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The Subtlety of Sound: Accent as a Marker for Culture

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Abstract

Aspects of language, such as accent, play a crucial role in the formation and categorization of one's cultural identity. Recent work on accent emphasizes the role of accent in person perception and social categorization, demonstrating that accent also serves as a meaningful indicator of an ethnic category. In this article, we investigate whether the accent of an interaction partner, as a marker for culture, can induce cultural frame-shifts in biculturals. We report the results of three experiments, performed among bicultural and monocultural individuals, in which we test the above hypothesis. Our results demonstrate that accent alone can affect people's cognition.

Keywords

accent, culture, frame-switching, biculturalism

Recent work has demonstrated that subtle primes, such as circling personal singular or plural pronouns in a paragraph of text, can significantly affect cognition and behavior by priming different cultural mindsets (see Oyserman & Lee, 2008, for a meta-analytic review). If language can be used as a prime for culture, then is it possible for the accent of a speaker's voice to have a similar effect? In this article, we show that bicultural individuals can be induced to adopt a specific cultural frame solely through exposure to accented English.

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Language has been shown to reliably cue one self-construal more salient than another in biculturals. Ross, Xun, and Wilson (2002) report that ChineseEnglish bilinguals responding in Chinese made more collective self-statements, showed greater endorsement of Chinese values, and reported lower self-esteem relative to the English-responding groups. Similarly, Boucher and O'Dowd (2011) observed that bilinguals answering in Chinese scored higher on Eastern-collectivist traits than when answering in English. These findings suggest that when switching languages, bilinguals also adopt the cultural values and attitudes associated with the target language. Other studies have also confirmed this observed change in thinking and responding styles in bilinguals concurrent with use of their native language versus a second language (Yang & Bond, 1980; see also Chen & Bond, 2007, for evidence of ethnic affirmation where participants from Hong Kong responding in English actually identified more with the Chinese culture). This body of research demonstrates the power of language in shaping self-concept and activating associated cultural constructs in bilinguals.

Auditory cues have also been shown to play a critical role in impression formation, stereotyping, and social categorization. Among the vocal cues available for person perception, accent has emerged as one of the most salient auditory factors (e.g., Fuertes, Gottdiener, Martin, Gilbert, & Giles, 2012). The innate power of accent is illustrated in the work of Kinzler, Shutts, DeJesus, and Spelke (2009) who demonstrated that 5-year-old children preferred to be friends with native speakers of their native language compared with foreign-accented speakers. Experiment 3 of Kinzler et al. (2009) showed that children chose the native accented targets regardless of whether the target was same race (French Caucasian faces) or other race (Black faces). In similar work on the characteristics of accent, Rakić, Steffens, and Mummendey (2011) reported that speakers' accents were more important cues compared with their visual appearance for listeners to socially categorize their ethnicity. These results illuminate the role of accent in person perception and social categorization.

Here we study whether accents can make biculturals switch interpretive frames. We use advanced digital technology to control for a virtual speaker's visual appearance and manipulate the lone variable of the virtual speaker's accent in order to study whether accent alone can induce cultural frame-switching. Cultural frame-switching refers to the idea that interpretive frames can shift because of situational cues in individuals who have internalized two cultural identities (Benet-Martinez, Leu, Lee, & Morris, 2002). Cultural frame-switching takes place in individuals who have a deep knowledge of more than one culture. A plausible explanation for frame-switching is that multicultural individuals internalize different norms and culturally specific systems of meaning, which are activated depending on context.

Based on cultural priming literature, we hypothesize that accent can prime a cultural identity by activating a subset of internalized values and norms, thereby resulting in culturally specific patterned cognition. Self-categorization theory (SCT) provides an account of the psychological mechanisms that motivate this prediction (Turner & Reynolds, 2012). According to SCT, as a particular social identity becomes more salient, individuals will behave in ways congruent with that social identity. In our work, cues effectuate this identity salience by priming cultural identity and activating

