Are Cross-Cultural Differences in Reasoning Style Associated with Taste Preferences?

By

Alexander Hall Sheehan

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ABSTRACT

Previous research by Ahn, Ahnert, Bagrow, and Barabasi (2011) found that North American recipes tended to use ingredients with more similar flavor compounds, while East Asian recipes tended to use ingredients with more dissimilar flavor compounds. The current study sought to determine whether taste preferences predicted by Ahn et al. (2011)'s findings were related to cultural differences in dialectical reasoning style. To test this, researchers gave 63 European North Americans and 51 East Asians or Asian Americans a blind taste test of four pairs of ingredients that varied on the number of flavor compounds each ingredient pairing shared, and how common the ingredient pairings were in North American and East Asian recipe databases. The results showed that European North Americans gave higher liking ratings to the ingredient pairings with little overlap in flavor compounds compared to those with a higher degree of overlap; East Asians gave similar liking ratings to both similar and dissimilar ingredient pairings. However, East Asians' and North Americans' liking ratings were not correlated with any of the dialectical reasoning style questionnaires. Additionally, participants’ liking ratings showed that both North Americans and East Asians gave liking ratings in line with the number of flavor compounds shared between each ingredient pairings, but not how common the ingredient pairings were in North American and East Asian recipe databases. We discuss possible interpretations of these findings, and suggest the results be replicated in other testing locations. Although there could be a possible correlation between North Americans' and East Asians' self-construal and taste preferences, this was not found because the measure of self-construal used did not provide an in-depth analysis of the concept.
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Introduction

In the past twenty years, cross-cultural researchers have prioritized how cultural differences can affect higher-order cognition. For example, Markus and Kitayama (1991) noted East Asians tend to construe themselves in collectivistic terms, in relation to one another, while North Americans tend to construe themselves as individuals, meaning the self is inherently separate from person to person. Culture can also influence how participants evaluate contradictory information. Peng and Nisbett (1999) found that, when evaluating an argument, East Asians have a tendency to engage in dialectical reasoning, meaning that they are more prone to seeing both sides of an argument as having truthful information, whereas North Americans are prone to viewing only one side of an argument as correct. Thus researchers found that not only does culture affect a participant's self-concept, but culture can also influence how people reason and evaluate external information.

Since these initial studies, researchers have explored whether cultural differences in reasoning or self-construal could be related to cultural differences in other areas of higher order cognitive processing, such as visual attention to context. For example, researchers have found that priming a collectivistic or individualistic self-construal can affect the speed at which a person attends to specific details or global elements of a picture or a letter (Kuhnen & Oyserman, 2002; Lin & Han, 2009). Likewise, Spencer-Rodgers, Boucher, Mori, Wang, and Peng (2009) found, using open ended responses, that Chinese participants scored higher on measures of dialecticism and tended to characterize themselves more holistically, or in terms of a larger context, than North Americans. Hence, this evidence shows that cultural differences in self-construal and reasoning style can be related to other areas of cognitive processing.
To date, research has not addressed whether cultural differences in higher-order reasoning styles are linked to differences between East Asians and European North Americans in sensory processing. A recent investigation suggested that East Asian recipes used more dissimilar flavor compound ingredients, whereas North American recipes used more similar flavor compound ingredients (Ahn et al., 2011). This finding, however, was based on an analysis of recipes found in cookbooks, rather than a direct comparison of taste preferences in individuals drawn from different cultures. An additional question is whether East Asians' and European North Americans' potential differences in taste preferences for more dissimilar or similar flavor compound ingredient pairings result from the same mechanisms as cross-cultural differences in reasoning style. Researchers have proposed that the dissimilarity in reasoning styles between East Asians and North Americans could be due to differences in participants' naïve understanding of ontology, or the laws that govern the universe's existence (Spencer-Rodgers, Williams, & Peng, 2010). For example, East Asians believe the universe is fluid and constantly changing, while North Americans usually view the universe as according to rigid principles of logic (Peng & Nisbett, 1999). Thus East Asians and European North Americans could each be inadvertently applying their cultures' laws about how the universe is governed to how they evaluate different foods.

_Dialectical Reasoning_

To consider how the different reasoning styles and taste preference could be related, it is necessary to first examine how East Asians and North Americans evaluate contradictory information. Peng and Nisbett (1999) demonstrated that when evaluating an argument, East Asians were more prone to think that each side of an argument had pieces of information that could be true, and thus were more reluctant to choose a side. North Americans, in contrast, were
more prone to select one side and try to argue in its favor (Peng & Nisbett, 1999). Hence, East Asians accepted apparent contradictions, while North Americans disliked contradictions, and instead preferred reasoning from only one point of view.

Researchers have since proposed that East Asians' dialectical reasoning style and North Americans' logical reasoning style may be symptomatic of different naïve conceptions of ontology. Specifically, East Asian thought reflects the belief that the universe is inherently composed of the opposing forces of yin and yang, whereas traditional Western thought holds that the universe acts in accordance with strict logical rules (Spencer-Rodgers et al., 2010). According to this idea, East Asians would be more likely to accept contradictory information because contradictory information is in accordance with their naïve ontological outlook (Spencer-Rodgers et al., 2010). Conversely, North Americans would show greater distress when presented with contradictory information, because a central tenet of Western reasoning is the law of noncontradiction. This law states that truthful information cannot have any contradictions, and is a fundamental part of North American's naïve reasoning style (Peng & Nisbett, 1999). Therefore, East Asians' and North Americans' naïve ontological viewpoints could produce dissimilar judgments not only when evaluating contradictory information presented in an argument, but cultural differences could also extend to evaluating contradictions presented in other contexts.

Naïve dialecticism has been shown to have applications outside of reasoning about contradictory information. In five different studies, Ji, Nisbett, and Su (2001) found that Chinese participants and North American participants view change differently. Specifically, Chinese participants are more prone to believe that an ongoing change will reverse itself, while North Americans believed that an ongoing change would continue in either a positive or negative
direction (Ji et al., 2001). For example, compared to North Americans, Chinese participants will be more prone to believe that a trend in the stock market will reverse itself (Ji et al., 2001; Ji, Zhang, & Guo, 2008). To extend this finding, Spina, Ji, Ross, Li, and Zhang (2010) found that when evaluating athletes at a competition, Chinese participants expected an athlete's future performance on a task to regress towards the mean performance in the competition. Conversely, Canadian participants believed a person's performance would continue on the same trend, even if the performance was atypical (Spina et al., 2010). Researchers have also shown that when evaluating a related measure such as time, Chinese and Chinese North Americans believe that the past was much better than the present, and hope that the future will again become as ideal as the past (Guo, Ji, Spina, & Zhang, 2012; Ji et al., 2001). European North Americans instead believe changes over time will have a continuous positive trend, or will be constantly improving (Guo et al., 2012; Ji et al., 2001). Hence, these trend reversal studies indicate that cultural differences in the understanding of ontology can influence more areas than evaluating contradictory information.

