

Beyond East and West: Cognitive Style in Latin America

Journal of Cross-Cultural Psychology
2017, Vol. 48(10) 1554–1577
© The Author(s) 2017
Reprints and permissions:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/0022022117730816
journals.sagepub.com/home/jcc



Stephanie de Oliveira¹ and Richard E. Nisbett¹

Abstract

Research on culture and cognition suggests that East Asians are relatively holistic and North Americans are relatively analytic. Social orientation and philosophical traditions have been linked to those differences; collectivism and Confucian tradition are associated with holistic thinking whereas individualism and Western philosophy are associated with analytic thinking. We tested whether Brazilians, who are Western such as North Americans and collectivistic such as East Asians, would more closely resemble U.S. Americans or Chinese participants in various measures of cognitive style. Across five studies, Brazilians were always more holistic than Americans and sometimes more holistic than Chinese participants. Brazilians differed from Chinese participants in that they were particularly optimistic in their judgments about the future (Study 3) and reported varying their emotion expressivity more by context (Study 5). Results build on previous East/West comparisons by identifying a non-Confucian, Western group that may be as holistic as East Asians.

Keywords

cross-cultural differences, judgment, holistic thinking, Latin America

Introduction

“Holistic” and “analytic” thinking styles are distinct frameworks for interpreting the world, and cultures vary in the degree to which they favor one style over another (Nisbett, Peng, Choi, & Norenzayan, 2001). Holistic thinking fundamentally involves high attention to context, whereas analytic thinking fundamentally involves focusing on central objects in relative isolation from their context. Most studies documenting these cognitive differences compare an East Asian group and a North American group (Cohen, 2009; Nisbett et al., 2001; Spencer-Rodgers, Williams, & Peng, 2010), typically finding that East Asians are more holistic on average than North Americans. The work presented in this article tests the extent to which Brazilians, compared with Chinese and American participants, exhibit holistic thinking.

Although culture and cognition have been heavily researched, straightforward hypotheses about cognitive style in Latin America remain elusive. In the next sections, we review research on culture and cognitive style. We then focus on one Latin American group—Brazilians—and consider how their history and society might have fostered holistic thinking in a manner very

¹University of Michigan, Ann Arbor, MI, USA

Corresponding Author:

Stephanie de Oliveira, Department of Psychology, University of Michigan, 530 Church Street, Ann Arbor, MI 48109, USA.

Email: sdeochen@umich.edu

different from how it was developed in East Asia. Finally, we propose two opposing hypotheses about cognitive style in Latin America.

Cognitive Style

Holistic versus analytic thinking. Holistic and analytic thinking styles differ in several ways. Holistic thinkers, such as many East Asians, are more likely to be influenced by contextual cues when making judgments (Choi, Dalal, Kim-Prieto, & Park, 2003; Masuda, Ellsworth, et al., 2008), categorize objects based on relationships or resemblance (Ji, Zhang, & Nisbett, 2004), and assign causality to situations (Morris & Peng, 1994). They are also more likely to be dialectical; they tend to accept contradiction in reasoning (Peng & Nisbett, 1999) and expect the world to change in a cyclical manner (Ji, Nisbett, & Su, 2001). Analytic thinkers, such as many Westerners, focus more on central objects than on the background when making judgments, categorize objects based on rules rather than relationship or resemblance, and assign causality to traits and dispositions. They are less dialectical; they embrace formal logic and expect stable trends in the world.

Antecedents of Eastern/Western differences. Researchers have proposed that historical intellectual tradition may be one source of modern cognitive differences (for reviews, see Nisbett et al., 2001; Peng & Nisbett, 1999). East Asian philosophies such as Confucianism and Daoism promoted holistic ways of thinking about the world, emphasizing relationships and context. Greek philosophers, by contrast, devoted energy to developing logical rules by which one can accurately understand the world and make predictions (Nisbett et al., 2001). Greek thought also emphasized personal agency to a degree not found in Eastern thinking, which emphasized collective harmony instead.

Researchers have also proposed that thinking style may be reinforced by a culture's "social orientation," that is, collectivistic and individualistic approaches to social life (e.g., Varnum, Grossmann, Kitayama, & Nisbett, 2010). Collectivistic cultures such as those of East Asia emphasize relationships, group harmony, and group goals over individual goals (Triandis, 2001). People are understood to be embedded in context as part of a whole (Oyserman, Coon, & Kemmelmeier, 2002). Consequently, daily living in a collectivistic society demands frequent attention to context for successful navigation in the world. In other words, it demands and rewards holistic thinking.

Individualistic cultures emphasize autonomy, personal agency, and personal goals (Triandis, 2001). People in individualistic cultures such as those of North America are considered to be discrete and stable entities that are not as influenced by context (Oyserman et al., 2002). Thus, contextual demands are relatively less pressing, supporting a more analytic thinking style when navigating the world. Repeatedly engaging in an independent context may reinforce analytic thinking in nonsocial contexts more generally.

Overall, research supports the association between collectivism (or interdependence) and holistic thinking, and between individualism (or independence) and analytic thinking (Varnum et al., 2010). Cross-national and within-country studies support the association between social orientation and cognitive style (e.g., Masuda & Nisbett, 2001; Talhelm et al., 2014; Uskul, Kitayama, & Nisbett, 2008). Furthermore, work experimentally priming social orientation supports its causal effects on thinking (Oyserman & Lee, 2008).

The Latin American Case

Latin American cultures have been underrepresented in the cross-cultural psychology literature in general and in the cognitive style work in particular. Psychological theory suggests that a Latin American culture, insofar as it is collectivist, will be more holistic than analytic individualists

such as U.S. Americans (henceforth, Americans). Indeed, research supports the idea that Latin Americans are collectivist relative to North Americans, with some regional variation (Hofstede, Hofstede, & Minkov, 2010; Morling & Lamoreaux, 2008; Oyserman et al., 2002; Pearson & Stephan, 1998; Shkodriani & Gibbons, 1995). But how might Latin American history and philosophical traditions have influenced cognitive style? Here, we focus on Brazil as a case study, reviewing aspects of its society and history that may have produced holistic tendencies.¹ Causal inferences cannot be directly drawn, but we propose this historical approach as a foundation for future theorizing and research on Latin American thinking.

Brazilian history. Perhaps the favorite words of historians and anthropologists who write about Brazil are “dialecticism” and “contradiction” (e.g., Costa, 1964; DaMatta, 1995; de Holanda, 1936/2004; Freyre, 1933/2003). In using these terms, they usually mean that Brazilian identity has been shaped by diverse sources, producing diverse results that outsiders find contradictory. Below we review some of these ideas.

The Portuguese and colonization. Brazil was colonized by the Portuguese. Portugal had a complex history, including a period of Romanization, followed by Germanic tribe occupation, an African Muslim conquest, and a subsequent expulsion of the Muslims in 1139 (Livermore, 1953). Gilberto Freyre conceptualized the Portuguese as the product of both European and African culture:

The African air, a hot, oily air, softened the Germanic edges in [Portuguese] institutions and culture; corrupted the medieval Church’s moral and doctrinal rigidity; removed the bones from Christianity, from feudalism, from gothic architecture, from canonic discipline, from Visigothic law, from Latin, from the very character of the people. (Freyre, 1933/2003, p. 66, first author’s translation)

Early Brazilian colonization efforts were slow; settlers were not organized around a single particular goal. There was little organization and infrastructure until nearly a century after the first settlers landed, when some competition from other European settlers prompted the Portuguese to settle in earnest (Bueno, 2003). Settlers engaged primarily in agriculture and mining, using indigenous and African slaves for labor. Brazilians imported about 20 times as many slaves as U.S. Americans (Voyages: The Trans-Atlantic Slave Trade Database, 2010) and, as the settlers were mostly men rather than families, they commonly had children with indigenous and slave women.

Thus, Brazilian colonization can be contrasted against U.S. American colonization in several ways: (a) it was initially slower and undirected, (b) settlers were not motivated by religious purity, (c) there were far more slaves and more miscegenation with them and indigenous peoples, (d) settlers came from a culturally hybrid region between two continents. These conditions set the stage for modern Brazil’s dialectical approach to race, religion, and the self as described below.

Philosophical tradition. Brazilian intellectuals historically leaned on Europe for their ideas. In this sense, their tradition is undoubtedly Western. Yet, it is impossible to assign a linear heritage to Brazil’s philosophical tradition. European ideas, transplanted across the Atlantic rather than seamlessly developed over time, were consumed without coherence. One historian writes that literary and philosophical ideas were taken from France, political structure for the monarchy was taken from England, and metaphysics and scientific approaches were taken from Germany (Costa, 1964). Thus, postindependence, Brazilian thought can best be described as adhering to Eclecticism, incorporating elements from various philosophies rather than choosing one over the other.

Modern society and culture. Modern Brazilian culture reflects cultural influences from Africa, Europe, and indigenous peoples. It may be argued that from these varied and, at times, opposing influences, coupled with a pragmatic approach to life, a culture of contradiction and dialecticism emerges today. Prominent Brazilian anthropologist Roberto DaMatta suggests that to understand Brazilian society, one must adopt dialectical thinking:

For generations, Latin America has had its share of observers who like to prove that the continent is a true logical disaster. More precisely, it's a sociological disaster! The problem is that these observers . . . assume their position to be logical and precise . . . and [accept] only one sort of logic—the excluded middle . . . —that does not allow apples and oranges to mix. But none of this works for the so-called “Latin American reality.” (DaMatta, 1995, p. 270)

The work of DaMatta and his colleagues provide abundant modern examples of cultural contradiction in which opposites are merged, categories are blurred, relationships are emphasized, and inconsistency and change are accepted. Consider race. At various times in U.S. history, miscegenation was outlawed and people were officially segregated by race. Today, people of mixed racial heritage are frequently perceived as belonging more to one race than another (Ho, Sidanius, Levin, & Banaji, 2011). This reflects a type of analytical thinking in which one is *either* White or Black, for example. The U.S. Census form only recently included mixed-race categories, and even so, these are not frequently used—only 3% identify as belonging to two or more races (U.S. Census Bureau, 2015).

In Brazil, by contrast, society has held a more “dialectical” view of race, in that people can formally belong to multiple categories. In colonial times, Portuguese men commonly had children with indigenous and slave women, and after the abolition of slavery, the legal system did not systematically enforce segregation. As early as 1711, André João Antonil, a Jesuit missionary, described Brazil as “hell” for Blacks, “purgatory” for Whites, and “heaven” for “Mulattoes.” Although this claim downplays the privileges that lighter skinned people enjoyed, it reflects the early use of mixed-race categories in Brazilian society. Today, Brazilian Portuguese has many more words and categories for mixed-race people than American English. Moreover, in the Brazilian Census, 40% of people identify as “Parda,” which is a mixed-race category (Instituto Brasileiro de Geografia e Estatística, 2000).