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cultural norms in bicultural individuals. Accent is a cue to a cultural social identity. Biculturals have at least two cultural identities, and accent will make either identity salient. For biculturals, the American English accent will more strongly activate an individualistic frame compared with a nonstandard English accent because individualistic values are exemplified most in American and Western European cultures (Markus & Kitayama, 1991) compared with cultures such as Chinese (Markus & Kitayama, 1991), Mexican (Shkodriani & Gibbons, 1995), and Iranian cultures (Hofstede, 2001; Javidan & Dastmalchian, 2003). While there is little research on the effects of cultural priming with accent on monoculturals, one possible prediction is that a nonstandard accent will make an out-group social category salient. Similarly, social category salience is also postulated to increase when one category must vie to supersede other categories in an internal struggle of cultural identity (Wagner & Ward, 1993). For listeners who are exposed to an out-group accent, this conflicting social identity cue could lead to a stronger in-group attraction. This self-categorization at the intergroup level illustrates a key premise in SCT wherein individuals define themselves to be members of a particular group through contrast to a relevant out-group. In our study, accent is used as the salient cultural cue. We predict that based on this defining factor, monocultural Americans will behave in a manner consistent with in-group values and provide more individualistic responses in the foreign accented conditions.

Experiments

Our method differs from previous studies in several ways. First, unlike studies which investigate how different accents affect person perception, we use accent to induce cultural frame-switching. Second, our method differs from studies that use language as a prime because participants in our experiments only listen to speech rather than generate language explicitly. Third, we use virtual-confederates as a technological application of traditional experimental methods. In two of the three studies, this work offers an extension of previous methods, such as the commonly used matched guise technique (Fuertes et al., 2012), in which a single bicultural confederate speaks one phrase with different accents. The virtual avatar used in each condition across all three studies was identical, and only accents were varied. We chose to use stimuli recorded from native and nonnative English speakers with different accents but similar vocal characteristics instead of one bilingual speaker because we wanted a more authentically representative accent manipulation. Last, while previous research has examined how exposure to various cultural artifacts can affect people's cognition (e.g., frame-switching: Hong, Morris, Chiu, & Benet-Martinez, 2000; social categorization: Rakić et al., 2011), to the best of our knowledge no other study has examined whether accent can induce cultural frame-switching.

The first experiment investigates whether a Chinese English accent is more likely to prime Chinese American participants to employ a more collectivist interpretive frame compared with an American English accent. The second experiment investigates whether accent affects social decision making in a less commonly examined cultural group (bicultural Iranian Americans). Finally, the third experiment

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investigates whether a Mexican English accent is more likely to prime Mexican Americans to agree more with collectivistic views compared with an American English accent. Based on self-categorization theory (Turner & Reynolds, 2012), we predict that an American English accent will more strongly activate an individualistic frame compared with a nonstandard English accent for the biculturals; the culturally congruent nonstandard accent will activate a collectivistic frame. Conversely, for monoculturals, we predict that a nonstandard accent will activate an individualistic frame to a greater extent compared with the standard English accent because it makes an outgroup salient and leads monoculturals to more strongly identify with their native individualistic values. All our predictions, unless noted, were a priori, directional and therefore verified with one-tailed tests (Rosenthal, Rosnow, & Rubin, 2000).

Experiment 1

Method

Participants. Eighty-five Chinese American participants (mean age = 28.19 years, 48 female participants) were recruited online through the Chinese American student association at a Californian university and snowball sampling, which consisted of asking subjects to forward the recruitment e-mail to other members. Five Chinese American participants were excluded from analysis as they failed to meet the bicultural criteria. Specifically, these participants were excluded because they had lived in the United States for less than five years (4.7% lived in the United States for less than 5 years, 18.8% for 5-10 years, 54.1% for more than 10 years, and 22.4% lived in the United States all their lives) or because their parents were born in the United States (second generation Chinese Americans). Eighty Chinese American participants remained in the bicultural sample. We recruited 87 participants online (mean age = 33.73 years, 35 female participants) for our control monocultural American group. Twenty-five of these participants were excluded from the analysis because they did not satisfy our monocultural criteria: Their parents must have been born in the United States, the participant must have lived in the United States for their entire life, and they must have no knowledge of the Chinese language. Sixty-two participants remained in the monocultural sample. All participants were rewarded with a $5 electronic gift card.

Design. The study employed a between-subject 2 × 2 × 2 design, where the first factor was participants' culture (monocultural American or Chinese American), the second factor was the virtual-confederate's accent (standard American English or Chinese English accent), and the third factor was the speaker of each accent (Speaker A or Speaker B). Participants were randomly assigned to the accent condition with one of the two speakers for each accent.