**Taste Literature**

If naïve differences in viewing ontology are related to how participants perceive change and evaluate changes over time, it is possible that different ontological assumptions could affect participants’ sensory experiences, such as taste preference. To support this idea, Ahn et al. (2011) found that East Asian recipes tended to have ingredient pairings with more dissimilar flavor compounds, while North American recipes tended to have ingredient pairings with more similar flavor compounds. Hence, if Ahn et al. (2011)’s finding is in line with Spencer-Rodgers et al. (2010)’s suggestion that East Asians and North Americans could be applying their cultures' laws about how the universe is governed to how they evaluate arguments, then we propose that East
Asians should prefer more dissimilar flavor compound ingredient pairings compared to similar flavor compound ingredient pairings. East Asians should favor more dissimilar flavor compound ingredient pairings because a food pairing containing multiple contrasting flavor compounds could be analogous to having a dialectical reasoning style, or an appreciation for contradiction and an expectation of reversals in the direction of trends. If North Americans evaluate foods similarly to how they evaluate arguments, then they should prefer more similar flavor compound ingredient pairings over those of dissimilar flavor compound ingredient pairings. North Americans should show this preference because, similar to evaluating an argument, they may seek complementary and similar flavors rather than contradictory flavors. Additionally, if this predicted cultural difference in taste preference reflects cultural differences in reasoning and understanding of the world, rather than experience eating particular foods (Prescott & Bell, 1995), then North Americans' and East Asians' taste preferences should be observed regardless of whether the flavors represent culturally common or uncommon ingredient pairings.

The Present Study

In the present experiment we investigate whether East Asians' and European North Americans' different naïve views of ontology, which shape their reasoning styles, are linked to their taste preferences for dissimilar or similar flavor compound ingredient pairings. We predict:

H1: East Asians will prefer dissimilar flavor compound ingredient pairings whereas European North Americans will prefer similar flavor compound ingredient pairings. This will substantiate the findings of Ahn et al. (2011) based on a direct comparison of taste ratings by human participants. The preference for similar vs. dissimilar pairings will persist across ingredient pairings that are common and uncommon in East Asian or North American culture.
H2: East Asians’ and European North Americans' taste preferences for dissimilar flavor compound ingredient pairings will be associated with a dialectical reasoning pattern. Specifically, those who predict the most change in reasoning tasks (a style expected to be more typical for East Asians) will also prefer dissimilar ingredient pairings to a greater extent than those who predict less change (the style expected for European North Americans).

Methods

Participants

Fifty-one East Asians and Asian Americans and sixty-three European North American adults over the age of 18 completed the study (see Tables 1). Participants either attended the Boston Cocktail Summit in Boston, Massachusetts in the fall of 2012, or were students and staff at Brandeis University in Waltham, Massachusetts in the spring of 2013. Six additional participants were ineligible for analysis because their native country was not in North America or East Asia. Participants were recruited at the Boston Cocktail Summit through a booth set up at the event, and through a verbal announcement at the event. At Brandeis University, students and staff were recruited through advertisements and flyers in classes, laboratories, academic meetings, and campus buildings. East Asians were those who indicate a specific East Asian country as their native country, Asian Americans were those who indicated their native country was either US or Canada and noted that they identified with an Asian ethnicity (Chinese, Japanese, Korean, Vietnamese), and North Americans were those who indicate that they live in either the U.S. or Canada and were not ethnically Asian. Participants at Brandeis University received a small non-food reward (a pen) as compensation for participation in the study. Procedures were approved by the Brandeis University Institutional Review Board.
Measures

A screening questionnaire was used to first verify that subjects were not allergic to any of the ingredients used in the four pairings, and were at least 18 years of age. To select the ingredient pairings, Ahn et al. (2011)'s recipe database was used. The database was a catalogue of different cultures' recipes, which also listed the number of shared flavor compounds for all the recipes' possible ingredient pairings (Ahn et al., 2011). This recipe database was then subdivided into two separate regional recipe databases (East Asian and North American). Next, any ingredients listed in the database that referred to a broad category (e.g. meat), instead of a specific ingredient (e.g. chicken), were rendered ineligible for possible ingredient pairings. From this list, ingredient pairings were sorted for selection by the number of flavor compounds they shared. According to Ahn et al. (2011), ingredient pairings with many shared flavor compounds had approximately 100 flavor compounds in common, while ingredient pairings with dissimilar flavor compounds shared approximately fewer than nine. Next, ingredient pairings were further sorted by whether they were commonly or uncommonly found in each culture's regional recipe databases. Upon examining the databases, it was found that commonly used ingredients appeared in approximately 20% or more of North American or East Asian recipes in the database, while uncommon ingredient pairings were featured in less than one percent of all the recipes in the database (Ahn et al., 2011). To determine whether an ingredient pairing commonly appeared in a region's recipe database, five samples, each containing 100 recipes, were randomly taken from both the North American and East Asian regional recipe databases to determine how many recipes in each sample contained the target ingredient pairing. The frequency of the target ingredient pairings were then calculated as percentages for each sample, and the percentages were averaged across all of the five samples collected from that culture's regional recipe database.
Also, all chosen ingredient pairings were examined to assure they were uncommon in the other region's recipe database; for example, an uncommon North American ingredient was also not commonly found in the East Asia's recipe database. Lastly, the number of shared flavor compounds for the similar flavor compound ingredient pairings were matched, so that both ingredient pairings shared the same number \pm 1 of flavor compounds. This step was repeated for the dissimilar flavor compound ingredient pairings.

