and Chinese country. These differences between high and low BII individuals, however, do not undermine the bicultural status of individuals with low BII. First, low BIIs' endorsement of American culture (in terms of language and identification) was still moderate to high. More important, low and high BII groups did not differ in their endorsement of biculturalism (as

TABLE 3  
**Study 2: Descriptive Statistics for High and Low BII Participants**

	<i>High BII</i>		<i>Low BII</i>	
	M	SD	M	SD
Years in the United States	9.3	3.8	7.5*	4.2
Years in Chinese culture	10.8	6.9	12.7*	6.4
English language	3.9	0.7	3.5*	0.7
Chinese language	3.5	0.8	3.8*	0.6
U.S. identification	4	1.2	3.3*	1.2
Chinese identification	4.6	0.9	4.9*	1.0
Acculturation strategies				
Biculturalism	4	0.5	4	0.5
Separation	2.2	0.7	2.5*	0.6
Assimilation	2.2	0.7	2.0	0.5
Marginalization	1.5	0.5	1.6	0.5

NOTE:  $N = 261$  first-generation Chinese American biculturals; BII = Bicultural identity integration.

\* $p < .01$ .

measured by Berry's Scales), and both groups endorsed this acculturation strategy well above the other three (separation, assimilation, and marginalization).

### Hypothesis Testing

$2 \times 3$  analyses of variance were conducted with experimental condition (American, Chinese, landscape) and BII (high, low) as independent variables, density, differentiation/integration, and abstractness as dependent variables. Like Study 1, separate analyses were conducted for each of the dependent variables. The means and standard errors for each condition are listed in Table 4.

Using density as the dependent variable, there was no main effect of BII. There was a highly significant main effect of condition,  $F(2, 260) = 3.07, p = .05, \eta^2 = .15$ . Examination of the means showed that Chinese ( $M = 4.20$ ) and American ( $M = 3.84$ ) culture descriptions were more dense than landscape descriptions ( $M = 3.13$ ); a post hoc contrast to test this effect (using the weights +1 Chinese, +1 American, -2 landscape) was significant,  $F(1, 260) = 5.47, p = .02, \eta^2 = .14$ . The BII  $\times$  Condition interaction was significant,  $F(2, 260) = 3.89, p = .0207, \eta^2 = .17$ . As Table 4 shows, compared to the landscape descriptions, low BII's descriptions of Chinese and American cultures were relatively higher in density than those written by high BIIs, supporting Hypothesis 2. A contrast to test this effect (using the contrast weights Chinese high BII -1, Chinese low BII +1; American high BII -1, American low BII +1; landscape high BII +2, landscape low BII -2) was significant,  $F(1, 260) = 13.61, p = .0002, \eta^2 = .22$ .

Similar results were obtained with abstractness as the dependent variable. There was no main effect for BII. The main effect of condition was significant,  $F(2, 260) = 29.30, p < .0001, \eta^2 = .43$ . Examination of the means showed that Chinese ( $M = 2.54$ ) and American ( $M = 2.79$ ) culture descriptions were more dense than landscape descriptions ( $M = 1.88$ ); a post hoc contrast to test this effect (using the weights +1 Chinese, +1 American, -2 landscape) was significant,  $F(1, 260) = 54.46, p < .00001, \eta^2 = .42$ . The BII  $\times$  Condition interaction was significant,  $F(2, 260) = 4.55, p = .0107, \eta^2 = .18$ . The means again support Hypothesis 2: Compared to the landscape descriptions, low BII's descriptions of Chinese and American cultures were

**TABLE 4**  
**Study 2: Cognitive Complexity Means by Level of BII and Condition**

		<i>Cognitive Complexity</i>																		
		<i>Density</i>				<i>Abstractness</i>				<i>Differentiation-Integration</i>										
Condition	<i>Chinese</i>		<i>American</i>		<i>Chinese</i>		<i>American</i>		<i>Chinese</i>		<i>American</i>		<i>Chinese</i>		<i>American</i>		<i>Chinese</i>		<i>American</i>	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Low BII	4.28	0.80	4.16	1.90	3.12	0.82	2.67	0.47	2.91	0.67	1.87	0.98	1.59	0.70	1.27	0.47	1.25	0.37	1.23	0.44
High BII	4.08	1.8	3.57	1.41	3.14	0.81	2.39	0.52	2.68	0.71	1.89	0.70	1.35	0.59	1.17	0.40	1.23	0.44	1.23	0.44