Religion offers another example. Early U.S. settlers arrived seeking religious freedom, and religion continues to be approached in an analytic manner; one is either Protestant or Catholic, for example. However, in Brazil, notions of religious purity are generally not found in the cultural narrative. A Catholic might attend a séance without concerns about being unfaithful. Adopting one religion does not necessarily preclude adopting practices from another.

A final example can be more directly tied to psychological patterns. Anthropological accounts suggest that individual consistency across different contexts is lower among Brazilians than Americans. Americans prescribe personal consistency across contexts; inconsistencies between thoughts or behaviors often produce dissonance (Festinger & Carlsmith, 1959; Heine & Lehman, 1997). In Brazil, inconsistency is assumed to be a part of life; one's behavior, values, and beliefs are understood to vary depending on context. DaMatta (1995) suggested, for example, that an individual can easily espouse liberalism in public while enforcing paternalistic values at home. Corruption, another type of inconsistency, is fairly commonplace in government and business (Osland, De Franco, & Osland, 1999).

Hypotheses

We know of only two studies investigating cognitive style in Latin Americans. In both studies, participants indicated agreement with holistic or analytic statements, such as, “Everything in the

universe is somehow related to each other” (Choi et al., 2003; Choi, Koo, & Choi, 2007). Participants were either Mexicans and Americans or Spanish/English bilinguals (Lechuga & Wiebe, 2011; Lechuga, Santos, Garza-Caballero, & Villarreal, 2011). Mexicans and bilinguals primed with Spanish were more holistic on some subscales, less holistic on others, and at times no more holistic than non-Mexican participants.

Both history and psychological theory suggest that Brazilians may be more holistic than Americans. Collectivism might reinforce holistic thinking, and holistic thinking may also have been reinforced from repeated exposure to historical and social “contradiction” and a low concern for reconciling those contradictions. However, it is unclear from these theories whether Brazilians are as holistic as Chinese. Confucian traditions, formally and informally taught in East Asia, may amplify holistic thinking for East Asians, whereas Western philosophical traditions—even conflicting ones—might dampen and attenuate holistic thinking in Brazilians. Thus, we expected either that Latin Americans would be as holistic as East Asians, or that Latin Americans would be less holistic than East Asians but more holistic than North Americans.

The Present Work

Five studies examined cognitive style in American, Brazilian, and Chinese participants, representing the most populous nations in each region of interest. Self-report measures can fail to detect real differences due to problems such as the reference group effect (Heine, Lehman, Peng, & Greenholtz, 2002) or people’s lack of insight into their own thinking (Nisbett & Wilson, 1977). Moreover, the work by Lechuga and colleagues did not find consistent results using the holism scale (Lechuga et al., 2011). Thus, we measured holistic thinking indirectly as such approaches tends to be more sensitive to cultural difference (Morling & Lamoreaux, 2008).

The tasks were developed from previous published work and measure holistic thinking in various ways. Specifically, they test (a) how much context is included in photographs from each country, (b) how much emotion judgment varies according to contextual information, (c) how much people expect future change, (d) whether people favor a relational or categorical way of organizing objects, and (e) how much people adapt reports of positive emotion expression across different contexts.

Study 1

Photography can reflect a culture’s value for context, a key feature of holistic thinking (Peng & Nisbett, 1999). Masuda, Gonzalez, Kwan, and Nisbett (2008) found that East Asians tend to photograph models with a wide angle, whereas Americans tend to closely capture the model at the expense of the background (Study 2). We compared how much background was included relative to the main human subject in published photographs from the United States, Brazil, and China.

Method

Photos from women’s magazines, celebrity magazines, and photojournalistic slideshows on news sites were analyzed for context inclusion. Four magazines per country were purchased in the United States, Brazil, and China. Researchers spoke with shopkeepers and local informants to select popular and comparable magazines. Women and celebrity magazines were chosen because relative to other genres such as business, they were easy to obtain, highly compatible in genre, and had abundant photos of people. Photos of people were preferred because it can be difficult to consistently determine the focal object in other types of photography. News photographs were selected from the most visited portal websites of each country (as of November 2014, per Alexa

Rankings, www.alexarankings.com). The sites were yahoo.com, uol.com.br, and qq.com for the United States, Brazil, and China, respectively.

Two selection criteria were used to consistently choose news and magazine photos. First, according to the assistants' best judgment, the photograph had to include the original background (not a digitally created background), and second, the photograph had to depict a single human subject in the foreground. This was to ensure that the main subject of the photo would be easily identifiable. All eligible images in magazines were analyzed, and the number of news photographs was limited to 120 to be compatible with the average number of photos per magazine.

After marking eligible images, assistants recorded three measurements per image in centimeters: the length and width of the image frame and the subject's head size from chin to top of the head. For celebrity magazines, Chinese pages tended to be extremely crowded with images. This led to photo overlap, rendering measurement of the frame less accurate and blocking background context that would have been included in the original photo. To correct for this disparity in page layout, we only retained Chinese images from pages with four or fewer eligible photos as these were more similar to the types of pages represented in other magazines.

To compute a measure of context inclusion, a ratio of background area to head height was computed. The image length and width were multiplied to calculate the image area (or, in the case of nonrectangular photos, estimated area), and this value was divided by head size. Larger values indicate more background relative to the main subject, or more "context inclusion." Head height was used rather than head area because in most photos, people were not facing forward and upright as in previous work on portraits (Masuda, Gonzalez, et al., 2008), making it difficult to generate a reliable and straightforward rule for measuring head width.

Results

All eligible images were measured once to capture the three dimensions of interest. Fifteen images per magazine and 15 images per news website were measured twice by two assistants to test for reliability. Reliability was high. Krippendorff's alpha was .98 for image height (95% confidence interval [CI] = [0.97, 0.99]), .96 for image width (95% CI = [0.92, 0.99]), and .89 for face height (95% CI = [0.83, 0.95]); computed using a script by Hayes & Krippendorff, 2007).

All national magazine samples had strongly positively skewed data. For magazines, log transformation normalized the distributions only after the removal of outliers (± 3 SDs).² After removal of outliers, there were 325 American, 190 Brazilian, and 544 Chinese images for women's magazines, and 160 American, 260 Brazilian, and 214 Chinese celebrity images. For news images, there were no extreme outliers; thus, a simple log transformation normalized the distributions. In total, there were 605, 570, and 878 images.

An ANOVA tested the effects of culture on context inclusion, controlling for image source and the interaction of the image source with culture. The main effect of country was significant, $F(2, 2044) = 45.59, p < .001, \eta_p^2 = .043$, and post hoc power for this effect was .99 (computed using G*Power; Faul, Erdfelder, Lang, & Buchner, 2007). American images ($M = 1.24, SD = 0.53, 95\% CI = [1.20, 1.29]$) included less context than Brazilian images ($M = 1.56, SD = 0.46, 95\% CI = [1.50, 1.57]$) and Chinese images ($M = 1.46, SD = 0.50, 95\% CI = [1.41, 1.47]$); all $ps < .001$. Brazilian images included more context than Chinese images ($p = .001$). Figure 1 displays marginal means and standard errors for each country.

The culture by source interaction was significant, $F(4, 2044) = 20.43, p < .001$. We did not have theoretical predictions about the meaning of this interaction, but the marginal means and further analyses are available in the supplemental material ("Study 1, source by country

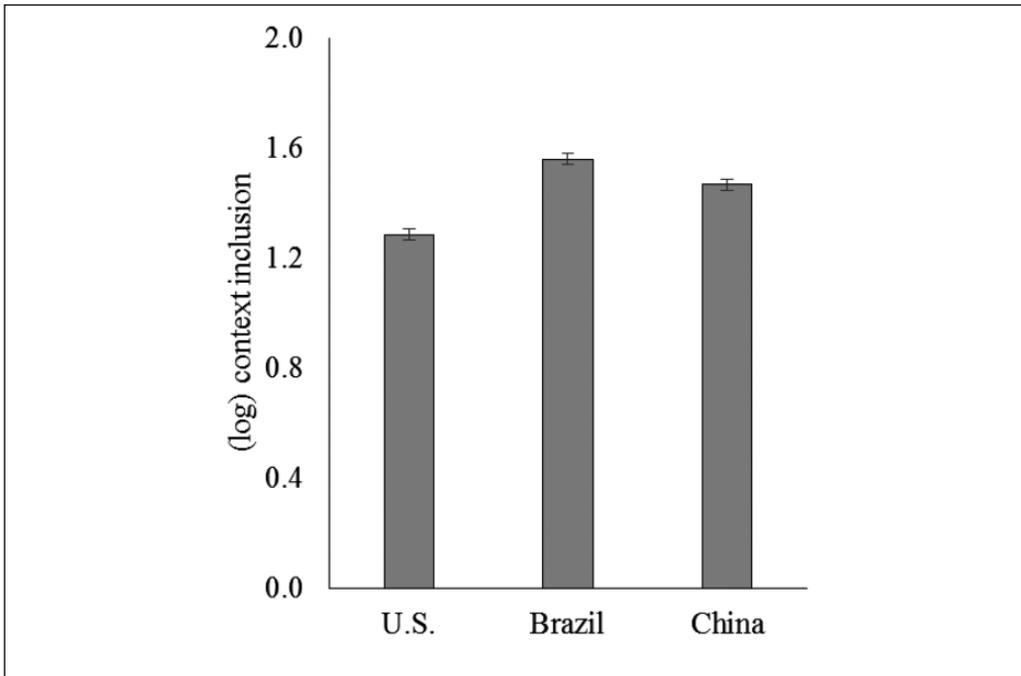


Figure 1. Context inclusion by country, marginal means (Study 1).

Note. The y axis denotes log of context inclusion score (image area / head height). Higher values indicate more background in the photograph relative to the main subject's face. Error bars denote standard error.

interaction"). Brazilian and Chinese means were always significantly higher than American means. Relative to each other, the Brazilian images had more context inclusion for celebrity magazines, but Chinese images had more context inclusion in women's magazines. The two did not significantly differ for news images.

Discussion

This study offers initial evidence that Brazilians think more holistically than Americans. Across three types of photography, Brazilian and Chinese images consistently included more background relative to the main person than American images. Comparisons between Brazilians and Chinese were not consistent across photo types, however; thus, firm conclusions about that comparison cannot be drawn. The news photographs may have offered the best comparison across the three countries because factors such as page layout played no role in how the images were organized. In that case, Brazilian and Chinese photographs had similar context inclusion.

