

Abstract thinking in Chinese individuals living in the US

A Thesis

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by

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BIOGRAPHICAL SKETCH

Dong Wang holds a Bachelor of Arts degree with majors in Psychology from the University of Connecticut, 2018. He then joined the graduate program in Human Development at Cornell University in fall 2018. Within a year, he interested in the relationship between different cultures and completed this study with his committee member and lab partners. Upon approval of this thesis, he will be conferred the degree of Master of Arts with a major in Human Development.

Abstract

According to tests of rule-based reasoning, Westerners tend to think more abstractly than East Asians. However, thinking abstractly involves more than rule-based reasoning. According to tests of hierarchical event construal, Chinese individuals living in China are more likely to think abstractly than Caucasian Americans living in the US. This study investigated event construal in Chinese individuals living in the US. In a validated measure of abstract thinking, participants chose either abstract or concrete definitions of events. On average, the Chinese participants living in the US construed events significantly less abstractly than Chinese participants living in China; the immigrants' performance did not differ from US participants'. Chinese individuals who had spent more time in the US chose more concrete event construals than the individuals who had spent less time in the US. Although these data are correlational, they are consistent with the proposal that people's thinking style is influenced by the environment they live in. Specifically, living in the US may cause Chinese individuals to construe events more concretely.

Keywords: culture; abstract thought; event construal.

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Introduction

How do minds differ across cultures? A large literature documents differences in cognition and perception between East Asians and Westerners. Westerners (typically Caucasian North Americans or Western Europeans) tend to be more independent and East Asians (typically Chinese, Japanese or Korean) tend to be more interdependent (Markus & Kitayama, 1991). Nisbett et al., (2001) argued that Westerners had an analytic style of thinking, which is based on logic and rule-based reasoning. Whereas East Asians had a holistic style of thinking, which is based on the experience embedded in the contexts. Further research had been conducted proposing East Asians tend to engage a context-dependent process by focusing on the relationship between the object and the context in which the object is located (Nisbett & Miyamoto 2005). These studies claimed that Westerners are more likely than East Asians to using abstract categories, and Westerners are better than East Asians at reasoning based on Formal rules. According to tests of formal logic and rule-based reasoning, Westerners tend to think more abstractly than East Asians (e.g., Nisbett, Peng, Choi, & Norenzayan, 2001; Norenzayan, Smith, Kim, & Nisbett, 2002).

However, the generalization that Westerners think more abstractly than East Asians was challenged by Singh, Wang, and Casasanto (2019). To test for cross cultural differences in abstract thinking Singh and colleagues administered the Behavioral Identification Form (BIF; Vallacher & Wegner, 1989) to both Western and East Asian participants. In the BIF, participants are asked to choose between two possible descriptions of events: one that is abstract or another that is relatively concrete. Results showed that Chinese participants construed events abstractly more often than did Caucasian Americans (Singh et al., 2019).

Singh and colleagues (2019) predicted this outcome on the basis of reevaluating previous cross-cultural studies which, although they were not designed as tests of abstract vs. concrete thinking, can be interpreted as relevant to this distinction. For example, East Asians have been found to attend to the more abstract global level of hierarchical visual stimuli more than Westerners do (McKone, et al., 2010). Likewise, in a widely used test of context-dependent perception, the Framed Line Task (Kitayama et al., 2003), East Asians showed an advantage for reproducing the lengths of lines on the basis of abstract (invisible) ratios, whereas Westerners showed an advantage for reproducing the lines on the basis of the concrete, perceptible exemplar lines. Furthermore, in memory tests, East Asians tended to recall more abstract gist-based information, whereas Westerners recalled more concrete details (Wang & Ross, 2005). In combination with Singh et al.'s (2019) BIF results, these earlier findings suggest a pattern: East Asians appear to think more abstractly than Westerners in various ways, across diverse measures of perception, cognition, and memory.