NOTE: N = 261 first-generation Chinese American biculturals.

relatively more abstract than those written by high BIIs. A contrast to test this effect (using the same weights in the previous paragraph) was significant,  $F(1, 260) = 6.90, p = .009, \eta^2 = .16$ .

Using differentiation-integration as the dependent variable, we found a marginally significant main effect for BII, with low BIIs using more differentiation-integration ( $M = 1.32$ ) than high BIIs ( $M = 1.26$ ),  $F(1, 260) = 2.89, p = .09, \eta^2 = .10$ . The condition main effect was not significant. Again, the Condition  $\times$  BII interaction was significant,  $F(2, 260) = 3.25, p = .04, \eta^2 = .16$ . As shown in Table 4, compared to the landscape descriptions, low BII's descriptions of Chinese and American cultures were relatively higher in differentiation-integration than those written by high BIIs, supporting Hypothesis 2. A contrast to test this effect (using the same weights in the previous paragraph) was marginally significant,  $F(1, 260) = 2.41, p = .12, \eta^2 = .10$ . Overall, we found support for Hypothesis 2 on all three components of cognitive complexity.

## GENERAL DISCUSSION

The increasing prevalence of bicultural and multicultural individuals in our society today calls for a better understanding of how these individuals' repeated processing and managing of information from different cultures may affect their cognitive and social behavior (Hermans & Kempen, 1998; Hong et al., 2000). The present work attempts to address this issue by comparing biculturals and monoculturals' levels of cognitive complexity.

### Complexity of Cultural Representations: Comparing Biculturals and Monoculturals

We first examined how CFS may affect the ways in which bicultural individuals think and reason about their cultures. Specifically, we compared the complexity of "cultural representations" (Hall, 1997)—the particular values, practices, images, and artifacts associated to a specific culture—of Chinese American biculturals and Anglo-American monoculturals (Study 1). Relying on evidence from the sociocognitive literature on cognitive complexity (e.g., Suedfeld et al., 1992), expertise (e.g., Feltovich et al., 1997), multitasking (e.g., Rubinstein et al., 2001), and self-schemmaticity (Markus, 1977), we hypothesized that, compared to monoculturals, biculturals would have more complex ethnic and mainstream cultural representations because of (a) their repeated experience in detecting, processing, and reacting to cultural cues in the environment (i.e., CFS, Hong et al., 2000), (b) the executive cognitive processing involved in cultural schema switching, and (c) the unique relevance to the self that cultural knowledge has for them. Furthermore, following arguments from the literature linking social cognition and expertise (e.g., Woll, 2002), we predicted that these differences would be not apparent for noncultural representations (e.g., reasoning about nature).

Results from this first study partially confirmed our predicted interaction effect: Chinese-American biculturals' free descriptions of (American or Chinese) cultures were higher in density and abstractness (two components of our cognitive complexity measure) than Anglo-American monoculturals' descriptions, but the same effect was not found with descriptions of culturally neutral entities (landscapes). Our predicted interaction effect was not found for the cognitive complexity component of integration-differentiation (although biculturals scored higher on this variable than monoculturals did). Overall, our findings provided initial support for the idea that biculturals think about both their ethnic (e.g., Chinese, Mexican) and mainstream (e.g., American) cultures in more complex ways.