Study 2

Holistic thinking is characterized not only by attention to context but also by the use of context when making judgments. Thus, Study 2 tested to what extent each culture uses contextual information for judgment. Subjects repeatedly judged the emotion of a central character in cartoon images while the characters in the background displayed various emotions. This task was adapted from previous work (Masuda, Ellsworth, et al., 2008). In our version of this task, we used variation in emotion judgment as an indicator of contextual influence on judgment.

Method

Participant recruitment. We developed a novel approach to recruiting subjects online to coordinate multiple cross-cultural comparisons. Americans were recruited via Amazon Mechanical Turk (MTurk), whereas Brazilians and Chinese were recruited via Google Ad Words. Two methods were used because Brazilians and Chinese are not represented on MTurk and Americans did not respond to English Google ads during the study period. In both MTurk and Google announcements, a brief statement asked respondents to lend their time to take a short social survey. Portuguese and Chinese ads were used in Brazil and The People's Republic of China, respectively, targeting only users whose IP addresses originated from the target country. Google optimized display of the ads to appear in search results and on websites. Therefore, although sites such as google.com are blocked in Mainland China, Ad Words can place ads on sites that are not blocked.

We took several steps to promote sample compatibility across countries, especially with regard to motivation. First, because Google Ad subjects were asked to volunteer for the study (there was no infrastructure for compensation), we offered MTurk participants little compensation (5-10 cents) for their time. While some MTurk workers aim only to earn money, many also participate to kill time (Paolacci, Chandler, & Ipeirotis, 2010). Thus, we expected that offering little compensation would encourage money-driven workers to choose more lucrative tasks over ours.

In a separate study testing this recruitment method, we asked subjects to report their motivations for participating in an open-ended format. We found similar motivations across cultures for participation, including interest/curiosity, boredom, or a desire to help with research and learn something new; 21% of MTurk respondents in the test survey reported participating only for money. (By contrast, more than half of general MTurk workers use MTurk to earn money; Paolacci et al., 2010. Paolacci and colleagues asked their participants to choose motivations from a predefined list, including "to earn additional money." Note that we used an open-ended text box to avoid limiting people's responses.) Table 1S in the supplement reports the proportion of different motivations by country. As a final measure to maximize the quality of the data across the three samples, we included an attention check question to filter out distracted subjects.

Subjects. We aimed to collect at least 50 to 60 subjects per culture, based on similar work that has detected cultural effects with this number (Masuda, Ellsworth, et al., 2008) and based on meta-analyses estimating the effect of social orientation on cognition to be approximately $d = 0.5$ (Oyserman & Lee, 2008). The recruitment stopped when there were 2 to 3 times the number of subjects needed because some respondents who clicked through the survey were not fully completing the questions. Sixty-eight Americans, 60 Brazilians, and 48 Chinese subjects completed all emotion rating questions and passed a filter question, which tested for attention. American, Brazilian, and Chinese mean ages were 33 years ($SD = 10.38$ years), 37 years ($SD = 13.05$ years), and 29 years ($SD = 7.66$ years), respectively. Americans were 56.7% male, Brazilians were 30.9% male, and Chinese were 81.4% male.

Materials. Surveys were originally written in English. They were translated and back-translated into Portuguese and Mandarin Chinese. Discrepancies were resolved before posting the final versions online.

Stimuli included 16 cartoon images depicting a standing boy in the foreground with four background people, based on Masuda, Ellsworth, and colleagues' (2008) images. The boy looked happy, sad, angry, or neutral, and the background characters' emotions were fully crossed such that they also exhibited these emotions. The boy was adapted from original stimuli to appear ethnically ambiguous. Ambiguity was intended to allow subjects from each country to plausibly imagine that the character was from their own country, particularly among the East Asian subjects who may more strongly distinguish between ethnic in-group and out-group members. In

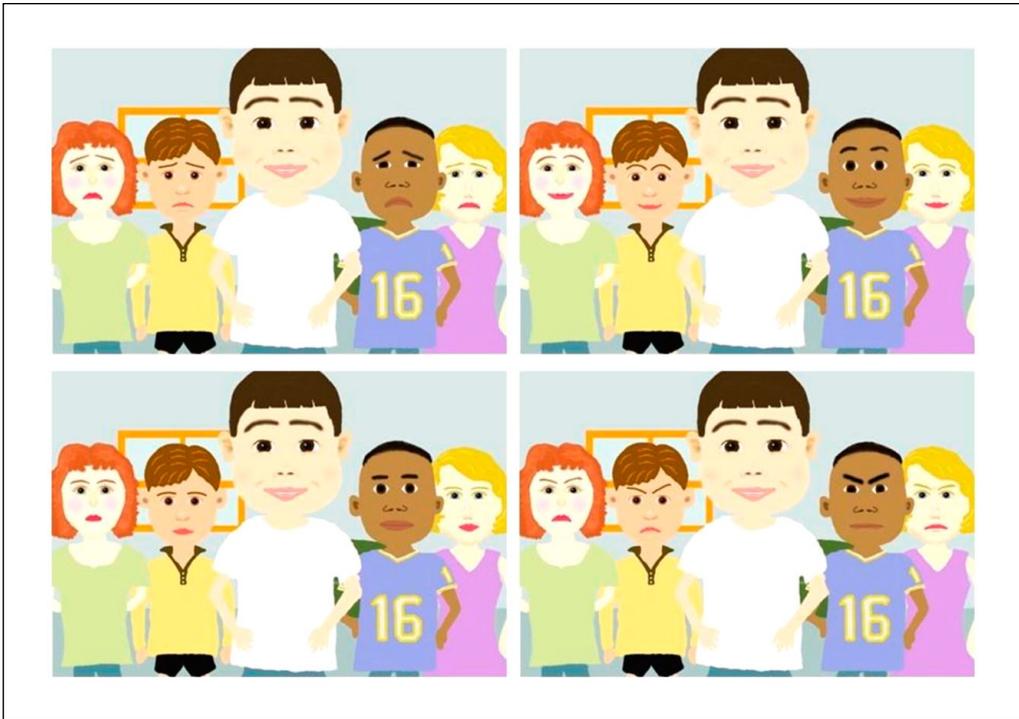


Figure 2. Cartoon characters used in Study 2.

Note. The foreground character displayed happy, sad, angry, or neutral faces and these were crossed with background expressions of the same four emotions.

pretesting, 95% of Chinese respondents thought the main character was ethnically nonmixed East Asian, compared with 23% of Brazilians and 35% of Americans who thought so. Figure 2 displays an example of the images.

Procedure. After clicking on the study links, participants were taken to an informed consent page in their language. They first completed emotion ratings for a practice image. The experimental images were then presented individually in random order. For each image, the subjects indicated how angry, sad, and happy they thought the main character was feeling on a 10-point scale anchored at *not at all angry (happy/sad)* to *extremely angry (happy/sad)*. After the 16 images, we also asked subjects, “Did you notice the emotional expressions of the background characters in the cartoon?” and “Did the background characters’ expressions influence your judgment about the middle character?” as a simple self-report measure of attention to context (Masuda, Ellsworth, et al., 2008). Subjects indicated “yes” or “no” in response to each question. Finally, a filter question asked subjects to select a specific answer from an answer scale to ensure that they understood the scale and were paying attention (Goodman, Cryder, & Cheema, 2013).

Results

Because the boy’s emotional expressions were fully crossed with four emotional expressions of background characters, each emotion that the target boy expressed was rated 4 times. We computed the variance for each subject’s four ratings of happiness for the happy target, four ratings of anger for the angry target, and four ratings of sadness for the sad target. The variance was used as a “background sensitivity” score to gauge how much the ratings of the same character’s

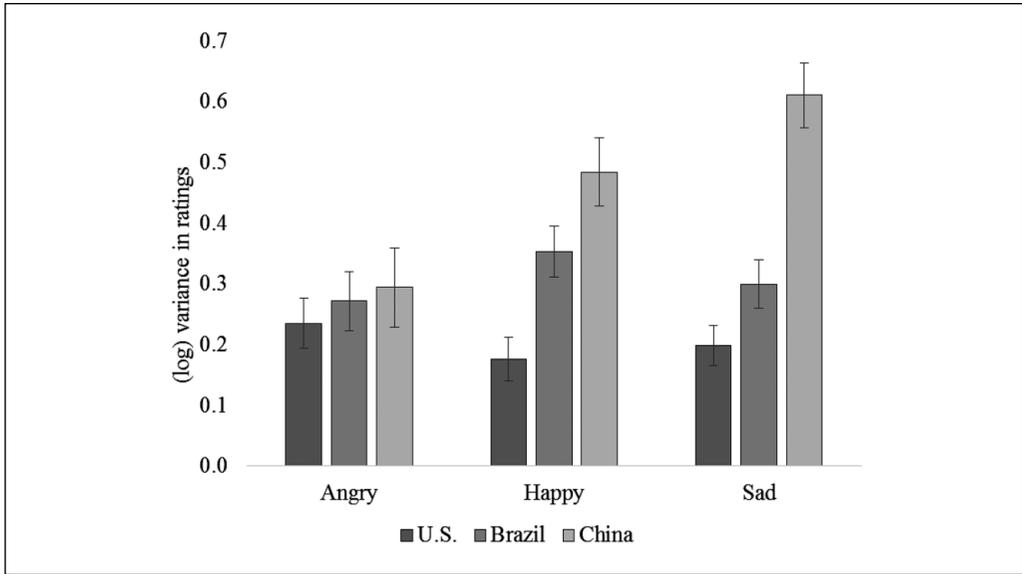


Figure 3. Context sensitivity by country and emotion, controlling for sex (Study 2).

Note. Higher y-axis values signify more variation in judgments of the target's emotion while the target's emotion remained constant and background expressions varied. Bars represent standard error.

emotions varied across different background emotions.³ Higher variance reflects relatively greater influence of background on judgment. Data for all three countries were strongly positively skewed, so log-transformed values were used for analyses. Untransformed values yield similar patterns—all means and 95% CIs are reported in the supplement (“Study 2, untransformed statistics”).

A two-way mixed ANOVA examined the effect of country (three, between subjects) and emotion (three, within subjects) on logged variance of emotion ratings. There was no significant main effect of emotion ($p = .209$), but a main effect of country emerged, $F(2, 173) = 32.81, p < .001, \eta_p^2 = .275$, with post hoc power of .99.