The present study builds on Singh, Wang & Casasanto (2019), testing Chinese immigrants to the US to determine whether time spent in a Western culture corresponds to graded differences in the tendency to construe events more abstractly or concretely. To the extent that culture-specific habits of thinking remain malleable into adulthood, and to the extent that these habits are the result of enculturation, exposure to Western culture may cause Chinese immigrants to think more concretely. If so, two predictions follow. First, on average, Chinese immigrants in the US should show a pattern BIF responses that is intermediate between the Chinese-in-China and US-in-US samples reported in Singh, Wang & Casasanto (2019). Second, the number of concrete BIF responses in the Chinese immigrants should increase the longer these individuals have spent in the US. Alternatively, however, the culture-specific biases

shown in Singh, Wang & Casasanto (2019) could reflect stable cognitive traits that are unaffected by exposure to a new culture -- either because these cognitive profiles have a biological basis, or because they are largely fixed by adulthood. If so, overall the BIF responses in the Chinese immigrant sample should show the same pattern found in the Chinese-in-China sample, and individuals' responses should be unrelated to the amount of time they have spent in the US.

Method

Participants. The research was preregistered (<https://osf.io/t8spx>). We planned to recruit 200 native East Asian participants who were living in the US. The timing of recruitment was constrained by Cornell University's academic semesters. At the end of the second semester of recruiting, 232 volunteers had participated. However, 171 were excluded prior to data analysis for failure to complete the survey, or because they did not meet our demographic requirements: To be eligible, participants must (a) be born in East Asia, (b) declare their race to be Asian, and (c) be living in the US at the time of testing. After exclusions, only 61 complete data sets remained. An additional 163 volunteers participated in a second round of recruitment; of these participants, 85 were excluded for failing to complete the study. After both rounds of recruiting, a total of 141 participants from the target demographic had completed the BIF and the necessary demographic questions; of these participants, 139 were Chinese. To facilitate direct comparison with data from the Chinese participants reported in Singh et al. (2019), data from these 139 Chinese participants were analyzed below. All volunteers participated without payment after giving informed consent.

Materials and Procedure. Participants completed an electronic of the Behavioral Identification Form (BIF; Vallacher & Wegner, 1989). Links to the survey were distributed via social media, using the Qualtrics survey platform. Four different versions of the BIF were created, each with a different random ordering of the 25 items; 13 of the items had the abstract answer on top and 12 had the concrete answer on top. For each item, participants read an action description (e.g., *locking a door*) and selected one of two alternative interpretations of the action: one relatively concrete, focusing on the action's physical details (e.g., *putting a key in a lock*), and the other relatively abstract, focusing on the action's goals or outcomes (e.g., *securing the house*). Participants were asked to choose the alternative that best described the action for them, and were told that there were no wrong or right answers.

In the first round of data collection (see Participants section for details) we administered the Self Construal Scale (SCS; Singelis, 1994). This scale was omitted in the second round of data collection, however, to reduce the overall length of the study and encourage participants to complete it. Finally, participants answered demographic questions, reporting their country history, language history, race, age, sex, height and political preferences. All questions and responses were in English.

Results

Of the 139 participants who successfully completed the study, 139 (100%) were from China and were currently living in the US. We will refer to these participants as the “Chinese immigrant” group. Overall, the Chinese immigrants’ mean length of stay in the US was 30.77 months ($SE = 2.52$; range: 2-127 months).

Overall, the mean BIF score for Chinese immigrants was 16.12 ($SE = 0.40$; Fig. 1, middle), indicating that on average participants chose the more abstract event

construal for 16.12 out of the 25 questions. BIF scores from the Chinese immigrants reported here were compared to those of Chinese participants in China ($SE = 0.17$; Fig. 1, left) and US White participants ($SE = 0.24$; Fig. 1, right) reported in Singh, Wang, and Casasanto (2019). According to a binomial logistic regression model with Cultural Group as a fixed factor (Chinese, Chinese Immigrants, US White) and random effects for subject and item, BIF scores differed significantly across the three groups (Wald $\chi^2(2) = 12.37, p = 0.002$): Chinese participants chose the most abstract action interpretations, US White participants chose the fewest abstract action interpretations, and Chinese immigrants chose an intermediate number of abstract action interpretations. In pairwise tests using the same model, the Chinese immigrant group differed significantly from the Chinese group (Wald $\chi^2(1) = 5.32, Beta = -0.55, p = 0.021$), but not from the US White group (Wald $\chi^2(1) = 0.19, Beta = 0.11, p = 0.659$).