Stimuli and Procedure. Participants watched a video of an ethnically ambiguous virtual-confederate which thanked them for participating in the study and gave them brief instructions about the task (http://www.youtube.com/watch?v=CTWWcXwJKg4).

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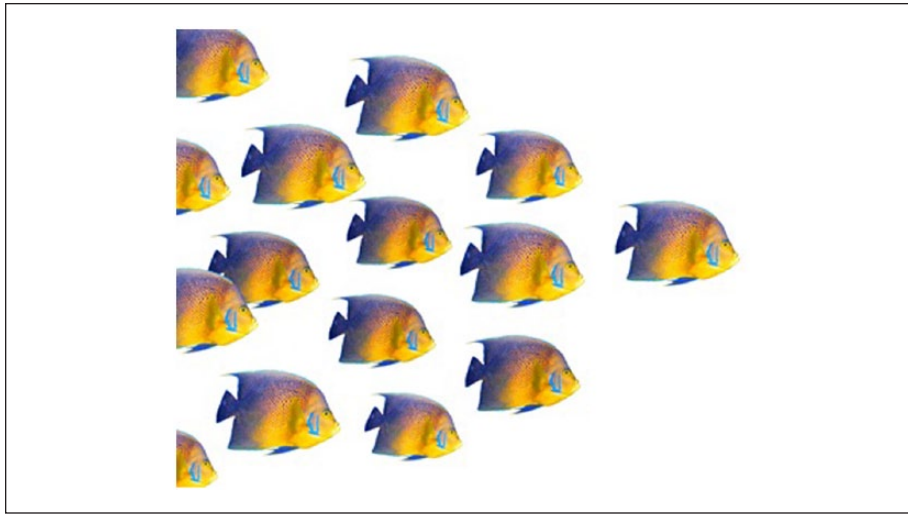

Figure 1. Causal attribution task as a measure of collectivist/individualistic tendencies, by Hong, Chin, and Rung (1997, Experiment 2; originally adapted form Morris and Peng, 1994) used in Experiment 1. Participants are asked on a 12-point Likert-type scale why they think the lone fish is swimming in front of the group.

The virtual-confederate was a middle-aged male with only his upper torso visible. Audio length and volume as well as visual appearance of the confederate were identical across all conditions. In order to control for possible effects of particular voice/accent, for each accent condition we used two different prerecorded voices of two 28-year-old males. The mean pitch of the voices was very similar (150 Hz). Moreover, given that the length of the audio recording was similar across all speakers, and all speakers read the same instructions, speech rate was similar across all conditions (142 words per minute). For the Chinese English accented condition, we recorded the voices of two Chinese researchers from Mainland China reading the instruction paragraph of the experiment. The researchers had lived in the United States for less than 5 years. For the American English condition, we used voice recordings of two native American English speakers.

After watching the video, participants were given an attribution task used by Hong, Chin, and Rung (1997, Experiment 2; originally adapted from Morris & Peng, 1994). This causal attribution task has been widely used in other experiments to measure collectivist/individualistic tendencies (e.g., Benet-Martinez et al., 2002; Chattaraman, Lennon, & Rudd, 2010; Friedman, Liu, Chi, & Hong, 2006; Hong et al., 1997). In this task, participants were presented with a picture of a group of fish with one fish swimming in front of the others (see Figure 1) and were asked on a 12-point Likert-type scale why they thought the lone fish was swimming in front of the group (1 = v*ery confident that it is because the one fish is leading the other fish*, 12 = v*ery confident that it is because the one fish is being chased by the other fish*). In this task, lower

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ratings indicate that participants focus more on internal causal attributions and higher ratings indicate that they focus more on external causal attributions. The reasoning is that East Asian collectivist cultures are more likely to identify individuals as members of groups that dictate individuals' actions and beliefs than individuals from individualistic cultures.

Finally, participants were asked manipulation check questions in random order about whether the virtual character appeared and sounded Western or Asian. Each question was answered on a 6-point scale (1 = v*ery much Western*, 6 = *very much Asian*; 1 = v*ery much American*, 6 = v*ery much Asian*).