Tukey's post hoc tests for the country effect indicated that American variance was significantly lower than Brazilian variance ($p = .005; M_{\text{American}} = 0.21, SE = 0.02, 95\% \text{ CI} = [0.16, 0.25]; M_{\text{Brazilian}} = 0.31, SE = 0.02, 95\% \text{ CI} = [0.26, 0.36]$) and Chinese variance ($p < .001, M_{\text{Chinese}} = 0.49, SE = 0.03, 95\% \text{ CI} = [0.44, 0.55]$). Brazilians' variance was significantly lower than Chinese variance ($p < .001$). The effect of country was not significantly moderated by emotion, although the interaction was marginal ($p = .063$).

When controlling for age and sex the main effect of country remained the same, with neither age nor sex predicting variance in emotion ratings. However, the interaction between country and emotion become significant, $F(4, 275.46) = 3.84, p = .005, \eta_p^2 = .050$. There was also a three-way interaction between country, emotion, and sex, $F(4, 275.46) = 3.93, p = .005, \eta_p^2 = .051$. Thus, we tested the country effect, controlling for sex, separately for each emotion.

As reflected by the means in Figure 3, the effect of country on judgment varied by emotion. Overall, patterns were similar across emotions, varying in degree. For anger, the effect of country was not significant, but it was for happiness, $F(2, 159) = 12.22, p < .001, \eta_p^2 = .133$, and sadness, $F(2, 159) = 21.95, p < .001, \eta_p^2 = .216$.⁴ Brazilians had significantly higher variance than Americans for happiness ($p = .002$) and sadness ($p = .05$). Chinese had significantly higher variance than Americans for happiness ($p < .001$) and sadness ($p < .001$). Chinese had significantly higher variance than Brazilians for sadness only ($p < .001$); the difference for happiness was marginal, $p = .063$.

Most subjects reported that they noticed the changes in image background (79%, 87%, and 65% for U.S., Brazil, and China subjects, respectively).⁵ A logistic regression revealed that country predicted whether subjects reported being influenced by the background, $\chi^2(2, N = 206) = 17.17, p < .001$. Results were consistent with the “variance” results; only 18.3% of Americans reported being influenced, whereas 42% of Brazilians and 50% of Chinese said they were influenced by the background. Contrasts revealed that Brazilians ($p = .003$) and Chinese ($p < .001$) were significantly more likely to report being influenced than Americans, and they did not differ from each other. These results suggest that the cultural differences in context influence is not attributable to any group’s failure to notice the context. Rather, it is more plausible that the subjective informational value of the context drove subjects to vary their responses to different degrees.

Discussion

Study 2 supports the hypothesis that Brazilians are more holistic than Americans in judging happy and sad faces, although there were no cultural differences in variation for judgments of angry faces. Chinese respondents were more holistic than Americans and Brazilians for those same emotions. The results held when controlling for age and sex, and no consistent effect of sex emerged across the three countries’ emotion ratings.

Although Study 1 suggests context inclusion might be similar for Brazilians and Chinese, Study 2 suggests that Chinese are particularly sensitive to context as compared with Brazilians when judging emotion in a group image. We were surprised that Brazilians were not more similar to Chinese. Study 2’s findings, however, are consistent with evidence that East Asians are higher in social anxiety than both North and Latin Americans (Schreier et al., 2010). Some scholars have found evidence supporting the notion that East Asians scan their environments especially carefully for social cues of approval or disapproval in an effort to avoid losing “face” (Hamamura, Meijer, Heine, Kamaya, & Hori, 2009). These differences in social anxiety might explain why Brazilians showed weaker holistic tendencies than Chinese participants in emotion judgment—Brazilians may be holistic but less “vigilant.”

Study 3

Peng and Nisbett (1999) described change as being fundamental to Chinese holistic thinking, and they also connected the expectation of change to contradiction and context sensitivity: “It is because of change that contradiction becomes inevitable; it is because change and contradiction are inevitable that it is meaningless to discuss the individual part without considering its relationships with other parts” (p. 743).

Ji et al. (2001) found that Chinese subjects gave higher probability ratings than Americans when asked about the likelihood of future change (e.g., a currently successful chess player losing an upcoming tournament). Like Peng and Nisbett, Ji and her colleagues attributed that difference to cognitive style. They argue that analytic thinkers build simpler causal models, focusing on a smaller set of potential causes for each effect. Thus, they are less likely to consider contextual factors that could trigger a future change. Holistic thinkers build more complex causal models, considering a broader array of factors and viewing them as interrelated. Thus, they are more likely to expect future change; their world is more dynamic, comprised of interconnected “moving parts.” In short, as context changes, so do the thoughts, feelings, and behaviors of people who are embedded in those contexts.

We used a likelihood judgment task similar to the example given. The present study tests whether Brazilians and Chinese expect more future change than Americans. Participants responded to positive and negative future change scenarios to test whether Brazilians might be

particularly positive, expecting change for the better more than change for the worse, in accordance with some stereotypes about Latin Americans (Rezende, 2008).

Method

Subjects. Participants were recruited as in Study 2, and we aimed for at least 60 subjects per country (similar to Ji et al., 2001). Eighty-three Americans, 76 Brazilians, and 65 Chinese respondents passed the attention check and reported being born and raised in the target country. Americans were 36 years old on average ($SD = 12.39$ years) and 40% male. Brazilians were 37 years old on average ($SD = 14.29$ years) and 26% male. Chinese respondents were 32.42 years old on average ($SD = 14.27$ years) and 56% male.

To further assess demographics of our sample, we asked respondents to indicate educational attainment as a rough measure of socioeconomic status. In our sample, 58% of Americans completed college, but only 31% of Brazilians and 33% of Chinese respondents completed college. Nationally, 22% of Americans aged 25 to 64 earn a bachelor's or its equivalent, whereas 14% of Brazilian and only 3% of Chinese adults do (Organization for Economic Co-Operation and Development, 2017). Thus, for all three samples, relative educational attainment was consistent with national averages, in that Brazilians and Chinese achieved less schooling than Americans. However, for all three countries, and especially China, our sample had a higher proportion of participants who completed college compared with national proportions.

Materials and procedure. Participants read 16 scenarios that described a current state and a future possible change, based on stimuli from Ji et al. (2001). Half of the items described a current negative state and asked about the likelihood of a future change for the better. The other half described a current positive state and asked about the likelihood of a future change for the worse. The scenario topics were diverse, describing changes in relationships, ability and performance in various domains, and life circumstances such as health and social class. Subjects indicated their estimates of the likelihood of that future change occurring. For example, "Sam did poorly on the math test at the beginning of the term. How likely is it that he will get a good grade in the course?" Subjects responded on an 11-point scale anchored at, *not at all likely* and *100% likely*, with 10% increments labeled numerically. Survey materials were translated and back-translated into Portuguese and Mandarin, with discrepancies resolved before launching each survey.

Results

Each subject's likelihood ratings for change for the better scenarios were averaged to produce a single "change for the better" score (henceforth, "better"), and the same was done for "change for the worse" scenarios (henceforth, "worse"). Cronbach's alphas for "better" items were .83 for Americans, .62 for Brazilians, and .71 for Chinese. Alphas for "worse" items were .74 for Americans, .66 for Brazilians, and .79 for Chinese.

A mixed ANOVA tested the effect of country (three, between subjects) and change type (two, within subjects) on likelihood ratings. There was a main effect of change type, $F(1, 221) = 47.88$, $p < .001$, $\eta_p^2 = .178$. People thought change for the better was more likely ($M = 45.05$, $SD = 18.04$) than change for the worse, $M = 37.93$, $SD = 15.65$. There was also a main effect of country, $F(2, 221) = 25.41$, $p < .001$, $\eta_p^2 = .187$, with observed power of .99. Brazilians expected the most change ($M = 49.85$, $SE = 1.47$), followed by Chinese respondents ($M = 39.91$, $SE = 1.66$). Americans expected the least change, $M = 34.98$, $SE = 1.47$. Tukey's post hoc comparisons indicated all contrasts were significant (U.S. vs. Brazil, Brazil vs. China $ps < .001$, U.S. vs. China $p = .027$). The country effect remained when controlling for age, sex, and educational attainment. None of those demographic variables predicted likelihood ratings or moderated country effects.

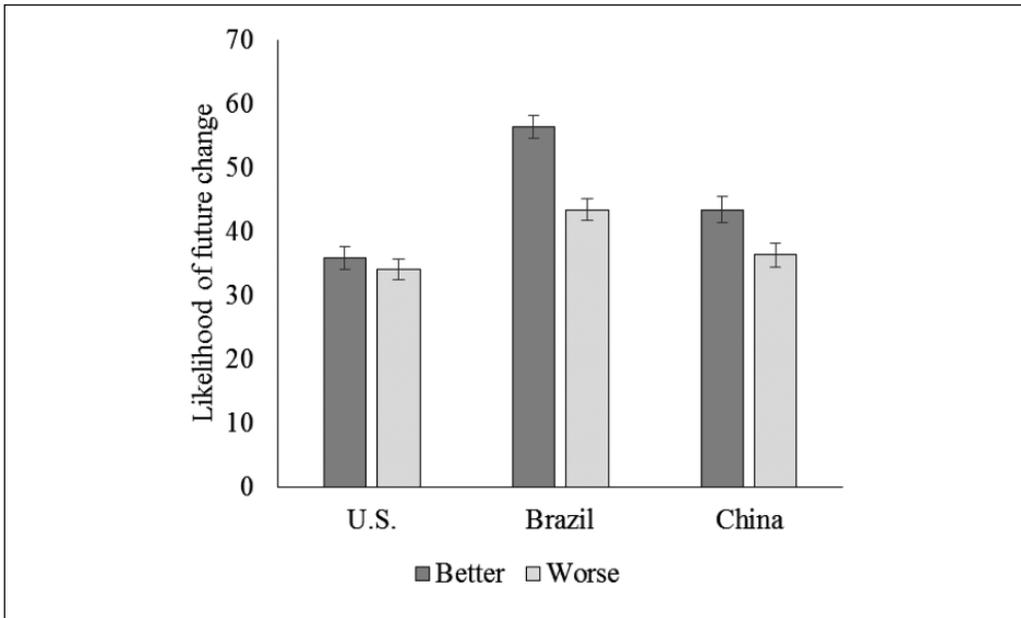


Figure 4. Expectation of future change (0%-100% likely) by country and change type (Study 3). Note. The y axis represents marginal means, the bars represent standard error.

