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Exploring the Consequences of Biculturalism: Cognitive Complexity

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To explore the possible socio-cognitive consequences of biculturalism, we examined 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 were higher in cognitive complexity than that of Anglo-American monoculturals, but the same effect was not apparent in descriptions of culturally-neutral entities (landscapes). Using 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) were more cognitively complex than that of biculturals with high BII (biculturals with *compatible* cultural identities). This work shows that biculturalism and BII have meaningful cognitive consequences; further it suggests that exposure to more than one culture increases individuals' ability to detect, process, and organize everyday cultural meaning, highlighting the potential benefits of multiculturalism.

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 U.S. has lived in another country before moving to the U.S. and has been exposed to and is familiar with more than one culture (U.S. Census, 2002). Further, there is a large number of U.S.-born ethnic and cultural minorities (e.g., second 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), but the phenomenon has rarely been investigated empirically. John Berry, who conducted some of the early seminal work on this topic (see Berry & Sam, 1996, for a review), identified biculturalism as one of four possible outcomes of the acculturation experience. 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 identify highly with both cultures (Ryder, Allen, & Paulhus, 2000).

Biculturalism and Cultural Frame Switching: Cognitive Consequences

Benet-Martínez and her collaborators have empirically examined the dynamics of biculturalism; specifically, the socio-cognitive processes involved in the development and maintenance of a bicultural identity (Benet-Martínez & Haritatos, 2005; Benet-Martínez, Leu, Lee & Morris, 2002; Hong, Benet-Martínez, Chiu, & Morris, 2003; Hong, Morris, Chiu, & Benet-Martínez, 2000). 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 been replicated in other behavioral domains and cultural groups (e.g., Gardner, Gabriel, & Dean, 2004; Verkuyten & Pouliasi, 2002; Wong & Hong, 2005).

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 him 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 socio-cognitive literature on expertise (e.g., Feltovich, Ford, & Hoffman, 1997), multi-tasking (e.g., Rubinstein, Meyer, & Evans, 2001), and self-relevant knowledge (e.g., Nowak, Vallacher, Tesser, & Borkowski, 2000), we propose in the present chapter 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 Burleson & Caplan, 1998, for a review). Put more simply, cognitive complexity is the capacity to construe people, objects, and ideas in a multidimensional way (Suedfeld, Tetlock, & Streufert, 1992). 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). Cognitive complexity has been examined in interpersonal (Burleson & 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 chapter 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 (Fontaine, 1990; 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).

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 and colleagues (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, as well as more deliberate and effortful processing of the cultural cues associated to each action schema (Rubinstein et al., 2001). 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. Cultural knowledge may be more accessible to biculturals than monoculturals 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 (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 how to best 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 (due to their accent, skin color, or behavior) and this "token" status has been shown to be an important dimension of selfhood and identity (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 (Nowak et al., 2000).

Cognitive Consequences of Biculturalism: Domain-General or Domain-Specific? While 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 (Bialystock, 1999). 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 socio-cognitive literature on expertise, where cognitive complexity is seen as a function of experience and involvement with the objects in a particular phenomenal domain (Cantor & Kihlstrom, 1987). 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 cultural frame switching 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 would 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 compared to descriptions of landscapes, biculturals will write relatively more complex descriptions of the two cultures than monoculturals.

Method

Participants

Our sample included 179 participants (88 males, 91 females; mean age = 20.7) 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 (*Mn* = 11.7; *SD* = 5.6) and the United States (*Mn* = 8.7; *SD* = 4.4). On a 1 to 6 scale where 6 indicated 'very strongly identified,' Chinese-American participants' identification with Chinese and American cultures were 4.7 (*SD* = 1) and 3.7 (1.2) respectively. On a scale of 1 to 5 where 5 indicated 'perfectly fluent,' Chinese-American participants' self-reported fluency in Chinese and English languages were 3.9 (*SD* = 1) and 4.4 (.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 U.S., had lived in the U.S. all their lives, were Caucasian, and identified with Anglo-American culture (*Mn* = 4.6; *SD* = 1.2).

Procedure

Study's instructions and instruments were in English. Participants were randomly assigned to one of three experimental conditions: American, Chinese, or landscape. Participants were told: Please write ten statements to describe American culture/Chinese culture/Natural landscapes. Before you start, we will show you some pictures strongly associated with this task. These pictures may give you some ideas but you don't need to use, describe or even mention these pictures in your statements (See Benet-Martínez, Lee, & Leu, 2006; for more detailed information about the pictures and instructions). 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, by showing the pictures, we were able to explore the degree to which participants' cultural descriptions focused on the obvious and 'easy' (i.e., writing statements mainly around the meaning conveyed by pictures; low complexity) vs. abstract and not obvious qualities of the cultures the pictures represent (high complexity).