What are the implications of Study 1 findings? First, the fact that biculturals describe ethnic cultures in more complex ways than monoculturals is hardly surprising given biculturals' unique exposure to and familiarity with their second culture. However, our finding

that biculturals also have more complex (i.e., higher in abstractness and word density) representations of mainstream culture than monoculturals contradicts the common notion that deep, complex understanding of a culture is higher among traditional, monocultural, majority members of that culture (vs. minority groups or immigrants with less exposure to that culture). This finding suggests that immigrants and ethnic minorities who have internalized the host culture in addition to their ethnic culture may have a unique grasp on the complexities and nuances of the main, dominant culture that surrounds them despite their minority status. In other words, our work suggests the possibility that CFS—or the experience of navigating between two cultures and being forced to reason about their differences, similarities, and abstract qualities—more than traditional cultural membership per se may be critical in the development of complex and multidimensional cultural representations.

Second, our findings suggest that the ability to think about one's culture(s) in complex ways can perhaps be learned or facilitated. We proposed that biculturals acquire more complex cultural representations largely through the experience of CFS; in a similar vein, daily immersion into a multicultural environment (e.g., being married to a person with a different cultural background, extensive traveling) may help monocultural individuals develop a more complex understanding of their own culture. If this were true, one may think then that multicultural policies should be encouraged, not only because of society's obligation to understand and support cultural minorities but also because cultural majorities may gain greater insight and understanding of their own cultural makeup.

The above ideas, although promising, should be taken with caution given some of the design limitations of our study. For instance, future work should test the generalizability of our findings to different samples of biculturals (e.g., non-Asian, U.S.-born and older individuals), monoculturals (e.g., monocultural Chinese), and people in different national territories (e.g., Canada, Europe, etc.). Furthermore, additional studies are needed to examine if biculturals' higher cultural complexity applies only to their two internalized cultures (i.e., ethnic and mainstream) or to all cultural descriptions in general. Another possible line of future work is to examine how the cognitive consequences of biculturalism may also bring benefits in the social domain; specifically, does biculturalism increase individuals' level of multicultural sensitivity, a collection of psychological traits also described as cultural competence or cultural effectiveness (Abe & Weisman, 1983; LaFromboise et al., 1993; Van der Zee & Van Oudenhoven, 2001)? Specifically, one may argue that biculturals' more complex mainstream and ethnic cultural representations could relate to higher levels of cultural empathy (ability to detect and understand other's cultural habits or pressures) and cultural flexibility (ability to quickly switch from one cultural strategy or framework to another). Relatedly, future research should examine if biculturalism facilitates the inhibition of cultural epistemic needs such as stereotyping and prejudice (Van der Zee & Van der Gang, 2005). Last, it is possible that the effects reported for the bicultural versus monocultural groups and for the cultural versus neutral conditions may have been tempered by two features of our design: the fact that the study was conducted in English across the three conditions and that the control condition required participants to describe landscapes as if they were in a geography class (two contexts typically associated with Anglo-American culture and college settings).

### **Complexity of Cultural Representations: Role of BII**

Recent work by Benet-Martínez and her colleagues (Benet-Martínez et al., 2002; Haritatos & Benet-Martínez, 2002) has shown systematic differences among biculturals in their level of BII or the extent to which they perceive their cultural identities as largely integrated and compatible (high BII) or conflictual and dissociated (low BII). Given the social and cognitive literature linking psychological conflict and cognitive complexity (Botvinick

et al., 1999; Suedfeld & Wallbaum, 1992; Tetlock et al., 1996; Tripodi & Bieri, 1966), our second study explored differences between high and low BIIs in the complexity of their cultural representations. We reasoned that the more systematic and careful processing of cues that underlies the monitoring of conflictual information would lead low BIIs to develop cultural representations that are more complex (e.g., richer in content, more differentiated and integrated) than high BIIs. Like in Study 1, we predicted that this effect would not be apparent in culturally neutral representations. Results from this second study supported our predictions: Descriptions of Chinese and American cultures written by low BIIs were higher in density, abstractness, and differentiation-integration than high BIIs' descriptions, and this effect was not found with descriptions of landscapes.