Results

Manipulation Checks. Responses for both manipulation check questions were dependent variables in a 2 × 2 × 2 ANOVA (analysis of variance), where the first factor was the accent of the virtual-confederate (American or Chinese), the second factor was the participants' culture (monocultural American or Chinese American), and the third factor was the speaker of each accent (Speaker A or Speaker B). All effects pertaining to speaker were nonsignificant. As a result, we collapsed across the two speakers for each accent condition.

Hypothesis Tests. In the 2 (accent of the virtual-confederate: American or Chinese) × 2 (participants' culture: monocultural American or Chinese American), there was a main effect of the accent of the virtual-confederate on participant's perceptions of whether the accent sounded Asian or not, $F(1, 138) = 97.71$, $p < .01$, $\eta^2_p = 0.42$). Participants who interacted with the virtual-confederate with a Chinese English accent rated the virtual-confederate to have more of an Asian accent ($M = 4.71$, $SD = 1.21$) compared with the virtual-confederate with the American English accent ($M = 2.73$, $SD = 1.57$). There was also a main effect of culture on the question about the virtual-confederate's accent, $F(1, 138) = 5.28$, $p = .02$, $\eta^2_p = 0.04$. Chinese American participants rated the virtual-confederate as sounding more Asian ($M = 3.88$, $SD = 1.52$) compared with the monocultural Americans ($M = 3.32$, $SD = 1.92$). Last, for the accent question there was a significant interaction between the culture of the participants and the accent of the virtual-confederate $F(1, 138) = 28.31$, $p < .01$, $\eta^2_{pl} = 0.17$, such that the monocultural Americans rated the American accent as more Western compared with the Chinese Americans, $t(75) = 5.29$, $p < .01$, $r^2 = 0.27$, and they also rated the Chinese English accent as more Asian, $t(75) = 2.23$, $p = .03$, $r^2 = 0.07$.

For the visual appearance question, there was a main effect of the virtual-confederate's accent, $F(1, 138) = 5.57$, $p = .02$, $\eta^2_p = 0.04$. Participants who interacted with the virtual-confederate with a Chinese-English accent rated the virtual-confederate as appearing more Asian ($M = 3.38$, $SD = 1.41$) compared with the virtual-confederate with the American English accent ($M = 2.9$, $SD = 1.48$). A similar interesting finding was also reported in Rubin (1992). There was also a main effect of culture on the visual appearance question, $F(1, 138) = 25.77$, $p < .00$, $\eta^2_p = 0.16$. Chinese American participants rated the virtual-confederate to look more Asian ($M = 3.63$, $SD = 1.49$)

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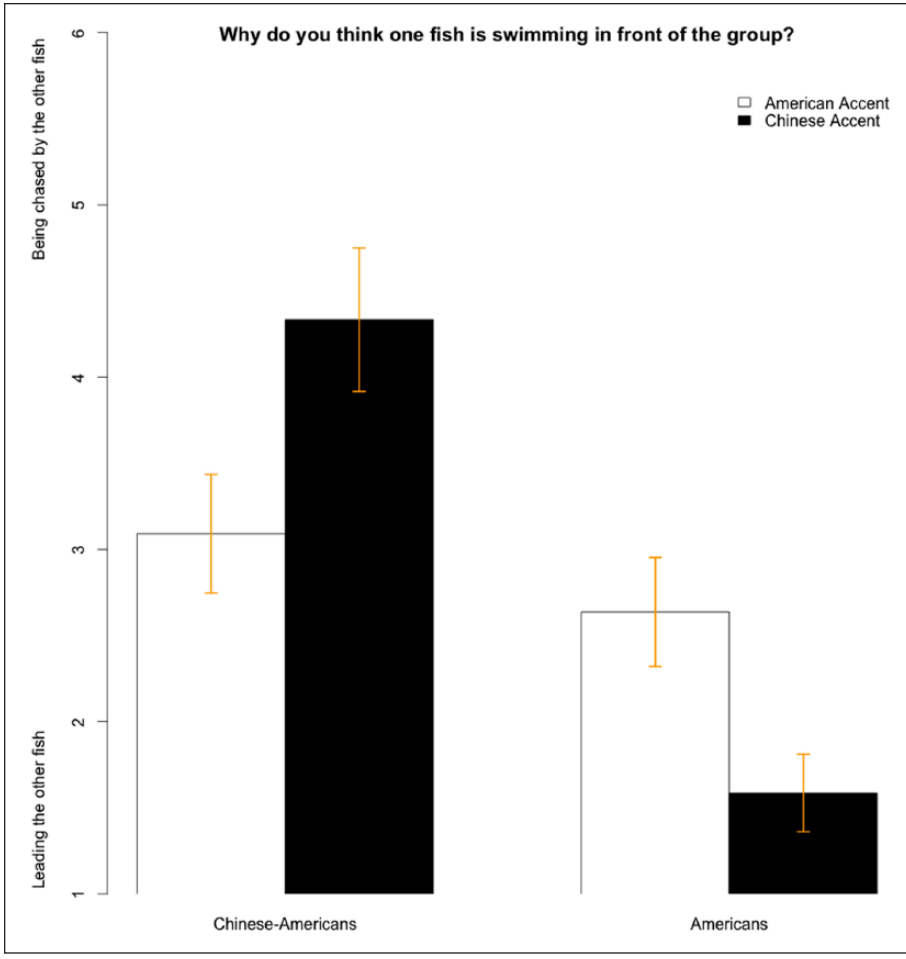