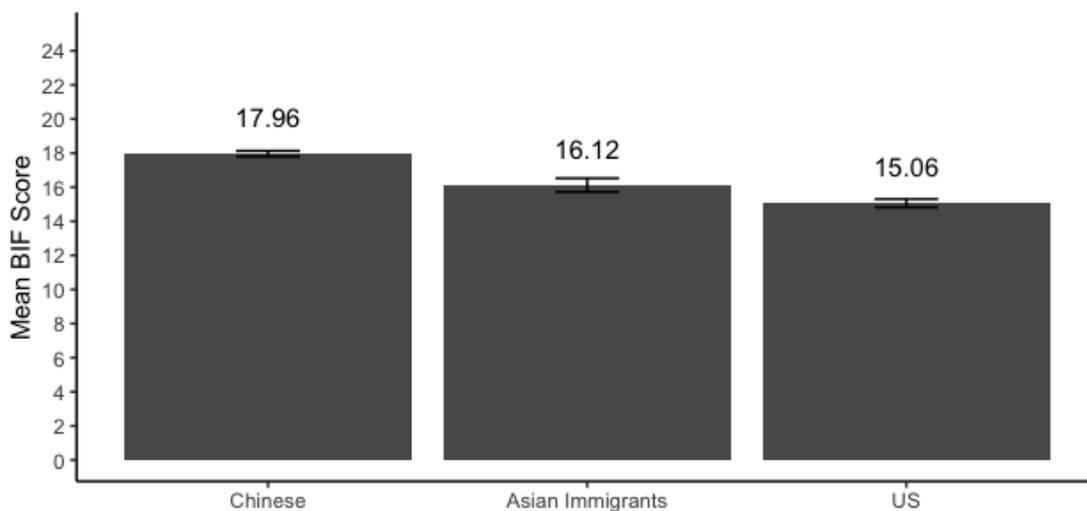


Figure 1: Mean BIF scores for Chinese participants tested in China (left), East Asian immigrants tested in the US (middle), and US White participants tested in the US (right). The Chinese and US White groups were reported previously by Singh, Wang, and Casasanto (2019).

BIF scores for the Chinese immigrant group were analyzed as a function of the time participants spent in the US. According to a binomial logistic regression model with time in US as fixed factors and random effects for subject and item, there was a significant negative correlation between time in the US and BIF score (Wald $\chi^2(1) = 7.86, p = 0.005$; Fig. 2). Chinese immigrants who spent more time in the US tended to construe actions less abstractly, and more like typical US White participants.