After seeing the pictures, participants were given 10 minutes to write their descriptions (see Appendix A in Benet-Martínez, Lee, & Leu, 2006; for examples of statements written in each experimental condition). Afterwards, participants completed a demographic questionnaire that included questions about sex, age, country of birth, years lived in the US and in a Chinese country, English and Chinese proficiency and usage, and cultural identification.

Coding of Responses: Cognitive Complexity

We used a coding scheme tailored for shorter text while measuring the key dimensions of cognitive complexity: differentiation, abstractness, articulation, and integration (Burleson & Caplan, 1998; Lee & Peterson, 1997). Two coders, one Anglo-American and one Chinese-American, independently rated *each* of the ten statements (i.e., descriptions) written by each

participant on each of the following theory-driven complexity dimensions (inter-rater reliability is included in parentheses): 1) whether the statement contained *multiple perspectives* (.93), 2) whether the statement made *comparisons* between different objects or viewpoints (.85), 3) whether the statement *contrasted* objects or viewpoints (.70), 4) whether the statement was *evaluative* (.87), 5) whether the statement referred to something *abstract* (vs. concrete) (.77), 6) whether the statement mentioned *only implicitly or not at all* any of the pictures shown in each condition (.99), 7) the *overall complexity* of the ideas or concepts contained in the statement (.81), 8) whether the statement referred to *time* (.83), 9) the *number of words* contained in each statement (.98), and 10) the *number of distinct ideas* (.77). 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 conducted their ratings independently. Given that the coders were generally reliable, the ratings from the two coders were averaged.

Results

Across experimental conditions, and for each participant, we averaged the ratings obtained on each the ten cognitive complexity variables described above across the ten statements each participant wrote. These average cognitive complexity scores were submitted to a principal components analysis with orthogonal rotation (varimax). The goal of this analysis was to identify the underlying structure of the complexity ratings (across the three experimental conditions). An examination of the scree plot and different factor solutions indicated that a structure with three factors was the most plausible. The first factor, which we called *density*, taped 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). The second factor, called *abstractness*, captured the evaluativeness and abstractness of the statements, and the absence of explicit references to the pictures (22%). The third factor, named *differentiation/integration*, taped whether the statements included multiple perspectives, and whether the statements compared and contrasted ideas (20%).[1] Using these results from the principal components analysis, we created three composite measures of cognitive complexity (Cronbach's α indices are given in parenthesis): density (.90), differentiation/integration (.79), and abstractness (.81).

Hypothesis Testing: 2 by 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 (Burleson & Caplan, 1998), the inter-correlations between the composite variables were low (r indices < .30); thus, separate analyses were conducted for each of the dependent variables (univariate approach). The analysis of variance results are summarized in Table 1.

Using *density* as the dependent variable, there was no main effect of cultural identity, as expected. There was a marginally significant main effect for the experimental condition and examination of the means showed that Chinese (3.89) and American (3.94) culture descriptions were more dense than landscape descriptions (3.54); to test for this effect we employed a contrast and this reached statistical significance. The interaction of cultural identity *by* experimental condition was also significant: Compared to the landscape condition (3.71), biculturals' descriptions of Chinese and American cultures (4) were relatively higher in density than monoculturals' descriptions, supporting Hypothesis 1. A contrast to test this effect was found statistically significant. Similar results emerged when we examined *abstractness* as the dependent variable. There was no main effect for cultural identity. The main effect of the experimental condition was significant and examination of the means showed that Chinese (2.79) and American (3.02) culture descriptions were more abstract than landscape descriptions (1.33); to test for this effect we employed a contrast which was found statistically significant. The interaction of cultural identity *by* condition was also found significant: Compared to

descriptions of landscapes (1.21), biculturals' descriptions of Chinese and American cultures (2.94) were relatively more abstract than those provided by monoculturals, supporting Hypothesis 1. A contrast to test this effect was also significant. Using *differentiation/integration* as the dependent variable, the main effect of the experimental condition was not significant. We found a significant main effect for cultural identity though, with biculturals' descriptions being more differentiated (1.36) than monoculturals' (1.22). The expected interaction of condition *by* cultural identity was not found statistically significant.