Figure 2. Results from the causal attribution task plotted by participant culture on the abscissa and different colored bars for the accent condition.

compared with the monocultural American participants ($M = 2.47$, $SD = 1.14$). There was no interaction of the participant culture and virtual-confederate accent on the visual appearance ratings, $F < 1$.

Similarly, for the causal attribution task, we first performed a 2 (culture: monocultural American, Chinese American) × 2 (accent: American English, Chinese English) × 2 (speaker: one of two same accented speakers) ANOVA. There was no significant 3-way interaction so we collapsed across the two different speakers from each accent group ($F < 1$). Next, we performed a 2 (culture: monocultural American, Chinese American) × 2 (accent: American English, Chinese English) ANOVA (see Figure 2). In line with previous findings, there was a main effect of culture $F(1, 138) = 20.86$,

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$p < .00$, $\eta^2_p = 0.13$, where Chinese Americans rated higher on the attribution scale, hence focusing more on external factors and reflecting collectivist interpretations. As predicted, there was also a significant interaction between culture and accent $F(1, 138) = 10.69$, $p < .01$, $\eta^2_p = 0.07$). As predicted, when asked why they thought the lone fish was swimming in front of the group, Chinese Americans who interacted with the Chinese English accented virtual-confederate gave higher ratings on the scale which indicated their belief that the fish was being chased by the other fish ($M = 4.33$, $SD = 2.49$), compared with Chinese Americans who interacted with the American English accented virtual-confederate ($M = 3.09$, $SD = 2.28$), $t(78) = 2.32$, $p = .01$, $r^2 = 0.06$.[1]

Monocultural American participants who were in the Chinese English accent condition focused more on internal (individualistic) factors ($M = 1.59$, $SD = 1.21$) compared with those who were in the American English condition ($M = 2.64$, $SD = 1.81$), two-sample two-tailed t test: $t(60) = 2.64$, $p = .01$, $r^2 = 0.10$, suggesting an assertion of their American identity, whereby the monocultural Americans were more individualistic when they heard the foreign accented virtual-confederate. This process of identity assertion is conceptually similar to ethnic affirmation. Whereas ethnic affirmation traditionally refers to some bilingual *ethnic* group (e.g., Chinese from Hong Kong) affirming its ethnic identity to demonstrate psychological distinctiveness from the normative expectations of the second (foreign) language, identity assertion, as defined here, refers to the American monocultural group reacting to exposure to an out-group by asserting their individualistic American identity.

Discussion

Experiment 1 demonstrates that accent alone can induce a cultural frame-shift in biculturals. For the monoculturals, the foreign accent made the monocultural American participants' own social identity more salient (Wagner & Ward, 1993). These findings are especially compelling because the virtual-confederate delivering the two different accents was completely matched for visual appearance and vocal auditory characteristics across all conditions. Furthermore, this effect was observed using a widely used collectivist/individualistic measure.

In Experiment 2, we investigate whether accent can shift interpretive frames in biculturals of Middle Eastern descent using a social decision-making task.