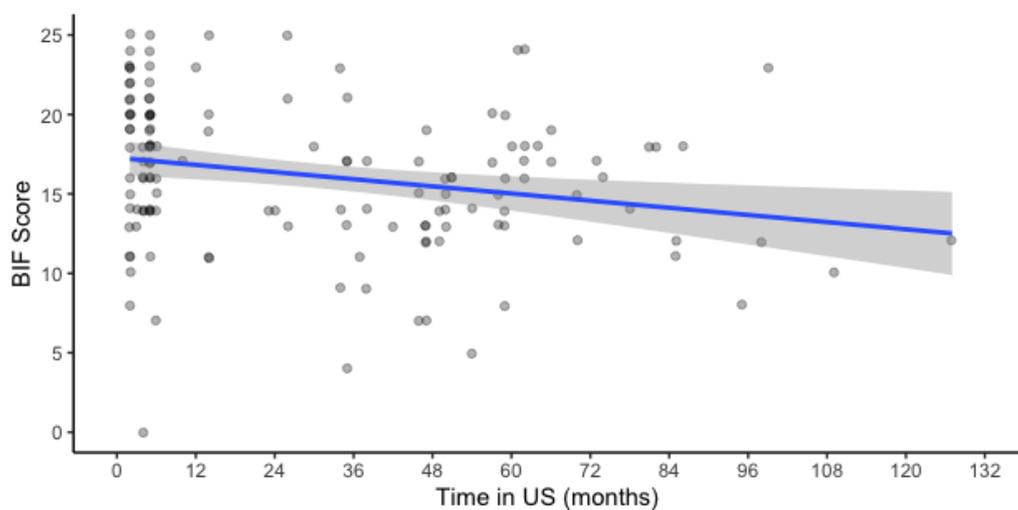


Figure 2: BIF Score by time in US BIF scores in the East Asian immigrant group plotted as a function of the number of months participants had spent in the US. The shaded area indicates the 95% C.I. Higher BIF scores indicate more abstract action interpretations, and lower BIF scores more concrete interpretations.

Discussion

Here we show a correlation between time spent in the US and Chinese participants' construal of events. Compared to Chinese participants tested in China (Singh et al., 2019), Chinese immigrants in the US tended to think more concretely, as indicated by a significant difference in mean BIF scores across groups. The Chinese immigrants' BIF scores were statistically indistinguishable from the US participants'

scores reported by Singh and colleagues (2019), suggesting that Chinese immigrants in the US appear to construe events more like Caucasian Americans than like Chinese people in China. In addition, there was a significant correlation between how long Chinese immigrants spent in the US and their BIF scores: Chinese immigrants who had spent a longer time in the US showed more concrete BIF responses than immigrants who had spent a shorter time in the US.

Together, these results are consistent with an effect of enculturation: According to one likely interpretation of these data, spending time in the US *caused* Chinese immigrants to think about events more concretely. However, given that these data are correlational, we must consider alternative possibilities. First, the turning to the difference in group means, it is important to note that Singh and colleagues' (2019) Chinese participants performed a Chinese translation of the BIF, whereas the Chinese immigrants in the present study used the original English BIF. Although a rigorous backtranslation procedure was used to construct the Chinese BIF, it may be impossible to make documents in two different languages exactly equivalent; perhaps the "concrete" event descriptions were simply better matches for the target events in the English BIF than in the Chinese BIF? Alternatively, in addition, it is possible that using English activated Western mindsets, contributing to group differences.

Yet, although these translation-related explanations could potentially contribute to the difference in group means, they cannot explain the pattern of data obtained, overall, across the present study and Singh et al. (2019). First, Singh et al. (2019) showed the predicted difference in BIF scores between historically Rice-growing and Wheat-growing provinces in China even though all participants were doing the BIF in Chinese. Second, the present data show graded effects of time spent in US, even though all participants were doing the BIF in English.

In order to examine effect of language-of-test further, our lab is currently collecting data on Chinese immigrants to the US using the Chinese language version of BIF. If the difference in group means reported here was primarily due to language of test, then the new Chinese-language sample should show same pattern to Chinese-in-Chinese sample from Singh et al. (2019). Alternatively, if the difference in group means was due to time spent in US, then the new sample of Chinese immigrants tested in Chinese should show a similar pattern to the Chinese immigrants tested in English, reported here.

Turning to the graded effect of time-in-US, the correlation we found between time spent in the US and more concrete BIF responses is consistent with an effect of enculturation on event construal: Exposure to US culture may have encouraged more concrete, US-like habits of thinking. However, we cannot rule out an alternative, which could be equally illuminating with respect to understanding interactions between minds and cultures. It is possible that individuals within our Chinese immigrant sample differed from one another in their tendencies to think abstractly or concretely *prior to arriving in the US*. On this account, perhaps individuals who (already) tended to think in a more Western-like way found the US more congenial, and therefore decided to stay longer. Although it is natural to assume, on the basis of our data, that the amount of time individuals spent in the US affected their cognitive tendencies, these data are equally consistent with the possibility individuals' cognitive predispositions affected the amount of time they stayed in the US.

A true experimental intervention would be needed to establish the causal links underlying the correlations between culture and cognition reported here.

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