Table 1. Study 1: Analysis of variance results

DV - Effect	F (df_1, df_2)	p	η^2	Contrasts
DV: DENSITY				
Exper. Cond	2.47 (2, 177)	.08	.03	[a] F (1, 177) = 4.88, p<.05, η^2=.03
Cultural Id.	NS			
Interaction	8.57 (2, 177)	<.001	.09	[b] F (1, 177) = 8.76, p<.01, η^2=.04
DV: ABSTRACTNESS				
Exper. Cond	182.24 (2,177)	<.001	.67	[a] F (1, 177) = 358.74, p<.001, η^2=.67
Cultural Id.	NS			
Interaction	3.00 (2, 177)	.05	.03	[b] F (1, 177) = 3.66, p = .057, η^2=.02
DV: DIFFERENTIATION/INTEGRATION				
Exper. Cond	NS			
Cultural Id.	4.09 (1, 177)	.05	.02	—
Interaction	NS			

Key for Contrasts

[a] Chinese and American *vs.* Landscape

[b] The following weights were applied for this contrast: Chinese monocultural –1 , Chinese bicultural +1; American monocultural –1, American bicultural +1; Landscape monocultural +2, Landscape bicultural –2.

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 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. 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. 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 BII?

While 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 & Haritatos, 2005; Benet-Martínez et al., 2002). Specifically, biculturals can differ in their level of *Bicultural Identity Integration* (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 levels of acculturation experiences and stresses, and react to cultural cues in the environment in different ways (Benet-Martínez & Haritatos, 2005).

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 socio-cognitive literature suggests that perceptions of conflict, a characteristic of low BIIs, 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 & Wallbaum, 1992; Suedfeld, Bluck, Loewen, & Elkins, 1994) 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 BIIs) think in cognitively more complex ways about their cultures than those who perceive their two cultural orientations as compatible (high BIIs).

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 non-cultural 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) drawn from a large public university in the Midwest of the 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 (*Mn* = 11.5; *SD* = .6) and the United States (*Mn* = 8.4; *SD* = .4). Some participants were recruited through campus fliers, and were paid for their participation; the rest were recruited through the Introductory Psychology subject 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* = .7) and 3.7 (*SD* = .7) respectively. These descriptive means suggest that this sample was overall clearly bicultural and bilingual.

Procedure

The procedure was similar to Study 1: Before writing the ten statements on American culture, Chinese culture, or natural landscapes, participants were given the same instructions and shown the same pictures in each condition as in Study 1. After writing the ten 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 multi-statement 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. 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 et al.'s (1989) 20-item measure of the four acculturation strategies: assimilation, integration (or biculturalism), separation, and marginalization. Each item was rated with a scale that ranged from 1 ('strongly disagree') to 5 ('strongly agree'). Similar to Study 1, we 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-on American culture, Chinese culture and natural landscapes written by the participants in each condition were coded using the same categories and rating method as Study 1 (inter-rater reliabilities were high and ranged from .79 to .99). Ratings from the two coders were averaged given the reliability across all variables. Similar to Study 1, ratings were further collapsed across the ten statements. Principal component analysis of these ratings (across the three experimental conditions) with Varimax rotation yielded a 3-dimensional structure similar to the one found in Study 1. Cognitive complexity composites identical to the ones created in Study 1 were then computed (Cronbach's α indices are given in parenthesis): density (.89), differentiation/integration (.91), and abstractness (.79).

Results

Participants were classified into high BII (N = 148) or low BII (N = 113) groups by performing a median-split on the BIIS-P ratings. This method, which arguably has some statistical limitations, has reliably distinguished between different levels of BII in previous work (e.g., Benet-Martínez et al., 2002; Cheng, Lee, & Benet-Martínez, 2006).[2]

Hypothesis Testing: 2 by 3 analyses of variance were conducted with experimental condition (American, Chinese, landscape) and BII (high, low) as independent variables, and density, differentiation/integration, and abstractness as dependent variables. Like Study 1, separate analyses were conducted for each of the dependent variables. The analysis of variance results are summarized in Table 2 below.[3]

Table 2. Study 2: Analysis of variance results

DV - Effect	F (df_1, df_2)	p	η^2	Contrasts
DV: DENSITY				
Exper. Cond	3.07 (2, 260)	<.05	.02	[a] F (1, 260) = 5.47, p<.05, η^2=.02
BII.	NS			
Interaction	3.89 (2, 260)	<.05	.03	[b] F (1, 260) = 13.61, p<.001, η^2=.05
DV: ABSTRACTNESS				
Exper. Cond	29.30 (2,260)	<.001	.18	[a] F (1, 260) = 54.46, p<.001, η^2=.18
BII.	NS			
Interaction	4.55 (2, 260)	<.01	.03	[b] F (1, 260) = 6.90, p <.01, η^2=.03
DV: DIFFERENTIATION/INTEGRATION				
Exper. Cond	NS			
BII.	2.89 (1, 260)	<.10	.01	—
Interaction	3.25 (2, 260)	<.05	.03	[b] F (1, 260) = 2.41, p = .12, η^2=.01

Key for Contrasts

[a] Chinese and American *vs.* Landscape

[b] The following weights were applied for this contrast: Chinese high BII −1 , Chinese low BII +1; American high BII −1, American low BII +1; Landscape high BII +2, Landscape low BII −2.