Ingredients were then selected from the East Asian and North American regional recipe databases. For the common dissimilar flavor compound ingredient pairing, soy sauce and sesame oil were selected from the East Asian regional recipe database. Soy sauce and sesame oil share only one flavor compound and were found in approximately 31% of the East Asian recipes and in less than 1% of the North American recipes (Ahn et al., 2011). For the uncommon dissimilar flavor compound ingredient pairing, honey and lime were selected from the East Asian regional recipe database. Honey and lime share only one flavor compound, and were found in less than 1% of East Asian and North American recipes (Ahn et al., 2011). For the common similar flavor compound ingredient pairing, butter and milk were selected from the North American regional recipe database. Butter and milk share 74 flavor compounds, and were found in approximately 20% of the North American recipes and in less than 1% of East Asian recipes (Ahn et al., 2011). For the uncommon similar flavor compound ingredient pairing, green tea and cocoa were selected from the North American regional recipe database. Green tea and cocoa share 73 flavor compounds, and were found in less than 1% of East Asian and North American recipes (Ahn et al., 2011). All of the ingredients were in compliance with the FDA's Generally Recognized as Safe list.
Limited pretesting was then conducted with East Asians and North Americans to determine the most palatable concentrations of ingredients for each pairing. Each ingredient pairing concentration was determined by a group of volunteers, who rated which ratio of ingredients was most preferable and allowed for each of the ingredients to be detected. The concentrations used were .5 tablespoons of butter for every 5 ounces of 1% milk, and 1 tablespoon of cocoa for every 10 ounces of green tea (one teabag for 10 minutes) prepared. The concentrations for these mixtures were a 1:1 ratio of soy sauce to sesame oil, and a 1:2 ratio of honey to lime. All of these ingredient pairings were served in three ounce plastic cups, with the cups lined up on trays visible to the participant. The trays were labeled with codes indicating the ingredient pairings to the experimenter. The experimenter administered the ingredient pairing by picking up the three ounce cup, and giving the cup to the participant with specific instructions on how to consume the liquid. The composition of the ingredient pairings were masked by adding black food dye, and were mixed out of the sight of participants so the mixtures could not be immediately recognizable. All ingredients were served at room temperature. However, because milk and butter specifically required heat to mix, all of the mixtures were first heated, then mixed, and were served once the mixture cooled down to room temperature.

When sampling the different ingredient pairings, participants first received a cup of distilled water to cleanse their pallets. While tasting each of the ingredient pairings, the experimenter told participants to take only one sip from the cup, and then to immediately swallow. If participants could not swallow the ingredient pairing, the participants were instructed to spit the ingredient pairing back into the cup. After each of the four ingredient pairings, the pencil and paper measure asked participants, "How much did you like this food pairing?", on a 1
(not at all) to 7 (very much) point Likert scale, and had an area to write comments about each ingredient pairing directly below the Likert scale.

After the food sampling portion, additional pencil and paper measures were administered. A demographics questionnaire assessed information about nation of origin, countries lived in, immigrant history, and bicultural identity (Benet-Martinez & Haritatos, 2005; Benet-Martinez, Leu, Lee, & Morris, 2002; Hong, Morris, Chiu, & Benet-Martinez, 2000; Mok, Morris, Benet-Martinez, & Karakitapoglu-Aygun, 2007), as well as the number of alcoholic beverages and cigarettes consumed that day, and how much participants liked to eat East Asian cuisine (see Tables 1-3).

Additionally, a measure of individualistic vs. collectivistic self-construal from Li (2002) was also administered. This measure assessed how close participants view themselves to their family members (parents and siblings) on a modified 1 (individual) to 7 (collectivistic) Inclusion of Other in the Self Scale (Aron, Aron, & Smollan, 1992). The instructions were for participants to mark the degree of overlap between one circle representing the participant and another circle representing the participants’ family members (defined as parents and siblings; Li, 2002).

Lastly, two measures of dialectical reasoning adapted from Ji et al. (2001) were used. Specifically, the first dialectical reasoning task asked participants to give percent probability judgments for four questions that asked whether or not a change will happen in relation to a certain point in time (e.g. Lucia and Jeff are both seniors at the same university. They have been dating each other for two years. How likely is it that they will break up after graduation?; Ji et al., 2001). Next, one question was used from study two of Ji et al. (2001), which required participants give a percentage probability as to whether or not an expected trend on a graph will
continue to ascend, descend, or remain the same (neither ascend or descend). Participants were instructed to circle how confident their trend predictions were on a 1 (not confident at all) to 8 (extremely confident) point Likert scale. This question asked participants about change relevant to an ongoing, or continuous trend.

Procedure

Participants were first greeted and then asked to complete a pre-screening questionnaire. If they were eligible to participate, the participants then filled out an informed consent form. After filling out the informed consent, participants were told that they would first taste four different ingredient pairings, and then would complete a few pencil and paper measures. To ensure order did not affect participants' ratings of the ingredient pairings, the tasting order assignments were counterbalanced so ingredient pairings were administered approximately equally often in four different orders across participants. This process ensured that a specific pairing was administered in a different position in the order, and was followed and preceded by different ingredient pairings in each of the four counterbalanceings. The counterbalancing order was designated by the color of the participant’s questionnaire (blue, green, purple, and yellow), which informed the experimenter of the order in which to administer the pairings. Overall there were 15 yellow, 16 blue, 16 green, and 16 purple taste questionnaires administered to the European North Americans, and 12 green, 13 blue, 13 purple, and 13 yellow taste questionnaires administers to East Asians.

Participants were given a cup of water and asked to cleanse their pallet. After taking a sip of distilled water, the participant then took one sip from a three ounce cup containing the ingredient pairing and either immediately swallowed, or spat out, the pairing. After sampling
each ingredient pairing, participants then rated how much they liked each ingredient pairing on a 1 (not at all) to 7 (very much) point Likert scale, and wrote comments about the pairing. This process was then repeated for all four ingredient pairings.

Participants then completed a series of pencil and paper measures. They first completed a demographics questionnaire, including questions about nation of origin, countries lived in, immigrant history, and bicultural identity (Benet-Martinez & Haritatos, 2005; Benet-Martinez et al., 2002; Hong et al., 2000; Mok et al., 2007). Specifically, participants who had lived in two particular countries for at least 5 years, had a high level of identification with both cultures, and considered themselves bicultural were categorized as such. Additionally, we asked participants to list how many alcoholic beverages and cigarettes they have had that day to control for the impact of intoxication and smoking on taste. Lastly we asked how much participants tended to like eating East Asian cuisine to assess the role of cultural familiarity with dissimilar flavor compounds on taste ratings (see Tables 1-3).

After participants finished the demographics questionnaire, they then assessed themselves using the modified 1 (individual) to 7 (collectivist) Inclusion of Other in the Self Scale (Aron et al., 1992) adapted from a previous study (Li, 2002). Lastly, participants completed two tests of dialectical reasoning, drawn from Ji et al. (2001). Once participants completed these pencil and paper measures, they were then debriefed and given compensation in the form of a small reward (a pen).