Low BIIs' higher complexity in cultural representations could be explained by several mechanisms. First, it is possible that this trend is driven by low BIIs' negative moods in cultural domains. That is, our cultural description task might have reminded low BIIs of their conflictual cultural orientation and the emotional uneasiness associated with their bicultural experiences (e.g., feelings of being torn between two very different cultural orientations). These negative feelings, in turn, may make low BIIs more analytical and critical in their cultural descriptions, resulting in higher complexity (Dunning & Story, 1991; Suedfeld & Pennebaker, 1997; Tripodi & Bieri, 1966). Furthermore, low BIIs' uneasiness about possible competing cultural norms might make them more vigilant in cultural domains (Miller & Bieri, 1965), which could lead to higher cognitive complexity. In other words, it may be adaptive for low BIIs to pay extra attention to cultural cues to avoid behaving in culturally inappropriate ways; this attention in turn may bring about higher complexity.

What are the real-world implications for low BII's more complex cultural representations? At face value, our findings seem to suggest that low BIIs, despite their inner cultural conflict, may be better equipped at handling the demands of ambiguous, complex, and fast-changing cultural situations because they use more complex reasoning in cultural domains. In other words, perhaps low BIIs are more culturally competent. This, however, contradicts some past results; Benet-Martínez and her colleagues found that low BIIs largely respond to cultural cues in culturally incongruent ways; that is, they behave in a prototypically ethnic way when faced with Anglo-American cues and in a prototypical American way when exposed to ethnic cues (Benet-Martínez et al., 2002). In short, there is evidence suggesting that low BIIs display a behavioral "reactance" against the cultural expectations embedded in the particular situation. These various results suggest that although perceived cultural conflict in biculturals predicts more complex cultural representations, it also predicts cultural reactance that may be maladaptive. Future work is needed to examine more closely how BII relates to day-to-day cultural competence and well-being. Future studies should also examine the impact of perceived conflict more directly by experimentally manipulating cultural conflict among biculturals—for example, by having biculturals focus on a task that describes irreconcilable differences between their two cultures (vs. similarities)—and observe how this manipulation affects both the complexity of cultural representations and CFS behavior. Finally, with the newly developed multi-item measure of BII (BIIS-1; Benet-Martínez & Haritatos, 2005), researchers will be able to examine the aforementioned processes with a more refined measurement of BII.

## CONCLUSION

When a person participates simultaneously in two different cultures, and these cultural worlds are to a large extent disjunctive, that person may be confronted with uncertainties,

contradictions, ambiguities, and contrasting interests. The present work provides preliminary evidence for the idea that biculturals' meeting of such cultural contact zones leads to the development of more complex and integrative cultural representations. Our work suggests that this is especially true for biculturals who perceive their cultural identities as conflicting (low BIIs). Beyond the cognitive and social processes underlying biculturalism, we hope that the present work is also relevant to the understanding of multiculturalism at the societal level. Perhaps cultural plurality at the individual (bicultural identity) and collective level (multiculturalism) can lead to cultural knowledge that goes "beyond the respectful acknowledgement of differences to a fusion of horizons in which we both learn from others and are grounded afresh in our own best values" (Fowers & Richardson, 1996, p. 620).

## APPENDIX A

### Examples of Statements Written for the Chinese, American, and Landscape Conditions by Chinese American Participants

<i>Chinese Culture</i>	<i>American Culture</i>	<i>Landscapes</i>
1. Chinese culture has a very long history of different celebrations and traditions.	I would say that American culture is strict and orderly.	Some landscapes are rocky with little vegetation.
2. One of the most celebrated holidays is the Chinese New Year.	Liberty and freedom are valued.	One area may be made up with cliff and rocks, but plants can still grow.
3. Red is Chinese people's favorite color.	American culture is friendly.	Some hills are barren, surrounded by open plains of dirt and minimal grasses.
4. Family is very important to Chinese culture.	Old American culture is quite different from what it is today.	Higher mountains can be snow capped all year round.
5. Children are taught to obey and respect their parents.	American culture is different and unique from other cultures around the world.	A rain forest and jungle landscape would be green all year.
6. Different parts of China have their own traditions.	Many great people in history are from America.	An urban landscape consists of large buildings and busy, paved roads.
7. Chinese people can speak in different dialects.	America is not all about law and order; it also has a serious side.	A desert landscape is dry and sandy, with no vegetation.
8. Chinese people respect their ancestors and visit their graves annually.	Much of American culture is derived from other cultures.	An arctic landscape has little vegetation.
9. Chinese people like to have lots of food at gatherings.	It is easy to get used to American culture.	Swamps and marshes are part of a natural landscape.
10. Different foods served in Chinese New Year have different meanings.	Americans are more open minded than other nations—they like to express their feelings openly.	Grasslands are very common in Africa.