The interaction between culture and change type was significant, $F(2, 221) = 10.26, p < .001, \eta_p^2 = .085$. A one-way ANOVA revealed a significant effect of country on “better” scores, $F(2, 223) = 28.55, p < .001, \eta^2 = .204$. Tukey’s post hoc tests indicated that Brazilians gave significantly higher “better” estimates than Americans and Chinese ($ps < .001$). Chinese respondents gave significantly higher estimates than Americans ($p = .006$). Figure 4 displays mean estimates by country.

A one-way ANOVA revealed a significant effect of country on “worse” scores, $F(2, 224) = 7.40, p = .001, \eta^2 = .062$. Brazilians gave significantly higher “worse” estimates than Americans ($p = .001$) and Chinese ($p = .012$). Chinese and American responses were not significantly different ($p = .833$). Figure 4 displays mean estimates by country.

We finally conducted an ANOVA on the difference between each subject’s “better” and “worse” ratings as a type of optimism score. (Results were mathematically identical to interaction term results of the main ANOVA.) Tukey’s post hoc tests revealed that Brazilians had significantly bigger difference between “better” and “worse” probabilities than Americans ($p = .001$) and marginally bigger difference than Chinese ($p = .069$). Chinese in turn were not significantly different than Americans ($p = .099$).

Discussion

In Study 3, as in previous work, Chinese participants were more holistic than Americans. Brazilians were more holistic than both American and Chinese participants. This was driven by particularly high likelihood ratings for change for the better. Brazilians were also significantly more optimistic than the other groups, in the sense that, they especially expected positive change relative to negative change. Country effects did not change in significance or magnitude when controlling for age, sex, and educational attainment. Study 3, therefore, supports the hypothesis that Brazilians would be more holistic than Americans, and it also demonstrated that Brazilians are at least as holistic as Chinese people in this type of task.

Study 4

In categorization tasks, grouping objects by category, or taxonomically, is associated with analytic thinking. Grouping objects by relationship, or thematically, is associated with holistic thinking (Ji et al., 2004; Na et al., 2010; Talhelm et al., 2014; Uskul et al., 2008). In Study 4, people saw images of a target object (e.g., a cow), and paired it with one of two other objects. One object (e.g., grass) related to the focal object in a relational manner (cows eat grass). The other object (e.g., a chicken) related to the focal object in a categorical manner (cows and chickens are both animals). We compared the extent to which American, Brazilian, and Chinese respondents made relational (holistic) choices.

Method

Participants were recruited as in Study 2. After filtering out participants who were not born and raised in the target countries, there were 56 American, 73 Brazilian, and 53 Chinese respondents. American mean age was 37 years ($SD = 14.18$ years) and 40% were male. Brazilian mean age was 44 years ($SD = 14.62$ years), and 48% were male. Chinese mean age was 28 years ($SD = 9.96$ years), and 47% were male.

To compare our Western samples ethnically, we asked American and Brazilian participants to report their ethnicities on similar but not identical scales; racial categorization is typically different between the two countries. In Brazil, there are official categories for races that in the United States would be determined as “mixed.” Of Americans, 80% were White non-Hispanic, 5% were Black, 4% were Native American, and 11% were “Other.” Of all Brazilians, 58% were White, 4% were Black, 2% were Asian, 4% were Native American, and 33% were “Other,” including responses to the mixed-race category “Parda.” The relatively fewer White respondents and larger proportion of “Other” race respondents is reflective of ethnic differences between the two countries as discussed in the “Introduction” section.

Participants viewed 14 triads, as in Na et al. (2010), in random order. Each triad showed pictures of three objects arranged in triangular fashion: one focal object on the bottom, with an arrow pointing to it, and two objects on the top. Relational objects were placed equally often on the right or left side of the triangle. Participants clicked on one of the top objects to pair it with the focal object in whatever manner seemed most reasonable to them. They were told there were no right or wrong answers. They completed demographic information at the end of the study.

Results

Various methods of computing holistic scores have been reported. Some authors subtract number of categorical scores from number of holistic scores (e.g., Ji et al., 2004; Uskul et al., 2008). Others look at the frequency or percentage of relational associations (Na et al., 2010; Talhelm et al., 2014). Because a few subjects had missing data, we scored holistic thinking in the latter form, dividing the number of relational associations by the total number of associations. A score of 0 indicates completely analytic choices, and a score of 1 indicates completely holistic choices.

Country significantly predicted holism score, $F(2, 179) = 4.19$, $p = .017$, $\eta^2 = .045$, and the effect holds when controlling for age and sex. There were no main or interaction effects of age and sex. Overall, people across the three countries were holistic. Americans and Chinese were equally holistic ($M = 0.76$, $SD = 0.25$, for both countries). Brazilians were the most holistic ($M = 0.87$, $SD = 0.22$). Tukey’s post hoc tests revealed that the American and the Chinese participants were significantly less holistic than the Brazilian participants, $p = .037$ and $p = .045$, respectively. Chinese and American participants were not significantly different from each other.

In this study, participants indicated their motivations for participation as described in the “Introduction” section. Removing American participants who participated solely for money did not alter the results.

Discussion

Brazilians were more holistic than both Chinese and American respondents in this study. Surprisingly, Chinese and American respondents were equally likely to sort objects relationally, and overall people gave a higher proportion of relational answers than categorical answers. Post hoc analyses suggest that the study was slightly underpowered (.74 for our main effect). We do not think this explains the lack of a significant effect, however, between Chinese and Americans—there was not even a trend in the expected direction. The lack of a Chinese/American difference is most likely because our American holism scores were particularly high compared with holism scores in previous work using this task.

Study 5

Study 5 examined to what degree people’s reports about expressive behavior vary when considering different social contexts. Cultures that vary in their levels of individualism and collectivism tend to have different ways of conceptualizing the self. In individualist contexts, people are viewed as relatively discrete and independent, whereas collectivists tend to view people as embedded in a larger social context. These differences can affect how dynamic the self is across situations. Collectivists tend to adapt self-concept and behavior according to context more than individualists. In negotiation and reward allocation, Americans behave more similarly toward in-group and out-group members than do Chinese and Brazilians (Leung & Bond, 1984; Pearson & Stephan, 1998). Americans have been found to vary their self-descriptions less by social context than Japanese (Kanagawa, Cross, & Markus, 2001).

We take greater context-dependent constructions of the self to be indicative of holistic thinking, although this could also be considered holistic social style. Similar to previous work, the present task was developed to investigate how context-dependent participants would be in their reports of their own behavior. The task focuses on positive emotional expression, as positive expressivity and warmth are core part of the stereotype that many people hold of Latin Americans (Rezende, 2008) and also because East Asians and Latin Americans appear to have very different emotional styles. In this study, participants indicated on a visual scale how expressive they would be across five different social contexts varying in closeness—that is, ranging from interacting with family and friends to walking among strangers on the street.

Latin Americans and East Asians are both fairly collectivistic and holistic. Thus, the self would be perceived to be part of a larger social context, and more responsive to it. They might, therefore, both vary their reports of expressivity across contexts to a greater degree than Americans. (Note that we expected everyone to vary their expressivity across context; the prediction was a matter of degree.)

However, research suggests that a broader range of expressivity may be acceptable in Latin cultures as opposed to East Asian cultures. Mexicans have been found to value high-arousal positive emotion (Ruby, Falk, Heine, Villa, & Silberstein, 2012), in contrast to East Asians who prefer low-arousal positive emotions and generally avoid extreme expression (Murata, Moser, & Kitayama, 2013; Soto, Perez, Kim, Lee, & Minnick, 2011; Tsai, Louie, Chen, & Uchida, 2007). Extreme emotional expression has at times been viewed as pathological in East Asian culture (Kleinman, 1986), whereas it is viewed by many Latin Americans as a natural and important part of life (for a helpful review, see Soto, Levenson, & Ebling, 2005). Thus, although we hypothesized that Chinese and Brazilians may vary reports of expressivity more by context than

Americans, there may be less variation in emotional expressivity for Chinese participants than Brazilians.

Method

Participants. University students in the United States ($N = 93$), Brazil ($N = 123$), and China ($N = 83$) were recruited by researchers in class to participate in a survey study on a volunteer basis (Brazil), for course credit (the United States), or for a token gift (China) according to local custom. The present analyses were performed on data from a larger study on emotion; here, we just describe the questions related to the present task. Across all three countries, students were recruited from arts and sciences classes (e.g., education, psychology) to maintain some comparability between them.

Mean ages were 20 years ($SD = 2.18$ years) for Americans, 26 years ($SD = 9.05$ years) for Brazilians, and 21 years ($SD = 1.1$ years) for Chinese. The Brazilian subjects were older, on average. This is not surprising as it is common in Brazil to take longer to complete school. Many people work while taking college courses, and it is not rare to pursue multiple degrees and certificates over the course of one's career. The American sample was 40.9% male, Brazilians were 33.9% male, and Chinese were 42.9% male. The mean number of years of schooling was 14.68 for Americans ($SD = 1.87$ years), 14.62 for Brazilians ($SD = 6.04$ years), and 14.86 for Chinese ($SD = 1.66$ years)—thus, one facet of socioeconomic status, educational attainment, was controlled for across the countries.

Materials and procedure. After giving informed consent, students completed a survey packet. For the present study, survey items described five social contexts involving family members, friends, classmates, acquaintances, and strangers. For each context, students indicated their typical level of expressivity in that context (e.g., “Which face best describes how you typically look when you are with your best friends?”). Subjects selected their responses from a gender-matched scale that showed nine facial expressions gradually changing from a neutral face to a smiling face (see Figure 5). The images were comprised of still-shots taken from a dynamic video of emotional expression (Van der Schalk, Hawk, Fischer, & Doosje, 2011). We wanted participants to all use the same scale, so these stimuli were chosen for being the most ethnically ambiguous we could find. Responses were coded to values ranging from 1 to 9 (1 = *the least expressive face*, 9 = *the most expressive face*). This method was used to avoid the influence of potential differences in Likert-type scale interpretation.

Although the scale did not include other emotional expressions, a pretest with Brazilians and Americans confirmed that when this neutral-to-positive scale is used, the vast majority of people find the scale adequate to represent emotions that they would feel with people in these contexts.

To test how context influenced reports of expressivity, we computed the variance of each subject's responses across the five contexts. Higher values indicated that the subject varied his or her responses more according to context.