Results

First, analyses were run to understand whether East Asians prefer more dissimilar ingredient pairings and North Americans prefer more similar ingredient pairings, and if the
uncommon or commonness of the ingredient pairings affected participants' liking ratings. A 2 (commonality: common vs. uncommon) x 2 (flavor compound: similar vs. dissimilar) x 2 (culture: East Asian vs. North American) mixed ANOVA was conducted, with commonality and similarity of flavor compounds as within subjects factors and culture as the between subjects factor. The dependent variable was the Likert scale ratings of how much the participants liked each ingredient pairing. There was a significant main effect for similarity $F(1, 112) = 16.42, p = .0005 \, \eta^2_p = .13$, with dissimilar ingredient pairings being rated as more liked ($M = 3.21, SD = 1.06$) than similar ingredient pairings ($M = 3.84, SD = 1.29$). Moreover, the main effect for similarity appeared to have been qualified by a significant interaction of culture by similarity $F(1, 112) = 7.95, p = .006 \, \eta^2_p = .07$ (see Figure 1). There were no other main effects or interactions that approached significance (all $p$s > .10; see Table 4). In order to further understand the interaction of culture by similarity, two separate within subjects t-tests were conducted for East Asians and European North Americans ratings for similar and dissimilar ingredient pairings. European North Americans rated dissimilar ingredient pairings ($M = 3.97, SD = 1.28$) as liked significantly more than similar ($M = 2.98, SD = 1.06$) ingredient pairings, $t(62) = 5.07, p = .0005$; however, the liking ratings for East Asians did not differ significantly for dissimilar ($M = 3.68, SD = 1.30$) versus similar ($M = 3.50, SD = 1.01$) ingredient pairings, $t(50) = .844, p = .403$.

Because the East Asian sample was comprised of both Asian Americans and East Asians, analyses were conducted to see if taste ratings differed across these groups. A 2 (commonality: common vs. uncommon) x 2 (flavor compound: similar vs. dissimilar) x 2 (culture: Asian American vs. East Asian) mixed ANOVA was conducted. There was a significant main effect of culture, $F(1, 49) = 4.61, p = .037 \, \eta^2_p = .09$. East Asians rated their liking of the ingredient
pairings ($M = 3.83, SD = .85$) higher than Asian Americans ($M = 3.31, SD = .88$). There were no other main effects or interactions that approached significance (all $p$s > .10; see Table 4).

Because the North American sample was taken from two different testing locations, analyses were conducted to see if these two groups were similar to one another in taste ratings. A 2 (commonality: common vs. uncommon) x 2 (flavor compound: similar vs. dissimilar) x 2 (testing location: Boston Cocktail Summit vs. Brandeis) mixed ANOVA was conducted. There was a significant main effect for similarity $F(1, 61) = 30.19, p = .0005 \eta^2_p = .33$, with dissimilar ingredient pairings being rated as more liked ($M = 3.97, SD = 1.28$) than similar ingredient pairings ($M = 2.98, SD = 1.06$). Moreover, the main effect for similarity appeared to have been qualified by a significant interaction of testing location by similarity $F(1, 61) = 4.48, p = .038 \eta^2_p = .07$ (see Figure 2). To understand the interaction of testing location by similarity, two separate between subjects t-tests were conducted for the European North American Boston Cocktail Summit attendees' and the Brandeis students' and staffs' ratings for similar and dissimilar ingredient pairings. The dissimilar ingredient pairings were liked marginally more by the Boston Cocktail Summit attendees ($M = 4.31, SD = 1.14$) than Brandeis students and staff ($M = 3.73, SD = 1.33$), $t(61) = 1.80, p = .077$; however, there was no significant difference between the ratings of similar ingredient pairings for Boston Cocktail Summit attendees ($M = 2.85, SD = 1.05$) versus the Brandeis students' and staff's ratings ($M = 3.08, SD = 1.07$), $t(61) = -.87, p = .390$.

There were no other main effects or interactions that approached significance (all $p$s > .10; see Table 4).

Next Pearson’s correlations were used to assess whether participants who predicted the most change in reasoning tasks also would prefer dissimilar ingredient pairings over similar
ingredient pairings, and whether these results would hold within both North American and East Asian subject groups. Because there were no main effects or interactions involving commonality, both common and uncommon ingredient pairing ratings were collapsed across similarity, yielding one rating for dissimilar and one rating for similar ingredient pairings.

Assessments of dialectical reasoning included four reasoning questions about scenarios representing participants' predictions of change and one question regarding a graph (Ji et al., 2001). For the four questions about scenarios, higher percentile ratings for each question indicated that the participant believed that a change in the circumstance mentioned would happen in the future, or a more dialectical response. Hence, it was hypothesized that there would be a positive relationship between higher ratings for the dissimilar food pairings and higher scores on the dialectical reasoning measures (a style expected for East Asians). Contrariwise, there would be a negative relationship between higher ratings for the dissimilar food pairings and higher ratings for the dialectical reasoning measures (a style expected for North Americans). Instead, only North Americans showed a significant negative relationship between their responses to the first question and the average ratings for the similar ingredient pairing, $r = -.253$, $n = 63$, $p = .045$. Additionally, North Americans also showed a significant negative relationship between their responses to the second question and the average rating for the dissimilar ingredient pairing, $r = -.295$, $n = 62$, $p = .020$. There were no other correlations between the taste ratings and these dialectical reasoning questions (all $ps > .10$; see Table 5).

Next, for the dialectical predictions based on an ongoing change depicted in a graph, it was predicted that participants who believed that the graph would continue on a positive trend would also provide higher liking ratings for similar ingredient pairings (a trend expected for North Americans). In contrast, there would be a negative relationship between participants
predicting that a graph's trend would increase and their liking ratings for dissimilar ingredient pairings (a trend expected for East Asians). Instead, there was a marginal negative relationship between the liking ratings for the similar flavor ingredient pairings and the prediction for the graph to continue on a positive trend, \( r(114) = -.17, p = .073 \). There was also a marginal positive relationship between the rating for the similar flavor ingredient pairings and the prediction for the graph's trend to remain the same (neither increase nor decrease), \( r(114) = .18, p = .079 \). East Asians showed a marginally significant positive relationship between liking ratings for similar ingredient pairings and the predictions for the trend to remain the same, \( r(51) = .26, p = .063 \); however, North Americans showed a non-significant negative relationship for these same variables, \( r(63) = -.03, p = .807 \). There were no other significant correlations between the similar and dissimilar taste ratings and the dialectical reasoning graph question (all \( ps > .10 \); see Table 6).