NOTE: Statements within each column were provided by different participants.

## APPENDIX B

## Example of Cultural Descriptions Low and High in Complexity

<i>Participant A (Low Complexity)</i>	<i>Participant B (High Complexity)</i>
1. American culture is strict and orderly.	Americans are more open minded than people of other nations; they like to express themselves and their feelings in a straight-forward way.
2. Liberty and freedom are valued.	American schools are not too strict, providing people with more choices about college and career, such that everything is possible.
3. Like the Statue of Liberty, Americans are friendly.	Unlike Chinese culture, Americans like the outdoors and enjoy spending time outdoors as much as possible.
4. Mickey Mouse is famous in America.	Old America is different from modern America in many ways.
5. The cowboy is a symbol of American culture.	One of the things Americans do when they meet each other is to give each other a hug; but Chinese people won't do that.
6. America has a lot of historical figures.	Americans like to trade presents with each other so that they shows how much they care for one another.
7. Americans play all kinds of sports.	Americans gets very excited about religion—like Christmas is a big religious celebration for them.
8. America is the king of fast food.	Americans like to talk a lot even though they don't know each other very well.
9. Americans are rich, and with money comes power.	The American diet is different from that of other cultures around the world—they like to eat salad very much.
10. America has a fast-growing economy.	America contains a diverse culture with many different kinds of people; it has been like this since the very beginning of the country.

## NOTES

1. We examined the available psychological literature on biculturalism (and related topics such as multiculturalism) from 1954 to the present. This review yielded 55 publications, of which only 28 were actual studies. Out of these 28, only 20 were quantitative studies (the other 8 were case studies or ethnographies). Eight of these 20 studies were published in social personality or general audience journals (e.g., *Journal of Cross-Cultural Psychology*, *Personality and Social Psychology Review*, *Hispanic Journal of Behavioral Sciences*), and the rest in clinical, community, or educational journals. These low numbers indicate a large knowledge gap in the understanding of bicultural identity.

2. Naturally, it is difficult to differentiate the complexity of an individual's schemas (complexity as a feature of the cognitive structure) from the complexity of an individual's information processing (complexity as a feature of the encoding process), given that the structure of knowledge in any domain affects the processing of information about that domain (Schroder, Driver, & Streufert, 1967).

3. Note that the activation of top-down cognitive processes (attention control and executive control operations) by cultural cues does not necessarily make biculturals' cultural frame-switching behavior a conscious process (see Toth & Reingold, 1996, for a discussion of this issue).

4. Our review of the cognitive complexity literature suggests that the domain-specificity of this psychological attribute may not have been clearly established yet largely because of design limitations; specifically, studies' failure at examining cognitive complexity across different domains within the same study.

5. Anglo-American participants were given the option of rating their identification with another culture in addition to American culture, if this was applicable to them. We reasoned that this was necessary, given (a) the cultural diversity of the West Coast, where elements of Latin and Asian cultures may also be internalized by Anglo-American individuals, and (b) the strong ties many Anglo-American individuals have with their European heritage (e.g., Irish, Jewish, German, etc.). Twenty-five of these Anglo-American participants identified with a second culture ( $M = 4.4$ ,  $SD = 1.3$ ), which for most of them, was a European culture.

6. These 10 dimensions have been shown to adequately tap cognitive complexity in previous research (Lee & Peterson, 1997).

7. Notice that we did not control for length of writing in the participants' statements or the typical speed at which participants write in general. Burleson and his colleagues (e.g., Burleson & Caplan, 1988; Burleson & Samter, 1990) have found little relationship between assessments of cognitive complexity and independent measures of loquacity (e.g., the average number of words used to express a construct, the number of words used in an informal conversation, the number of conversational turns taken in a conversation, the average length of a conversational turn).