Results

Expressivity variation across context differed significantly by country, $F(2, 291) = 8.73, p < .001, \eta_p^2 = .057$, with post hoc power of .98. American and Chinese indications of expressivity varied, but significantly less than those of Brazilians (*means* are displayed in Figure 6). Tukey's post hoc tests revealed that Americans ($p < .001$) and Chinese ($p = .007$) scored significantly lower than Brazilians but were not significantly different from each other ($p = .789$). The effect of country remained when controlling for age and sex, and it was not moderated by either factor. There was a main effect of sex, however, $F(1, 279) = 20.35, p < .001, \eta_p^2 = .068$; female variance across contexts was higher than male variance ($M_F = 6.79, SE = 0.23$, vs. $M_M = 5.11, SE = 0.29$).

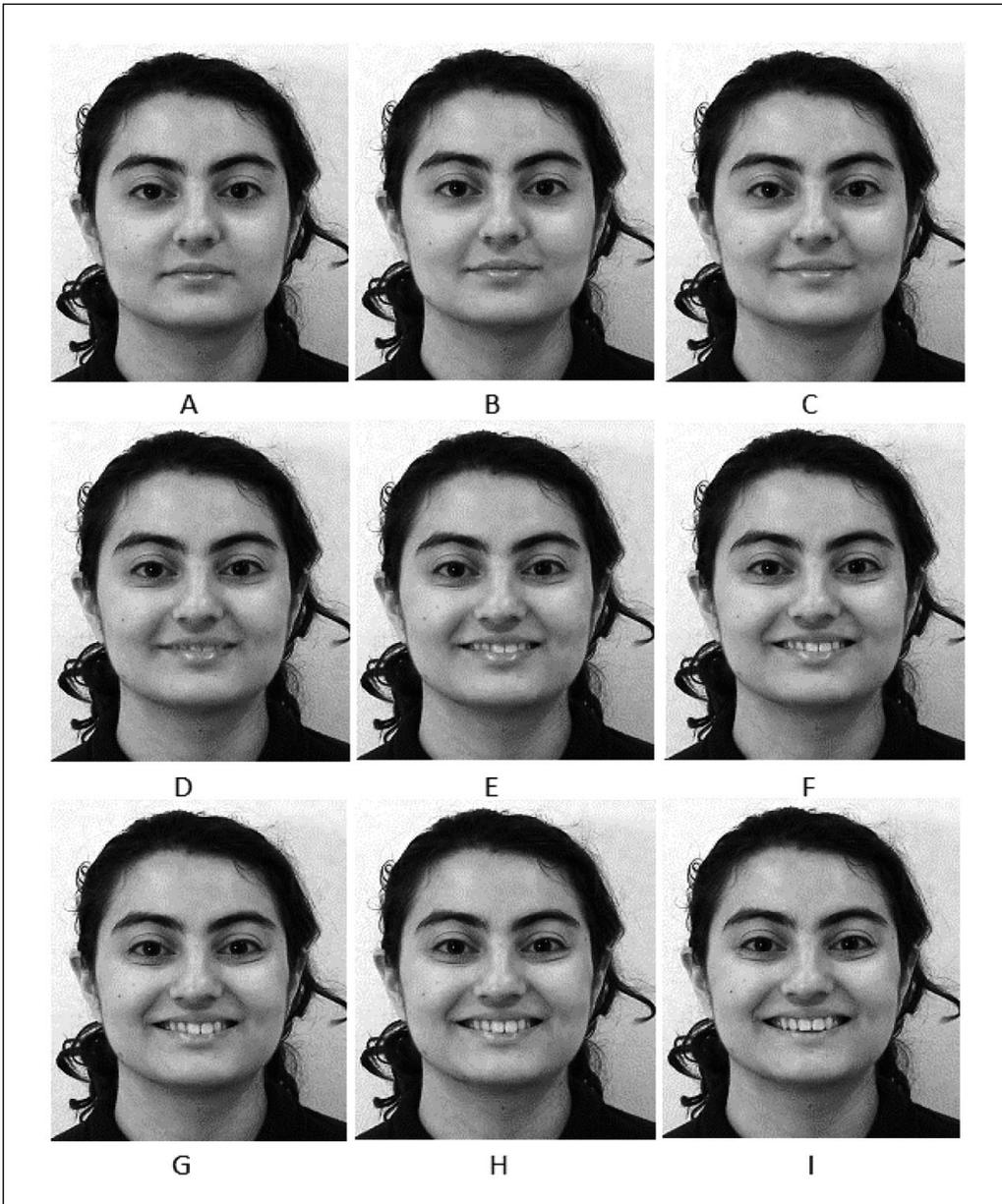


Figure 5. Female version of the facial expressivity scale (Study 5).

Note. Nine images ranging from a neutral to a positive expression allowed subjects to indicate how much positive expressivity they would typically display in a given context. Letter answers were recorded such that A = 1 and I = 9.

Discussion

Brazilians individually reported varying their levels of expressivity according to context more than Americans and Chinese in Study 5. This difference is consistent with evidence that using socioemotional cues to communicate is especially emphasized in Latin cultures (Holloway, Waldrip, & Ickes, 1999; Sanchez-Burks, Nisbett, & Ybarra, 2000). Thus, it appears that although context influences how expressive Americans and Chinese report themselves to be, it matters even more to Brazilians in this domain.

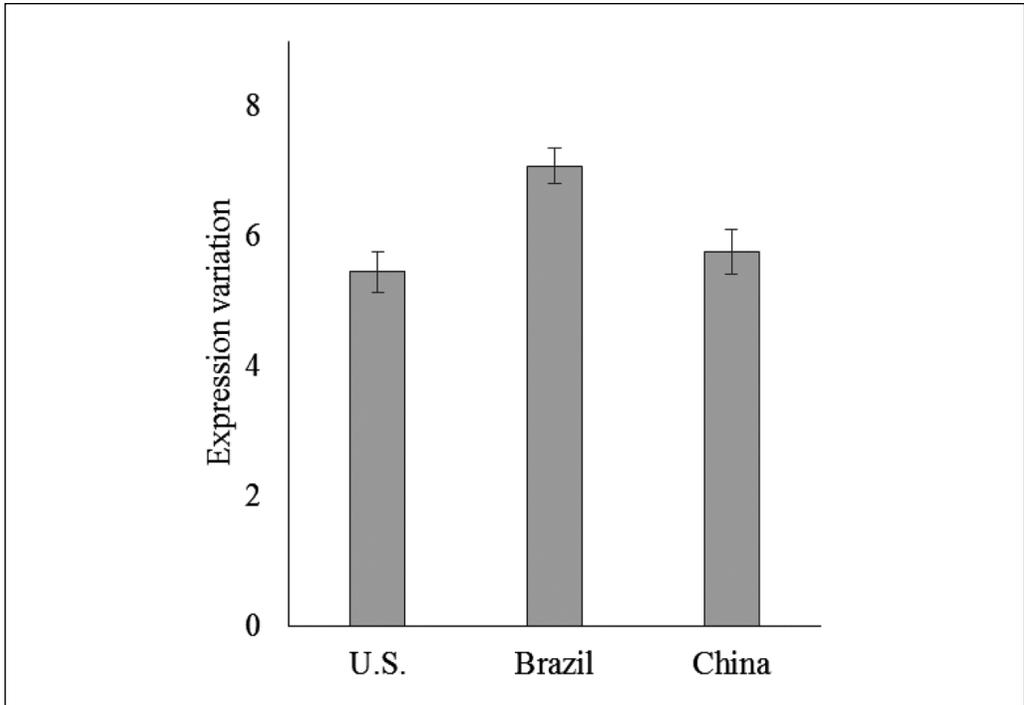


Figure 6. Expressivity variance across five contexts, by country (Study 5).

Note. The y axis denotes variance. Brazilian answers reflected, on average, more variance in expressivity across social contexts than American and Chinese answers. Bars indicate standard error.

Effect Size Results

To summarize overall country-level differences in holistic tendencies for each task type, the differences between country means were standardized for comparison. These standardized effect sizes (d) are displayed in Table 1. For simplicity, when necessary, the contrasts collapse across other factors present in each study. Specifically, for Study 1, the contrasts are for the effect of country on context inclusion across all image sources. For Study 2, the contrasts are collapsed across emotion types, and for Study 3, the contrasts are collapsed across change type. Variance was pooled across the three groups when computing d for each contrast. Overall, d_+ was calculated according to Hedges and Olkin's (1985) procedure.

As can be seen from Table 1, the overall size of the difference between Brazilian and Chinese samples is small, whereas the Brazil/U.S. contrast and the China/U.S. contrast are on average comparable. However, there is a lot of heterogeneity in the magnitude of cultural differences depending on the task.

General Discussion

Findings from five different measures suggest that Brazilians are more holistic than Americans. They include more context in photographs (Study 1), they vary emotion judgments more according to contextual cues (Study 2), they expect more future change (Study 3), they are more likely to sort objects by relationship than by category (Study 4), and they are more likely to vary their reports of expressivity based on context (Study 5). Most findings also support previous research demonstrating more holistic tendencies among Chinese than Americans. For four out of the five

Table 1. Standardized Effect Sizes for All Studies.

Study	Description	Effect size (<i>d</i>)			
		United States vs. Brazil (<i>n</i>)	United States vs. China (<i>n</i>)	Brazil vs. China (<i>n</i>)	
Study 1	Context inclusion in magazine and news images	-.62 (1,175) _B	-.42 (1,483) _C	.20 (1,448) _B	
Study 2	Variation of judgment based on context	-.33 (128) _B	-.88 (116) _C	-.55 (108) _C	
Study 3	Overall expectation of future change	-.79 (159) _B	-.26 (148) _C	.53 (141) _B	
Study 4	Categorization	-.50 (129) _B	0 (109)	.50 (126) _B	
Study 5	Variation in expressivity across five contexts	-.54 (213) _B	-.10 (174) _C	.44 (201) _B	
Overall	<i>d</i> ₊	-.57 _B	-.37 _C	.22 _B	

Note. For all *ds*, positive values mean the culture on the left was more holistic and negative values mean that the culture on the right was more holistic. For interpretation ease, subscripts of each *d* value denote the country that is *more holistic* (A = Americans, B = Brazilians, C = Chinese).

studies, Brazilians also scored higher on our holism measure than Chinese participants. Thus, Western cultures are not necessarily less holistic than groups with a Confucian tradition and can in fact be more holistic.

Although Brazilians and Chinese were both more holistic than Americans, they were not identical to each other. Their holism scores were not consistently of the same magnitude. We were surprised to find that Brazilians were often more holistic than Chinese respondents. Moreover, Brazilians but not Chinese were especially optimistic compared with Americans (Study 3), and Brazilians were more likely than Chinese to give context-dependent answers when reporting expressivity (Study 5). Psychological constructs can manifest themselves very differently across different people (Kitayama, Park, Sevincer, Karasawa, & Uskul, 2009), and as Triandis (2001) aptly noted, "There are as many varieties of collectivism as there are collectivist cultures" (p. 909). Although Brazilians and Chinese are holistic in comparison with Americans, they still show distinct patterns of thinking depending on the task.