Discussion

*Taste Ratings*

The current study assessed participants’ liking ratings for ingredient pairings to discern whether East Asians tended to like dissimilar ingredient pairings and whether North Americans tended to like similar ingredient pairings, as suggested by Ahn et al. (2011)’s results. We also assessed whether the commonality of a pairing in a given culture influenced potential effects of similarity. Our taste rating data revealed two important results. First, instead of North Americans preferring similar flavor compounds, as Ahn et al. (2011)’s data suggested, our results indicate that North Americans preferred dissimilar ingredient pairings. Second, rather than East Asians liking dissimilar ingredient pairings more than similar ingredient pairings, as Ahn et al. (2011)’s data suggested, in the current study East Asians liked dissimilar and similar ingredient
pairings equally. European North Americans could have rated dissimilar ingredient pairings higher than the similar ingredient pairings because the participants were tested in a large metropolitan area. Ottaviano and Peri (2005) noted that census data has shown that during the later quarter of the 20th century, many immigrants tended to settle in urban rather than rural areas, leading US cities to become "melting pots" for different cultures (p. 305). This evidence may imply that Bostonians have acquired a liking for more dissimilar flavor compound ingredient pairings because of the rich cultural diversity in and around the city. Thus, it could be that North Americans who live in urban areas with high cultural diversity may prefer different flavor compound ingredient pairings than participants who live in more rural areas with less cultural diversity. Instead, participants who live in less culturally diverse areas might tend to give higher ratings to traditional North American cuisine, or recipes with more similar ingredient pairings, and lower ratings to recipes with more dissimilar ingredient pairings. Further research should be done to see if preferences for similar and dissimilar ingredient pairings are comparable in both areas of high and low cultural diversity within the US.

While the current study did not test participants from different areas of North America, there is some evidence that participants in the same culture may have somewhat different preference ratings for ingredient pairings. In the current study, North Americans from both Brandeis and the Boston Cocktail Summit tended to rate dissimilar food pairings higher than similar ingredient pairings, suggesting that the results for North Americans liking more dissimilar ingredient pairings could be generalizable outside of a university setting. However, the North Americans at the Boston Cocktail Summit and Brandeis did have a difference in their liking ratings for ingredient pairings. North Americans at the Boston Cocktail Summit rated dissimilar food pairings as marginally higher than the North Americans at Brandeis. One reason
for this difference could be that the attendees of the Boston Cocktail Summit may have been connoisseurs who came to the convention to enjoy tasting different beverages. Therefore, the North Americans at the Boston Cocktail Summit may have been somewhat different from the North Americans at Brandeis. However, because all of the testing locations were located in either Boston or a surrounding suburb (Waltham, Massachusetts), participants selected from these nearby testing locations may have had similar levels of multicultural exposure, and therefore had similar trends for the liking of dissimilar and similar ingredient pairings.

Secondly, while East Asians did perform similar to Ahn et al. (2011)'s suggestions by having a relatively high liking rating for dissimilar ingredient pairings, East Asians rated similar ingredient pairings equally as high. One possible reason for this explanation is that East Asians who were tested all currently reside in North America. These East Asians may have more diverse taste preferences than East Asians who have lived their whole life only in their native country. Thus it could be that if the current study were to be conducted in East Asia, participants may give answers more in line with what Ahn et al. (2011)'s results suggested.

Interestingly, whether ingredient pairings commonly appeared in European North American or East Asian recipes did not seem to influence liking ratings. Instead, participants seemed to rate their liking for ingredient pairings in terms of the number of flavor compounds, despite the fact that very unique combinations of flavors and ingredients were used. This lack of an effect of commonality offers a different perspective from large body of literature which indicates that the cultural and social contexts foods are presented in and previous exposure to certain foods are the primary determinants for peoples' and animals' taste preferences (Chung et al., 2012; S. J. Chung, McDaniel, & Lundahl, 2010; Laing et al., 1994; Prescott, 1998; Prescott & Bell, 1995; Rozin, 1976, 1988; Rozin & Kennel, 1983; Tu, Husson, Sutan, Ha, & Valentin,
Reasoning and Taste across Cultures

2012; Tu, Valentin, Husson, & Dacremont, 2010; Zellner, Garriga-Trillo, Rohm, Centeno, & Parker, 1999). One possible reason for these results was that, instead of recipes with many ingredients that had specific instructions for their preparation, such as salad dressings (Chung et al., 2012) or different types of sweets and beverages (Zellner et al., 1999), the current study only had mixtures that contained two ingredients. Thus future investigations should seek to understand how the relationship between the number of flavor compounds shared and how using more than two ingredients can influence factors, such as previous exposure to certain food pairings and the socio-cultural context in which a food is presented, in determining taste preferences.

**Dialectical Reasoning Questionnaires**

We hypothesized that participants who had higher dialectical responses to the reasoning questionnaires would also have higher ratings for dissimilar ingredient pairings because both measures indicate a preference for contrasting opinions or flavor compounds. In contrast, participants who had lower dialectical responses to the reasoning questionnaires would have higher ratings for the similar ingredient pairings because both measures indicate a lack of contrast, or uniformity. However, only slight and somewhat inconsistent relationships emerged between the dialectical reasoning questionnaires and the liking ratings for the similar and dissimilar ingredient pairings. There were only marginal results for the similar ingredient pairings, and there were no discernible relationships between dissimilar ingredient pairings ratings and dialectical responses to the reasoning questionnaires. While the marginal relationships between higher ratings for similar ingredient pairings and the graph trend predictions are non-significant, it could have been due to the fact that the measures were conducted very quickly and in a busy environment.
Although dialectical reasoning did not seem to explain differences across groups in the ratings of similar and dissimilar ingredient pairings, some intriguing preliminary results emerged in exploratory analyses with the measure of self-construal (Li, 2002). Based on the previous literature on culture (Markus & Kitayama, 1991), and Ahn et al. (2011)’s findings, one might predict that there would be a positive relationship between ratings on the self-construal measure (indicating a more interdependent response) and dissimilar ingredient pairing liking ratings (a trend more expected for East Asians). In contrast, there would be a positive relationship between ratings on the self-construal measure (indicating a more independent response), and similar ingredient pairing liking ratings (a trend more expected for North Americans). However, the results showed a non-significant reversal of this trend. Specifically, North Americans' higher ratings for similar ingredient pairings were trending toward being associated with a more interdependent response, \( r(63) = .06, p = .656 \), and higher ratings for dissimilar ingredient pairings were trending toward being associated with a more independent response, \( r(63) = -.103, p = .329 \). Furthermore, East Asians' higher ratings for similar food pairings were trending toward being associated with a more independent response, \( r(51) = -.02, p = .909 \), and higher ratings for dissimilar food pairings were trending toward being associated with a more interdependent response, \( r(51) = .166, p = .244 \).