8. In previous work that has shown more variation in differentiation and integration, researchers have typically analyzed long paragraphs discussing controversial topics (e.g., abortion, capitalism) rather than single sentences about more straightforward topics such as culture or landscapes (Suedfeld, Tetlock, & Streufert, 1992; Tetlock, 1993).

9. In Benet-Martínez, Leu, Lee, and Morris's (2002) study, this vignette measuring opposition between Chinese and American cultures was tested in conjunction with another vignette capturing the compatibility between the cultures. Ratings on these two vignettes were highly (negatively) correlated, indicating that the two measures of cultural opposition and compatibility were largely interchangeable. At the same time, however, scores on the vignette measuring opposition were normally distributed, whereas scores on the vignette measuring compatibility were somewhat skewed to the right (perhaps because of the higher social desirability of the statements tapping compatibility). Thus, like in Benet-Martínez et al.'s (2002) study, the vignette measuring opposition was used to measure BII in the present study.

## REFERENCES

- Abe, H., & Weisman, R. L. (1983). A cross-cultural confirmation of the dimensions of intercultural effectiveness. *International Journal of Intercultural Relations*, *7*, 53-67.
- Benet-Martínez, V., & Haritatos, J. (2005). Bicultural Identity Integration (BII): Components and socio-personality antecedents. *Journal of Personality*, *73*, 1015-1049.
- Benet-Martínez, V., Leu, J., Lee, F., & Morris, M. (2002). Negotiating biculturalism: Cultural frame-switching in biculturals with 'oppositional' vs. 'compatible' cultural identities. *Journal of Cross-Cultural Psychology*, *33*, 492-516.
- Berry, J. W. (1990). Psychology of acculturation. In N. R. Goldberger & J. B. Veroff (Eds.), *The culture and psychology reader* (pp. 457-488). New York: New York University Press. (Reprinted from *Nebraska symposium on motivation: Cross-cultural perspectives*, by J. J. Berman, Ed., 1989, Lincoln: University of Nebraska Press)
- Berry, J. W., Kim, U., Power, S., Young, M., & Bujaki, M. (1989). Acculturation attitudes in plural societies. *Applied Psychology: An International Review*, *38*, 185-206.
- Berry, J., & Sam, D. (1996). Acculturation and adaptation. In J. Berry, M. Segall, & C. Kagitcibasi (Eds.), *Handbook of cross-cultural psychology: Social behavior and applications* (Vol. 3, pp. 291-325). Boston: Allyn & Bacon.
- Bialystok, E. (1999). Cognitive complexity and attentional control in the bilingual mind. *Child Development*, *70*, 636-644.
- Bialystok, E., Craik, F. M., Klein, R., Viswanathan, M. (2004). Bilingualism, aging, and cognitive control: Evidence from the Simon Task. *Psychology and Aging*, *19*, 290-303.
- Botvinick, M., Braver, T., Barch, D., Carer, C., & Cohen, J. (2001). Conflict monitoring and cognitive control. *Psychological Review*, *108*(3), 624-652.
- Botvinick, M., Nystrom, L., Fissell, K., Carter, C., & Cohen, J. D. (1999). Conflict monitoring vs. selection-for-action in anterior cingulate cortex. *Nature*, *402*, 179-181.
- Burleson, B. R., & Caplan, S. E. (1998). Cognitive complexity. In J. C. McCroskey, J. A. Daly, & M. M. Martin (Eds.), *Communication and personality: Trait perspectives* (pp. 230-286). Cresskill, NJ: Hampton.