What factors account for overall country-level differences? Future work might explore several candidate factors to answer this question, including those proposed in the "Introduction" section and in this "Discussion" section. The pattern of results is consistent with the outcome predicted by the social orientation hypothesis, as well as intellectual and sociological differences historically found among these countries. Another factor that merits attention is economic development. On average, people in China and Brazil receive comparable amounts of schooling (7.7 years, 7.5 years) and per capita income (about US\$12,000 and US\$15,000 per year; United Nations Development Programme, 2015). By contrast, the average American receives about 13 years of schooling and earns about US\$53,000 per year. Perhaps as people progress to higher levels of education, analytic thinking becomes more important regardless of local cultural customs.

Another possibility is that development, ecological factors, philosophical traditions, and so forth all influence thinking via social orientation rather than having independent effects on cognition. For example, more development may lead to higher individualism, which may, in turn, reinforce more analytic modes of thinking. Likewise, modes of subsistence, settlement history, and social class may all shape social orientation, which in turn may shape cognitive style (they are indeed correlated; Kitayama, Varnum, & Sevincer, 2014; Na et al., 2010; Snibbe & Markus, 2005; Talhelm et al., 2014; Uskul et al., 2008). Although it is beyond the scope of the present work to causally test these larger relationships, our portrait of Brazilian cognitive style is consistent with both the social orientation account as well as other accounts that emphasize historical and ecological factors' roles in shaping culture.

We note several limitations of these studies. In the online studies, we limited demographic questions mostly to age and sex to keep the surveys short and retain as many participants as possible. This limitation of demographic information made the samples harder to compare, although the ethnic information in Study 4 and the educational attainment measure in Study 3 are consistent with national differences. The sample sizes were also small. Post hoc power analyses on the main effects of country suggested that all but Study 4 were adequately powered. However, larger samples coupled with more demographic information in future work will allow for a deeper analysis of whether demographic variables play a role in the observed differences in holism.

Another limitation is the variation in sampling method between the three countries for Studies 2 through 4. Americans typically did not respond to Google ads, and MTurk is not commonly used in Brazil and China. Despite this limitation, Studies 1 and 5 had consistent results with the online studies, and as previously mentioned, several measures were taken to promote compatibility between the sampling methods.

In addition to shedding light on cultural differences in holistic tendencies, these studies contribute to filling the Latin American gap in cross-cultural research. Little work in cross-cultural psychology focuses on Latin groups, but they represent a large share of “Western” culture that is frequently described in cross-cultural work. Our studies only focus on Brazilians. To some extent, Latin Americans share a culture that is distinct from others and can be considered a “real” group (Inglehart & Carballo, 1997). Still, there is a lot of variability between countries and within countries, both in terms of history and culture. Despite the tentativeness with which we might generalize our findings to the rest of Latin America, we hope that the data as well as our historical discussion excite new questions about culture and cognition in the region.

More practically, these cultures play an increasing role in global affairs and people of Latin American heritage represent the largest share of ethnic minorities in the United States (U.S. Census Bureau, 2013). Our findings may partly explain why some Latin Americans abroad experience challenges in adjusting to other Western countries. Taking an anthropological approach, Rezende (2008) interviewed Brazilian academics who had worked abroad in other Western nations. She found that they faced challenges forging relationships with locals in their host country. This came somewhat as a surprise to them, as “. . . they had a more cosmopolitan, Western view of themselves. These were urban middle class intellectuals who consumed a host of globalised goods and worked with a Western body of knowledge” (p. 113). Those travelers abroad may have overestimated the role of being “Western” in attenuating cultural differences between themselves and North Americans.

In conclusion, for practical and theoretical reasons, we hope to see more attention to Latin American cultures in cross-cultural psychology. Such work would further enrich our understanding of psychological constructs as well as our characterizations of what it means to be Western or collectivistic.

Acknowledgments

We thank Phoebe Ellsworth, Agneta Fischer, Li-Jun Ji, and Takahiko Masuda for assistance with materials; the Culture and Cognition Lab for feedback; Ebenézer de Oliveira, Ines Borges, and Lan Hu for assistance with data collection in Brazil and China; and Crystal Farh and an anonymous reviewer for exceptionally constructive article comments.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This material is based partly upon work supported by the National Science Foundation Graduate Research Fellowship Program under Grant No. DGE 1256260 awarded to the first author.

Supplementary Material

Supplementary material is available for this article online.

Notes

1. Latin American countries are considered Western by some criteria (e.g., religion and historical roots in Western Europe) but not others (e.g., some economic and political criteria). Here, we consider Brazilians to be Westerners because of their traditions derived from Europe and, importantly, because many Brazilians consider themselves to be Westerners (Rezende, 2008).
2. For women's magazines, there were four American, one Brazilian, and nine Chinese outliers. For celebrity magazines, there were one American, four Brazilian, and four Chinese outliers.
3. Subjects responded to all emotion combinations from the original study. However, this task was originally used by Masuda et al. to test whether Japanese and American participants showed contrastive or assimilative patterns in judging the central emotion (i.e., whether target character's rating was more similar to background emotions or whether it contrasted against the background expression). For our purposes of examining general influence of background, we computed the variance for the four ratings of happiness the happy boy, the four ratings of sadness for the sad boy, and the four ratings of anger for the angry boy (we thank Takahiko Masuda for this suggestion). The images in which the boy had a neutral expression were not analyzed as there was no rating of "neutral" emotion in the study task.
4. For sadness, there was also a significant country by sex interaction; however, this was not further explored as sex did not have a consistent effect across analyses.
5. The proportion of Chinese respondents who reported "noticing" the background is low relative to the other groups. We suspect that this is due to the translation. Although the word "notice" was properly translated as *zhuyi*, this term also can mean to actively "pay attention" to something. Some respondents may have used the stronger, latter interpretation. Those participants could have chosen "no" if they simply noticed the background but did not feel that they strongly attended to it.

References

- Bueno, E. (2003). *Brasil: Uma história* [Brazil: A history]. São Paulo, Brazil: Ática.
- Choi, I., Dalal, R., Kim-Prieto, C., & Park, H. (2003). Culture and judgment of causal relevance. *Journal of Personality and Social Psychology, 84*, 46-59. doi:10.1037/0022-3514.84.1.46
- Choi, I., Koo, M., & Choi, J. A. (2007). Individual differences in analytic versus holistic thinking. *Personality and Social Psychology Bulletin, 33*, 691-705. doi:10.1177/0146167206298568
- Cohen, A. B. (2009). Many forms of culture. *American Psychologist, 64*, 194-204. doi:10.1037/a0015308
- Costa, J. C. (1964). *A history of ideas in Brazil: The development of philosophy in Brazil and the evolution of national history*. Berkeley: University of California Press.
- DaMatta, R. A. (1995). For an anthropology of the Brazilian tradition, or "A virtude está no meio." In D. J. Hess & R. A. DaMatta (Eds.), *The Brazilian puzzle: Culture on the borderlands of the Western world* (pp. 270-292). New York, NY: Columbia University Press.
- de Holanda, S. B. (2004). *Raízes do Brasil* [Roots of Brazil] (26th ed.). São Paulo, Brazil: Editora Schwarcz Ltda. (Original work published 1936)
- Duarte, F. (2011). The strategic role of charm, simpatia and jeitinho in Brazilian society: A qualitative study. *Asian Journal of Latin American Studies, 24*, 29-48. Retrieved from <http://www.ajlas.org/v2006/paper/2011vol24no302.pdf>
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175-191.
- Festinger, L., & Carlsmith, J. M. (1959). Cognitive consequences of forced compliance. *Journal of Abnormal and Social Psychology, 58*, 203-210.

- Freyre, G. (2003). *Casa-grande & senzala: Formação da família brasileira sob o regime da economia patriarcal* [The masters and the slaves] (48th ed.). São Paulo, Brazil: Global Editora e Distribuidora Ltda. (Original work published 1933)
- Goodman, J. K., Cryder, C. E., & Cheema, A. (2013). Data collection in a flat world: The strengths and weaknesses of Mechanical Turk samples. *Journal of Behavioral Decision Making*, *26*, 213-224. doi:10.1002/bdm.1753
- Hamamura, T., Meijer, Z., Heine, S. J., Kamaya, K., & Hori, I. (2009). Approach—Avoidance motivation and information processing: A cross-cultural analysis. *Personality and Social Psychology Bulletin*, *35*, 454-462. doi:10.1177/0146167208329512
- Hayes, A. F., & Krippendorff, K. (2007). Answering the call for a standard reliability measure for coding data. *Communication Methods and Measures*, *1*, 77-89.
- Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. San Diego, CA: Academic Press.
- Heine, S. J., & Lehman, D. R. (1997). Culture, dissonance, and self-affirmation. *Personality and Social Psychology Bulletin*, *23*(4), 389-400. doi:10.1177/0146167297234005
- Heine, S. J., Lehman, D. R., Peng, K., & Greenholtz, J. (2002). What's wrong with cross-cultural comparisons of subjective Likert scales? The reference-group effect. *Journal of Personality and Social Psychology*, *82*, 903-918. doi:10.1037/0022-3514.82.6.903
- Ho, A. K., Sidanius, J., Levin, D. T., & Banaji, M. R. (2011). Evidence for hypodescent and racial hierarchy in the categorization and perception of biracial individuals. *Journal of Personality and Social Psychology*, *100*, 492-506. doi:10.1037/a0021562
- Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the mind* (3rd ed.). London, England: McGraw-Hill.
- Holloway, R. A., Waldrip, A. M., & Ickes, W. (2009). Evidence that a simpático self-schema accounts for differences in the self-concepts and social behavior of Latinos versus Whites (and Blacks). *Journal of Personality and Social Psychology*, *96*, 1012-1028. doi:10.1037/a0013883
- Inglehart, R., & Carballo, M. (1997). Does Latin America exist? (And is there a Confucian culture?): A global analysis of cross-cultural differences. *Political Science & Politics*, *30*, 34-47. doi:10.1017/S104909650004261X
- Instituto Brasileiro de Geografia e Estatística. (2000). *Distribuição da população por cor ou raça* [Population distribution by race]. Retrieved from <http://www.ibge.gov.br/home/estatistica/populacao/condicaodevida/indicadoresminimos/tabela1.shtm>
- Ji, L.-J., Nisbett, R. E., & Su, Y. (2001). Culture, change, and prediction. *Psychological Science*, *12*, 450-456. doi:10.1111/1467-9280.00384
- Ji, L.-J., Zhang, Z., & Nisbett, R. E. (2004). Is it culture or is it language? Examination of language effects in cross-cultural research on categorization. *Journal of Personality and Social Psychology*, *87*, 57-65. doi:10.1037/0022-3514.87.1.57
- Kanagawa, C., Cross, S. E., & Markus, H. R. (2001). "Who Am I?" The cultural psychology of the conceptual self. *Personality and Social Psychology Bulletin*, *27*, 90-103. doi:10.1177/0146167201271008
- Kitayama, S., Park, H., Sevincer, A. T., Karasawa, M., & Uskul, A. K. (2009). A cultural task analysis of implicit independence: Comparing North America, Western Europe, and East Asia. *Journal of Personality and Social Psychology*, *97*, 236-255. doi:10.1037/a0015999
- Kitayama, S., Varnum, M. E. W., & Sevincer, A. T. (2014). The frontier: Voluntary settlement and cultural change. In A. B. Cohen (Ed.), *Culture reexamined: Broadening our understanding of social and evolutionary influences* (pp. 93-127). Washington, DC: American Psychological Association.
- Kleinman, A. (1986). *Social origins of distress and disease: Depression, neurasthenia, and pain in modern China*. New Haven, CT: Yale University Press.
- Lechuga, J., Santos, B. M., Garza-Caballero, A. A., & Villarreal, R. (2011). Holistic reasoning on the other side of the world: Validation of the analysis-holism scale in Mexicans. *Cultural Diversity & Ethnic Minority Psychology*, *17*, 325-330. doi:10.1037/a0023881
- Lechuga, J., & Wiebe, J. S. (2011). Culture and probability judgment accuracy: The influence of holistic reasoning. *Journal of Cross-Cultural Psychology*, *42*, 1054-1065. doi:10.1177/0022022111407914
- Leung, K., & Bond, M. H. (1984). The impact of cultural collectivism on reward allocation. *Journal of Personality and Social Psychology*, *47*, 793-804. doi:10.1037//0022-3514.47.4.793
- Livermore, H. V. (1953). Portuguese history. In H. V. Livermore (Ed.), *Portugal and Brazil: An introduction* (pp. 48-81). London, England: Oxford University Press.