Using *density* as the dependent variable, there was no main effect of BII, as expected. There was significant main effect of condition: An examination of the means revealed that Chinese (4.20) and American (3.84) culture descriptions were more dense than landscape descriptions (3.13); a post-hoc contrast to test this effect was significant. The BII by condition interaction was significant: As the means revealed, compared to the landscape descriptions (3.12), low BII's descriptions of Chinese and American cultures (4.22) were relatively higher in density than those written by high BIIs, supporting Hypothesis 2. A contrast to test this effect was significant. Similar results were obtained with *abstractness* as the dependent variable. There was no main effect for BII. The main effect of condition was significant; Chinese (2.54) and American (2.79) culture descriptions were more abstract than landscape descriptions (1.88); a post-hoc contrast to test this effect was significant. The BII *by* condition interaction was significant, in support of Hypothesis 2: compared to the landscape descriptions (1.87), low BII's descriptions of Chinese and American cultures (2.79) were relatively more abstract than those written by high BIIs. A contrast to test this effect was significant. Using *differentiation/ integration* as the dependent variable, we found a marginally significant main effect for BII, with low BIIs using more differentiation/integration (1.32) than high BIIs (1.26). The condition main effect was not significant. Again, the condition *by* BII interaction was significant: Compared to the landscape descriptions (1.25), low BII's descriptions of Chinese and American cultures (1.43) were relatively higher in differentiation/integration than those written by high BIIs, supporting Hypothesis 2 (see respective main effect and contrast testing in Table 2). 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 impact 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 cultural frame-switching (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 socio-cognitive literature on cognitive complexity (e.g., Suedfeld et al., 1992), expertise (e.g., Feltovich et al., 1997), multi-tasking (e.g., Rubinstein et al., 2001), and self-schematicity (Nowak et al., 2000), we hypothesized that, compared to monoculturals, biculturals would have more complex ethnic and mainstream cultural representations because of: (1) their repeated experience in detecting, processing, and reacting to cultural cues in the environment (i.e., CFS, Hong et al., 2000), (2) the executive cognitive processing involved in cultural schema switching, and (3) 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., Cantor & Kihlstrom, 1987), we predicted that these differences would be not apparent for non-cultural 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). 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 have also 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 make-up.

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 in different national territories (e.g., Canada, Europe, etc.). Furthermore, further 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 (Abe & Weisman, 1983; LaFromboise et al., 1993; Van der Zee & Van Oudenhoven, 2001). Specifically, does biculturalism increase individuals' level of multicultural sensitivity, a collection of psychological traits also described as cultural competence or cultural effectiveness? 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). Lastly, it is possible that the effects reported for the bicultural vs. monocultural groups and for the cultural vs. 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 Bicultural Identity Integration (BII)

Recent work by Benet-Martínez and her colleagues (Benet-Martínez & Haritatos, 2005; Benet-Martínez et al., 2002) has shown systematic differences among biculturals in their level

of Bicultural Identity Integration (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 (e.g., 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 (Suedfeld & Pennebaker, 1994; Tripodi & Bieri, 1967). Furthermore, low BIIs' uneasiness about possible competing cultural norms might make them more "vigilant" in cultural domains, 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.

Conclusion

When an individual participates simultaneously in two different cultures and these cultural worlds are to a large extent disjunctive, this individual 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).

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Endnotes

[1] See Table 1 in Benet-Martínez, Lee, and Leu (2006) for further information about this factor solution, and Table 2 for the means and standard deviations for each cognitive complexity dimension on each experimental condition and cultural identity group.

[2] See Table 3 in Benet-Martínez et al. (2006) for more information about the demographic and acculturation status of these two groups (e.g., endorsement of Berry's integration strategy by both groups).

[3] See Table 4 in Benet-Martínez, Lee, and Leu (2006) for the means and standard deviations for each cognitive complexity dimension on each experimental condition and BII level group.