- Burleson, B. R., & Samter, W. (1990). Effects of cognitive complexity on the perceived importance of communication skills in friends. *Communication Research, 17*, 165-182.
- Cantor, N., & Kihlstrom, J. F. (1987). *Personality and social intelligence*. Englewood Cliffs, NJ: Prentice-Hall.
- Carringer, D. (1974). Creative thinking abilities of a Mexican youth: The relationship of bilingualism. *Journal of Cross-Cultural Psychology, 5*, 492-504.
- Dunning, D., & Story, A. (1991). Depression, realism, and the overconfidence effect: Are the sadder wiser when predicting future actions and events? *Journal of Personality and Social Psychology, 61*, 521-532.
- Feltovich, P. J., Ford, K. M., & Hoffman, R. R. (1997). *Expertise in context: Human and machine*. Cambridge, MA: MIT Press.
- Fowers, B. J., & Richardson, F. C. (1996). Why is multiculturalism good? *American Psychologist, 6*, 609-621.
- Frable, D. (1993). Dimensions of marginality: Distinctions among those who are different. *Personality and Social Psychology Bulletin, 19*, 370-380.
- Gardner, W., Gabriel, S., Dean, K. (2004). The individual as "melting pot": The flexibility of bicultural self-construals. *Cahiers de Psychologie Cognitive/Current Psychology of Cognition, 22*, 181-201.
- Gutierrez, J., & Sameroff, A. (1990). Determinants of complexity in Mexican-American and Anglo-American mothers' conceptions of child development. *Child Development, 61*, 384-394.
- Gutierrez, J., Sameroff, A., & Karrer, B. M. (1988). Acculturation and SES effects on Mexican-American parents' concepts of development. *Child Development, 59*, 250-255.
- Hall, S. (1997). *Representation: Cultural representations and signifying practices*. Bristol, PA: The Open University.
- Haritatos, J., & Benet-Martínez, V. (2002). Bicultural identities: The interface of cultural, personality, and socio-cognitive processes. *Journal of Research in Personality, 6*, 598-606.
- Hermans, H., & Kempen, H. (1998). Moving cultures: The perilous problem of cultural dichotomies in a globalizing society. *American Psychologist, 53*, 1111-1120.
- Hoffman, R. R. (Ed.). (1992). *The psychology of expertise: Cognitive research and empirical AI*. New York: Springer.
- Hong, Y. Y., Benet-Martínez, V., Chiu, C., & Morris, M. (2003). Boundaries of cultural influence: Construct activation as a mechanism for cultural differences in social perception. *Journal of Cross-Cultural Psychology, 34*, 453-464.
- Hong, Y. Y., Morris, M., Chiu, C. Y., & Benet-Martínez, V. (2000). Multicultural minds: A dynamic constructivist approach to culture and cognition. *American Psychologist, 55*, 709-720.
- Klein, S. B., & Loftus, J. (1988). The nature of self-referent encoding: the contributions of elaborative and organizational processes. *Journal of Personality and Social Psychology, 55*, 5-11.
- LaFromboise, T., Coleman, H., & Gerton, J. (1993). Psychological impact of biculturalism: Evidence and theory. *Psychological Bulletin, 114*, 395-412.
- Lau-Gesk, L. G. (2003). Activating culture through persuasion appeals: An examination of the bicultural consumer. *Journal of Consumer Psychology, 13*, 301-315.
- Lee, F., & Peterson, C. (1997). Content analysis of archival data. *Journal of Clinical and Consulting Psychology, 65*(6), 959-969.
- Markus, H. (1977). Self-schemata and processing information about the self. *Journal of Personality and Social Psychology, 35*, 63-78.
- Menasco, M. B. (1976). Experienced conflict in decision-making as a function of level of cognitive complexity. *Psychological Reports, 39*, 923-933.
- Meyer, D., & Kieras, D. (1997). A computational theory of executive cognitive processes and multiple task performance: Part 2. Accounts of psychological refractory-period phenomenon. *Psychological Review, 104*, 749-791.
- Miller, H., & Bieri, J. (1965). Cognitive complexity as a function of the significance of the stimulus objects being judged. *Psychological Reports, 16*, 1203-1204.
- Morris, M., & Peng, K. (1994). Culture and cause: American and Chinese attributions for social and physical events. *Journal of Personality and Social Psychology, 67*, 949-971.
- Nowak, A., Vallacher, R. R., Tesser, A., & Borkowski, W. (2000). Society of self: The emergence of collective properties in self-structure. *Psychological Review, 107*, 39-61.
- Park, B., & Hastie, R. (1987). Perception of variability in category development: Instance-versus abstraction-based stereotypes. *Journal of Personality and Social Psychology, 53*, 621-635.
- Phinney, J. S. (1996). When we talk about American ethnic groups, what do we mean? *American Psychologist, 51*(9), 918-927.
- Rubinstein, J., Meyer, D., & Evans, J. (2001). Executive control of cognitive processes in task switching. *Journal of Experimental Psychology: Human Perception and Performance, 27*, 763-797.