- Masuda, T., Ellsworth, P., Mesquita, B., Leu, J., Tanida, S., & Van de Veerdonk, E. (2008). Placing the face in context: Cultural differences in the perception of facial emotion. *Journal of Personality and Social Psychology, 94*, 365-381. doi:10.1037/0022-3514.94.3.365
- Masuda, T., Gonzalez, R., Kwan, L., & Nisbett, R. E. (2008). Culture and aesthetic preference: Comparing the attention to context of East Asians and Americans. *Personality and Social Psychology Bulletin, 34*, 1260-1275. doi:10.1177/0146167208320555
- Masuda, T., & Nisbett, R. E. (2001). Attending holistically versus analytically: Comparing the context sensitivity of Japanese and Americans. *Journal of Personality and Social Psychology, 81*, 922-934. doi:10.1037//0022-3514.81.5.922
- Morling, B., & Lamoreaux, M. (2008). Measuring culture outside the head: A meta-analysis of individualism-collectivism in cultural products. *Personality and Social Psychology Review, 12*, 199-221. doi:10.1177/1088868308318260
- Morris, M. W., & Peng, K. (1994). Culture and cause: American and Chinese attributions for social and physical events. *Journal of Personality and Social Psychology, 67*, 949-971. doi:10.1037/0022-3514.67.6.949
- Murata, A., Moser, J., & Kitayama, S. (2013). Culture shapes electrocortical responses during emotion suppression. *Social Cognitive and Affective Neuroscience, 8*, 595-601. doi:10.1093/scan/nss036
- Na, J., Grossmann, I., Varnum, M. E. W., Kitayama, S., Gonzalez, R., & Nisbett, R. E. (2010). Cultural differences are not always reducible to individual differences. *Proceedings of the National Academy of Sciences, 107*, 6192-6197. doi:10.1073/pnas.1001911107
- Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review, 108*, 291-310. doi:10.1037/0033-295X.108.2.291
- Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review, 84*, 231-259. doi:10.1037/0033-295X.84.3.231
- Organization for Economic Co-Operation and Development. (2017). *Educational attainment and labour-force status* [Data file]. Available from <http://stats.oecd.org>
- Osland, J. S., De Franco, S., & Osland, A. (1999). Organizational implications of Latin American culture: Lessons for the expatriate manager. *Journal of Management Inquiry, 8*, 219-234. doi:10.1177/105649269982018
- Oyserman, D., Coon, H. M., & Kemmelmeier, M. (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin, 128*, 3-72. doi:10.1037//0033-2909.128.1.3
- Oyserman, D., & Lee, S. W. S. (2008). Does culture influence what and how we think? Effects of priming individualism and collectivism. *Psychological Bulletin, 134*, 311-342. doi:10.1037/0033-2909.134.2.311
- Paolacci, G., Chandler, J., & Ipeirotis, P. G. (2010). Running experiments on Amazon Mechanical Turk. *Judgment and Decision Making, 5*, 411-419. Retrieved from <http://journal.sjdm.org/10/10630a/jdm10630a.html>
- Pearson, V., & Stephan, W. G. (1998). Preferences for styles of negotiation: A comparison of Brazil and the U.S. *International Journal of Intercultural Relations, 22*, 67-83. doi:10.1016/S0147-1767(97)00036-9
- Peng, K., & Nisbett, R. E. (1999). Culture, dialectics, and reasoning about contradiction. *American Psychologist, 54*, 741-754. doi:10.1037/0003-066X.54.9.741
- Rezende, C. B. (2008). Stereotypes and national identity: Experiencing the "Emotional Brazilian." *Identities: Global Studies in Culture and Power, 15*, 103-122. doi:10.1080/10702890701801866
- Ruby, M. B., Falk, C. F., Heine, S. J., Villa, C., & Silberstein, O. (2012). Not all collectivisms are equal: Opposing preferences for ideal affect between East Asians and Mexicans. *Emotion, 12*, 1206-1209. doi:10.1037/a0029118
- Sanchez-Burks, J., Nisbett, R. E., & Ybarra, O. (2000). Cultural styles, relational schemas, and prejudice against out-groups. *Journal of Personality and Social Psychology, 79*, 174-189. doi:10.1037/0022-3514.79.2.174
- Schreier, S. S., Heinrichs, N., Alden, L., Rapee, R. M., Hofmann, S. G., Chen, J., . . . Bögels, S. (2010). Social anxiety and social norms in individualistic and collectivistic countries. *Depression and Anxiety, 27*, 1128-1134. doi:10.1002/da.20746

- Shkodriani, G. M., & Gibbons, J. L. (1995). Individualism and collectivism among university students in Mexico and the United States. *The Journal of Social Psychology, 135*, 765-772. doi:10.1080/00224545.1995.9713979
- Snibbe, A. C., & Markus, H. R. (2005). You can't always get what you want: Educational attainment, agency, and choice. *Journal of Personality and Social Psychology, 88*, 703-720. doi:10.1037/0022-3514.88.4.703
- Soto, J. A., Levenson, R. W., & Ebling, R. (2005). Cultures of moderation and expression: Emotional experience, behavior, and physiology in Chinese Americans and Mexican Americans. *Emotion, 5*, 154-165. doi:10.1037/1528-3542.5.2.154
- Soto, J. A., Perez, C. R., Kim, Y., Lee, E. A., & Minnick, M. R. (2011). Is expressive suppression always associated with poorer psychological functioning? A cross-cultural comparison between European Americans and Hong Kong Chinese. *Emotion, 11*, 1450-1455. doi:10.1037/a0023340
- Spencer-Rodgers, J., Williams, M. J., & Peng, K. (2010). Cultural differences in expectations of change and tolerance for contradiction: A decade of empirical research. *Personality and Social Psychology Review, 14*, 296-312. doi:10.1177/1088868310362982
- Stephens, T. B. (1992). *Order and discipline in China: The Shanghai Mixed Court 1911-27*. Seattle, WA: University of Washington Press.
- Talhelm, T., Zhang, X., Oishi, S., Shimin, C., Duan, D., Lan, X., & Kitayama, S. (2014). Large-scale psychological differences within China explained by rice versus wheat agriculture. *Science, 344*, 603-609. doi:10.1126/science.1246850
- Triandis, H. C. (2001). Individualism-collectivism and personality. *Journal of Personality, 69*, 907-924.
- Tsai, J. L., Louie, J. Y., Chen, E. E., & Uchida, Y. (2007). Learning what feelings to desire: Socialization of ideal affect through children's storybooks. *Personality and Social Psychology Bulletin, 33*, 17-30. doi:10.1177/0146167206292749
- United Nations Development Programme. (2015). *Human development index and its components* [Data file]. Retrieved from <http://hdr.undp.org/en/data>
- U.S. Census Bureau. (2013). *Asians fastest-growing race or ethnic group in 2012, census bureau reports*. Retrieved from <https://www.census.gov/newsroom/press-releases/2013/cb13-112.html>
- U.S. Census Bureau. (2015). *U.S. Census Quick Facts*. Retrieved from <https://www.census.gov/quickfacts/table/PST045215/00>
- Uskul, A. K., Kitayama, S., & Nisbett, R. E. (2008). Ecocultural basis of cognition: Farmers and fishermen are more holistic than herders. *Proceedings of the National Academy of Sciences, 105*, 8552-8556. doi:10.1073/pnas.0803874105
- Van der Schalk, J., Hawk, S., Fischer, A., & Doosje, B. (2011). Moving faces, looking places: Validation of the Amsterdam Dynamic Facial Expression Set (ADFES). *Emotion, 11*, 907-920. doi:10.1037/a0023853
- Varnum, M. E. W., Grossmann, I., Katunar, D., Nisbett, R. E., & Kitayama, S. (2008). Holism in a European cultural context: Differences in cognitive style between Central and East Europeans and Westerners. *Journal of Cognition and Culture, 8*, 321-333. doi:10.1163/156853708X358209
- Varnum, M. E. W., Grossmann, I., Kitayama, S., & Nisbett, R. E. (2010). The origin of cultural differences in cognition: The social orientation hypothesis. *Current Directions in Psychological Science, 19*, 9-13. doi:10.1177/0963721409359301
- Voyages: The Trans-Atlantic Slave Trade Database. (2010). *Estimate spreadsheet* [Data file]. Retrieved from <http://www.slavevoyages.org/voyage/download>