The current study’s results suggest that self-construal may influence North Americans’ and East Asians’ ratings for food pairings, but in a more complex fashion than previously thought. It could be that, for North Americans, a preference for dissimilar food pairings could be associated with individuality, while East Asians viewed the dissimilar food pairings as associated with interdependence because East Asian culture contains recipes with ingredients that contain...
more dissimilar food pairings (Ahn et al., 2011). However, the non-significant results may have been because only one question was used to measure independence and collectivism, and the constructs are construed as along a single dimension. Thus further studies should be conducted to examine liking ratings of similar and dissimilar ingredient pairings using more sensitive measures that consider independence and collectivism on separate scales, for example the Self-Construal Scale (Gudykunst et al., 1996).

Limitations and Further Directions

Besides the limitations in testing mixtures of two ingredients (as mentioned above), Ji et al. (2001)’s four dialectical reasoning questions about scenarios, which ascertained whether or not a participant believed a change would happen in relation to a certain point in time, were not answered in a consistent manner. For example, on questions one and four European North Americans had a non-significant trend to give a higher percentage probability response for whether a change would happen in the future, indicating a more dialectical response; however, on questions two and three they gave significantly lower percentage probability responses, indicating a less dialectical response. Because of the inconsistent responses to these four questions, the current study was not able to ascertain if there was a relationship between taste preference ratings and the answers to these four questions, and could only report the relationships between taste preference ratings and change as a continuous trend. This means that whether or not there was a relationship between dialectical reasoning style and liking ratings for similar and dissimilar food pairings is difficult to assess because the four dialectical reasoning questions about scenarios displayed inconsistent results.

Conclusions
Thus the current study demonstrates when tasting different combinations of ingredients in a blind taste test scenario the chemical composition of the ingredient pairings (here, whether they are similar or dissimilar pairings) differently influences liking ratings for European North Americans and East Asians. However, without support for a particular mechanism to account for cultural differences in taste preferences, such as dialectical reasoning style, it is difficult to assess whether these results represent a true cultural difference between North Americans and East Asians, or an effect of other confounds. For example, the area of the testing location (a metropolitan city in New England) may have influenced the pattern of the results for European North Americans in a way that may not generally reflect taste preferences across a broader sample of North Americans.

Despite the above points, the current study also offers some preliminary evidence that self-construal may be associated with differences in sensory processing, albeit in a manner different than what might have been hypothesized. While these results did not reach significance, North Americans and East Asians tended to have different relationships between how high of a rating they assigned to similar and dissimilar ingredient pairings and the way that they construed themselves (as independent or as interdependent). Thus the current study's results offer an initial suggestion into how East Asian and North American methods of self-construal may or may not affect their taste preferences for similar and dissimilar ingredient pairings.
References


APPENDIX A

Taste Ratings Questionnaire

After sampling each food pairing below, please rate how much you liked the selected food. After, please comments on why you rated the food as you did.

Trial 1

1. Food Pairing # 1

**How much did you like this food pairing? (please circle one number)**

1---------------2---------------3---------------4---------------5---------------6---------------7

not at all    somewhat    very much

Comments:____________________________________________________

2. Food Pairing # 2

**How much did you like this food pairing? (please circle one number)**

1---------------2---------------3---------------4---------------5---------------6---------------7

not at all    somewhat    very much

Comments:____________________________________________________
After sampling each food pairing below, please rate how much you liked the selected food. After, please comments on why you rated the food as you did.

**Trial 2**

1. Food Pairing # 1

**How much did you like this food pairing? (please circle one number)**

1--------------2---------------3---------------4---------------5---------------6---------------7

not at all somewhat very much

Comments:____________________________________________________

2. Food Pairing # 2

**How much did you like this food pairing? (please circle one number)**

1--------------2---------------3---------------4---------------5---------------6---------------7

not at all somewhat very much

Comments:____________________________________________________
APPENDIX B

Demographics Questionnaire

1) Sex: O 1 Male    O 2 Female

2) Date of Birth: _____/_____/_____ 

3) Education completed (check highest level)
   O 1 Less than high school graduate (highest grade completed? ________ )
   O 2 High school graduate/G.E.D.
   O 3 Some college, or trade, technical, or business school (how many years? ____ )
   O 4 Bachelor's degree
   O 5 Some graduate work (how many years? ____ )
   O 6 Master's degree
   O 7 M.D., J.D., Ph.D., other advanced degree

4) Ethnicity
   O 1 Hispanic
   O 2 Not Hispanic

5) Race
   O 1 American Indian/Alaskan Native
   O 2 Asian
   O 3 Native Hawaiian/Other Pacific Islander
   O 4 Black/African American
   O 5 White/Caucasian
   O 6 Multiracial (please specify: ____________ )
   O 7 Other (please specify______________ )

6) Where is your native country?
   O 1 North America (e.g. US, Canada)
   O 2 Western Europe (e.g. France, UK, Finland, Austria, Germany)
   O 3 Southern Europe (e.g. Spain, Greece, Italy, Albania, Croatia)
   O 4 Latin America (e.g. Mexico, Central America, South America, Caribbean)
   O 5 East Asia (e.g., China, including Hong Kong and Taiwan, Japan, Korea)
   O 6 South Asia (e.g., India, Pakistan)
   O 7 Middle East (e.g. Saudi Arabia, Israel, Lebanon, Armenia)
   O 8 None of the above (Specify country: ____________ )

7) What is the name of your native country?
   __________________________

8) What is your native language?
   __________________________
9) For each country you have lived in from more than one year, please list it here and the number of years you lived there- use the back of this page if needed

Country:______________________________________________ # of year(s):____________
Country:______________________________________________ # of year(s):____________
Country:______________________________________________ # of year(s):____________
Country:______________________________________________ # of year(s):____________
Country:______________________________________________ # of year(s):____________

10) How many generations have you/your family been in America?
   O 1 Not-applicable (don’t live in America)
   O 2 1st generation (immigrant)
   O 3 2nd generation (parents were immigrants)
   If you selected 2nd generation:
       10a) Your Father's and/or Mother's Place of Birth:________
   O 4 3rd generation (grandparents were immigrants)
   If you selected 3rd generation:
       10b) Your Grandmother's and/or Grandfather's Place of Birth:________
   O 5 More than 3rd generation

11) How much do you identify with U.S. culture? (please circle one number)

   1----------------2-----------------3-----------------4-----------------5-----------------6
   not at all                      highly identified

12) (if native country is NOT USA) How much do you identify with your native country's culture? (please circle one number)

   1----------------2-----------------3-----------------4-----------------5-----------------6
   not at all                      highly identified
13) Do you consider yourself bicultural?
   O 1 Yes
   O 2 No

13a) If YES to question 13, between which two cultures?_______________________

14) How many alcoholic beverages have you had today?_______________

15) How many cigarettes/cigars have you had today? _______________

16) Do you tend like East Asian cuisine? (please circle one number)

   1------------2------------3------------4------------5------------6------------7
   not at all               neutral               very much
APPENDIX C

Dialectical Reasoning Questionnaires

For the following questions 1-4, please provide a percentage probability judgment for each question.