- Rudmin, F. W. (2003). Critical history of the acculturation psychology of assimilation, separation, integration, and marginalization. *Review of Psychology, 7*, 3-37.
- Ryder, A., Alden, L., & Paulhus, D. (2000). Is acculturation unidimensional or bidimensional? A head-to-head comparison in the prediction of personality, self-identity, and adjustment. *Journal of Personality and Social Psychology, 79*, 49-65.
- Schroder, H. M., Driver, M. J., & Streufert, S. (1967). *Human information processing*. New York: Holt, Reinhart & Winston.
- Sekaquaptewa, D., & Thompson, M. (2003). Solo status, stereotype threat, and performance expectancies: Their effects on women's performance. *Journal of Experimental Social Psychology, 39*(1), 68-74.
- Suedfeld, P., & Bluck, S. (1993). Changes in integrative complexity accompanying significant life events: Historical evidence. *Journal of Personality and Social Psychology, 64*, 124-130.
- Suedfeld, P., Bluck, S., Loewen, L., & Elkins, D. (1994). Sociopolitical values and integrative complexity of members of student political groups. *Canadian Journal of Behavioral Science, 26*, 121-141.
- Suedfeld, P., & Pennebaker, J. W. (1997). Health outcomes and cognitive aspects of recalled negative life events. *Psychosomatic Medicine, 59*, 172-177.
- Suedfeld, P., Tetlock, P., & Streufert, S. (1992). Conceptual/integrative complexity. In C. P. Smith (Ed.), *Handbook of thematic content analysis* (pp. 393-400). New York: Cambridge University Press.
- Suedfeld, P., & Wallbaum, A. B. (1992). Modifying integrative complexity in political thought: Value conflict and audience disagreement. *International Journal of Psychology, 26*, 19-36.
- Tetlock, P. E. (1983). Cognitive style and political ideology. *Journal of Personality and Social Psychology, 45*, 118-126.
- Tetlock, P. E., Peterson, R., & Lerner, J. (1996). Revising the value pluralism model: Incorporating social content and context postulates. In C. Seligman, J. Olson, & M. Zanna (Eds.), *Ontario symposium on social and personality psychology: Values* (pp. 25-51). Hillsdale, NJ: Lawrence Erlbaum.
- Toth, J. P., & Reingold, R. M. (1996). Beyond perception: Conceptual contributions to unconscious influences of memory. In G. Underwood (Ed.), *Implicit cognition*. Oxford, UK: Oxford University Press.
- Tripodi, T., & Bieri, J. (1966). Cognitive complexity, perceived conflict, and certainty. *Journal of Personality, 34*, 144-153.
- Tsai, J. L., Ying, Y., & Lee, P. A. (2000). The meaning of "being Chinese" and "being American": Variation among Chinese American young adults. *Journal of Cross-Cultural Psychology, 31*, 302-322.
- U.S. Census. (2002). *Principal demographic results*. Retrieved March 3, 2003, from <http://www.census.gov>.
- Van der Zee, K., & Van der Gang, I. (2005). *Individual differences in reactions to cultural diversity under threat: The generalizability of the anxiety buffer hypothesis*. Poster presented at the 6th annual convention of the Society for Personality and Social Psychology, New Orleans, LA.
- Van der Zee, K., & Van Oudenhoven, J. P. (2001). The multicultural personality questionnaire: Reliability and validity of self- and other ratings of multicultural effectiveness. *Journal of Research in Personality, 35*, 278-288.
- Woll, S. (2002). *Everyday thinking: Memory, reasoning, and judgment in the real world*. Mahwah, NJ: Lawrence Erlbaum.

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