1. Lucia and Jeff are both seniors at the same university. They have been dating each other for two years. How likely is it that they will break up after graduation?
   _____________%

2. Two kids are fighting at kindergarten. How likely is it that they will become lovers some day?
   _____________%

3. Richard grew up in a poor family but he managed to go to college. How likely is it that he will become rich one day?
   _____________%

4. Vincent has been the chess champion for 3 years in high school. How likely is it that he will lose in the next game against his strongest opponent?
   _____________%
(Question 5) For the following questions, a graph is presented. Information about three time periods is given.

5. The striped dolphin populations from the Northeast Atlantic were estimated to be around 1100 in 2006, 1200 in 2008, and 1250 in 2010 as indicated on the graph below.

6a) Please predict the probability for the trend to go up, to go down, and to remain the same, in comparison to the last point on the graph. Also, please note that the three probabilities should add up to 100%.

Trend: to go up_______%  to go down_______%  to remain the same:_______%

6b) How confident are you about the predictions that you reported above (circle one number)?

1  2  3  4  5  6  7  8
Not Confident  Extremely Confident
At All
APPENDIX D

Independence and Collectivism Questionnaire

1. Please mark the picture which best describes your relationship with your family members (parents and siblings). One circle represents you, while the other circle represents your family members. The overlap between the circles indicates your relationship with your family members.
Table 1:  
*Mean (Standard Deviation) Test Scores and Demographic Information for European North Americans and East Asians*

<table>
<thead>
<tr>
<th></th>
<th>European North Americans Mean (SD)</th>
<th>East Asians Mean(SD)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>63</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>34 M, 29 F</td>
<td>30 M, 29 F</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>27.08(11.24)</td>
<td>20.44(2.15)</td>
<td>.0005</td>
</tr>
<tr>
<td>Education (years)</td>
<td>14.73(3.44)</td>
<td>13.01(1.51)</td>
<td>.001</td>
</tr>
<tr>
<td>Do you tend to like East Asian Cuisine? From 1 (Don't Like) to 7 (Like)</td>
<td>5.95(1.10)</td>
<td>6.41(1.20)</td>
<td>.036</td>
</tr>
<tr>
<td>Level of Identification with US Culture from 1 (Don't Identify) to 6 (Identify)</td>
<td>4.97(1.05)</td>
<td>4.33(1.13)</td>
<td>.002</td>
</tr>
<tr>
<td>Exposure to Non-North American Cultures (years)</td>
<td>.61(1.43)</td>
<td>6.57(6.89)</td>
<td>.0005</td>
</tr>
<tr>
<td>Family Generation from 1 (Not Living in US) to 7 (Family in US for More than 3 Generations)</td>
<td>4.30(.85)</td>
<td>2.21(.99)</td>
<td>.0005</td>
</tr>
<tr>
<td>Self-Construal from 1 (Individualistic) to 7 (Collectivistic)</td>
<td>4.98(1.59)</td>
<td>5.22(1.21)</td>
<td>.392</td>
</tr>
</tbody>
</table>

Notes: All information in Table 1 describes the European North American and East Asian samples. 1 North American and 4 East Asians did not write their age, and 32 European North Americans and 16 East Asians did not list the number of countries that they had lived in. The p values in the final column correspond to between subjects t-tests comparing European North Americans and East Asians on each measure.
Table 2: *Mean (Standard Deviation) Test Scores and Demographic Information for North Americans at the Boston Cocktail Summit and at Brandeis*

<table>
<thead>
<tr>
<th></th>
<th>Boston Cocktail Summit</th>
<th>Brandeis</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean(SD)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>26</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>15 M, 11 F</td>
<td>19 M, 18 F</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>33.88 (12.81)</td>
<td>22.17 (6.62)</td>
<td>.0005</td>
</tr>
<tr>
<td>Education (years)</td>
<td>16.15 (2.57)</td>
<td>13.74 (3.65)</td>
<td>.005</td>
</tr>
<tr>
<td>Do you tend to like East Asian Cuisine? From 1 (Don't Like) to 7 (Like)</td>
<td>5.73 (1.15)</td>
<td>6.11 (1.05)</td>
<td>.182</td>
</tr>
<tr>
<td>Level of Identification with US Culture from 1 (Don't Identify) to 6 (Identify)</td>
<td>5.04 (1.18)</td>
<td>4.92(.95)</td>
<td>.659</td>
</tr>
<tr>
<td>Exposure to Non-North American Cultures (years)</td>
<td>.85(1.68)</td>
<td>.44(1.25)</td>
<td>.450</td>
</tr>
<tr>
<td>Family Generation from 1 (Not Living in US) to 7 (Family in US for More than 3 Generations)</td>
<td>4.12(.91)</td>
<td>4.43(.80)</td>
<td>.149</td>
</tr>
<tr>
<td>Self-Construal from 1 (Individualistic) to 7 (Collectivistic)</td>
<td>4.77(1.75)</td>
<td>5.14(1.47)</td>
<td>.373</td>
</tr>
</tbody>
</table>

Notes: All information in Table 2 describes the Boston Cocktail Summit and the Brandeis North American sample. 1 participant from Brandeis did not write their age, and 13 participants from the Boston Cocktail Summit and 19 participants form the Boston Cocktail Summit did not list the number of countries that they had lived in. The p values in the final column correspond to between subjects t-tests comparing Boston Cocktail Summit and at Brandeis North Americans on each measure.
Table 3: 
*Mean (Standard Deviation) Test Scores and Demographic Information for Asian Americans and East Asians*

<table>
<thead>
<tr>
<th></th>
<th>East Asian Mean (SD)</th>
<th>Asian American Mean(SD)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>27</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>19 M, 8 F</td>
<td>11 M, 13 F</td>
<td></td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td>20.83(2.32)</td>
<td>20.04(1.94)</td>
<td>.213</td>
</tr>
<tr>
<td><strong>Education (years)</strong></td>
<td>13.27 (1.62)</td>
<td>12.78 (1.40)</td>
<td>.249</td>
</tr>
<tr>
<td><strong>Do you tend to like East Asian Cuisine? From 1 (Don't Like) to 7 (Like)</strong></td>
<td>6.63 (.71)</td>
<td>6.22 (1.50)</td>
<td>.236</td>
</tr>
<tr>
<td><strong>Level of Identification with US Culture from 1 (Don't Identify) to 6 (Identify)</strong></td>
<td>3.96 (1.12)</td>
<td>4.75 (.99)</td>
<td>.011</td>
</tr>
<tr>
<td><strong>Level of Identification with non-US Culture from 1 (Don't Identify) to 6 (Identify)</strong></td>
<td>4.62(1.20)</td>
<td>3.75(.50)</td>
<td>.171</td>
</tr>
<tr>
<td><strong>Exposure to Non-North American Cultures (years)</strong></td>
<td>.93(1.53)</td>
<td>10.80(6.26)</td>
<td>.0005</td>
</tr>
<tr>
<td><strong>Family Generation from 1 (Not Living in US) to 7 (Family in US for More than 3 Generations)</strong></td>
<td>1.63(.88)</td>
<td>2.88(.61)</td>
<td>.0005</td>
</tr>
<tr>
<td><strong>Self-Construal from 1 (Individualistic) to 7 (Collectivistic)</strong></td>
<td>5.22(1.25)</td>
<td>5.21(1.17)</td>
<td>.968</td>
</tr>
</tbody>
</table>

Notes: All information in Table 3 describes the East Asian and Asian American samples. 1 East Asian did not write their age, 3 East Asians and 20 Asian Americans did not list their identification with their native culture, and 12 East Asians and 4 Asian Americans did not list the number of countries that they had lived in. The p values in the final column correspond to between subjects t-tests comparing East Asians and Asian Americans on each measure.
Table 4:

*Mean (Standard Deviation) Ingredient Pairing Liking Ratings for North Americans and East Asians*

<table>
<thead>
<tr>
<th></th>
<th>Similar-Common Mean(SD)</th>
<th>Similar-Uncommon Mean(SD)</th>
<th>Dissimilar-Common Mean(SD)</th>
<th>Dissimilar-Uncommon Mean(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>European North Americans</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boston Cocktail Summit</td>
<td>3.08(1.32)</td>
<td>2.62(1.44)</td>
<td>4.46(1.36)</td>
<td>4.15(1.57)</td>
</tr>
<tr>
<td>Brandeis</td>
<td>3.11(1.47)</td>
<td>3.05(1.39)</td>
<td>3.49(2.31)</td>
<td>3.97(1.67)</td>
</tr>
<tr>
<td><strong>East Asians</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian American</td>
<td>3.13(1.51)</td>
<td>3.54(1.50)</td>
<td>3.38(1.84)</td>
<td>3.21(1.67)</td>
</tr>
<tr>
<td>East Asian</td>
<td>3.63(1.36)</td>
<td>3.67(1.24)</td>
<td>3.78(1.87)</td>
<td>4.26(1.70)</td>
</tr>
</tbody>
</table>
Table 5:

*Correlations Between Average Ratings for Similar and Dissimilar Ingredient Pairings and Four Dialectical Reasoning Questions About Scenarios Representing Participants' Predictions of Change*

<table>
<thead>
<tr>
<th>Dialectical Reasoning Question</th>
<th>Question 1</th>
<th>Question 2</th>
<th>Question 3</th>
<th>Question 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratings for Similar Food Pairings for European North Americans and East Asians</td>
<td>-.125</td>
<td>.034</td>
<td>.106</td>
<td>-.013</td>
</tr>
<tr>
<td>Ratings for Dissimilar Food Pairings for European North Americans and East Asians</td>
<td>-.032</td>
<td>-.110</td>
<td>-.066</td>
<td>-.050</td>
</tr>
<tr>
<td>Ratings for Similar Food Pairings for European North Americans at the Boston Cocktail Summit</td>
<td>-.253*</td>
<td>-.117</td>
<td>.015</td>
<td>-.055</td>
</tr>
<tr>
<td>Ratings for Dissimilar Food Pairings for European North Americans at Brandeis University</td>
<td>.092</td>
<td>-.295*</td>
<td>-.070</td>
<td>.022</td>
</tr>
<tr>
<td>Ratings for Similar Food Pairings for East Asians</td>
<td>.115</td>
<td>.111</td>
<td>.131</td>
<td>-.033</td>
</tr>
<tr>
<td>Ratings for Dissimilar Food Pairings Asian Americans</td>
<td>-.221</td>
<td>.162</td>
<td>-.019</td>
<td>-.108</td>
</tr>
</tbody>
</table>

*Note.* ^p < 0.10, *p < 0.05, **p < 0.01
Table 6:

*Correlations Between Ratings for Similar and Dissimilar Ingredient Pairings and the Dialectical Predictions Based on an Ongoing Change Depicted in a Graph*

<table>
<thead>
<tr>
<th></th>
<th>Graph Continuing on a Positive Trend</th>
<th>Graph Continuing on a Negative Trend</th>
<th>Graph Neither Increases nor Decreases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratings for Similar Food Pairings for European North Americans and East Asians</td>
<td>-.169(^\wedge)</td>
<td>.014</td>
<td>.178(^\wedge)</td>
</tr>
<tr>
<td>Ratings for Dissimilar Food Pairings for European North Americans and East Asians</td>
<td>-.044</td>
<td>.085</td>
<td>-.023</td>
</tr>
<tr>
<td>Ratings for Similar Food Pairings for European North Americans</td>
<td>-.024</td>
<td>.061</td>
<td>-.031</td>
</tr>
<tr>
<td>Ratings for Dissimilar Food Pairings for European North Americans</td>
<td>-.090</td>
<td>.095</td>
<td>.019</td>
</tr>
<tr>
<td>Ratings for Similar Food Pairings for East Asians</td>
<td>-.177</td>
<td>-.110</td>
<td>.262(^\wedge)</td>
</tr>
<tr>
<td>Ratings for Dissimilar Food Pairings for East Asians</td>
<td>-.094</td>
<td>.103</td>
<td>.008</td>
</tr>
</tbody>
</table>

*Note.* \(^\wedge\)p < 0.10, \(*p < 0.05, **p < 0.01*)
Figure Captions

Figure 1: East Asians’ and European North Americans’ Ratings of Similar and Dissimilar Ingredient Pairings. European North Americans rated dissimilar ingredient pairings as more liked than similar ingredient pairings, while East Asians’ ratings did not differ across dissimilar versus similar pairings.

Figure 2: European North American Samples’ Ratings of Similar and Dissimilar Ingredient Pairings. Boston Cocktail Summit attendees exhibited a marginally significant trend to like dissimilar ingredient pairings more than the Brandeis sample; there was no significant difference between the groups’ ratings for similar ingredient pairings.
Figure 1

![Bar chart showing liking ratings for North Americans and East Asians for similar and dissimilar conditions.](chart.png)
Figure 2

![Bar chart showing liking ratings for Boston Cocktail Summit and Brandeis, comparing similar and dissimilar conditions.](chart)