Experiment 2

Method

Participants. Sixty-six monocultural Americans (mean age = 38.91 years, 28 female participants) and 15 Iranian Americans[2] (mean age = 34.61years, 5 female participants) participated in this study (with exclusion criteria similar to Experiment 1). This experiment applied the same criteria used to identify monocultural American participants as in Experiment 1. The participants were recruited using Craigslist.com and snowball sampling. Each person received $25 at the end of the experiment for

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participating. The subjects were not aware that they were participating in a culture study, and each participant completed the task in individual experimental sessions.

Design. We used the same between subject 2 × 2 design as in Experiment One, where the first factor was the culture of the participants (monocultural American or Iranian American) and the second factor was the virtual-confederate's accent (standard American English or Iranian English accent). For this study, the voice of one of the male authors (161 Hz average pitch, 62 db intensity, 29 years old), who is bilingual and familiar with both Iranian and American accents, was prerecorded. As in Experiment 1, the speech rate, intensity, length, and vocal characteristics were controlled for across the conditions in Experiment 2.

Stimuli. The participants were first asked to read a short story (in the appendix with cultural artifacts underlined) which incorporated both Iranian and American cultural products. The story was about a student named Anthony who was asked to go to dinner at his classmate's (Shawn) house. Various incidents occur in the story that relate to common social customs in American and Iranian culture. The story included a balanced number of cultural products (e.g., proverbs, values, and events that could be tied to the celebration of Iranian New Year and to St. Patrick's Day[3]). None of these 16 cultural products were explicitly labeled with their cultural referent (there was no explicit reference to St. Patrick's Day as such) and they were placed throughout the story so as to minimize memory distortions due to recency or primacy.

Procedure. After reading the story, participants listened to the virtual-confederate explain the instructions of the task. The virtual confederate appeared ethnically ambiguous and was a middle-aged male with only his upper torso visible. Next, they filled out a questionnaire about the appropriateness of certain actions and intentions of the characters within the story. They were specifically asked the following two questions on a 6-point scale:

1. Was it appropriate for Anthony to leave before dinner? (1 = *not at all appropriate*, 6 = *completely appropriate*)
2. Do you think Shawn's parents really wanted to give the picture to Anthony? (1 = *no they did not*, 6 = *yes they did*)

When Shawn invited Anthony to his house, Shawn's parents insisted that Anthony stay for dinner and also offered him a framed picture as a gift. In both of these situations, the Iranian cultural frame suggests that it is not appropriate to refuse someone's generosity and hospitality. We hypothesize that bicultural participants should use culturally congruent frames to interpret and answer these questions; they should adopt an Iranian frame with the Iranian accented character and a Western frame with the standard American English accented character. If cultural frame-shifting does indeed take place for Iranian Americans when interacting with the culturally congruent Iranian virtual-confederate, then they should say it is inappropriate for Anthony to

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leave dinner early. For the second question, individuals using the Iranian frame could interpret the event as an instance of Iranian hospitality, especially when it comes to sharing their cultural artifacts (in this case, the Persian art piece). In that case, they should say that Shawn's parents genuinely meant to gift Anthony with the picture.

It is possible that the Iranian accent could conflict with the monoculturals' ethnolinguistic identity, thereby making their own Western identity salient. If that is the case, then monoculturals in the Iranian accented condition should affirm that it is more appropriate for Anthony to leave before dinner and that Shawn's parents did not genuinely want to give the gift. Last, to check the effectiveness of our manipulation, participants answered the following two questions on a 6-point scale in a random order:

3. Did the character have more of an American accent or Middle Eastern accent? (1 = *very much American*, 6 = *very much Middle Eastern*)
4. Did the character appear more Western or more Middle Eastern? (1 = *very much Western*, 6 = *very much Middle Eastern*)

Results

Manipulation Checks. Similar to Experiment One, we used the responses to questions three and four as dependent variables in a 2 × 2 ANOVA, where the first factor was participants' culture (monocultural American or Iranian American) and the second factor was the accent of the virtual-confederate (American or Iranian). There was a main effect of the virtual-confederates' accent for both questions: appearance—$F(1, 77) = 9.52$, $p < .01$, $\eta^2_p = 0.11$; accent—$F(1, 77) = 40.49$, $p < .01$, $\eta^2_p = 0.35$. The virtual-confederate with an Iranian accent was perceived as sounding more Middle Eastern (Iranian accent: $M = 4.98$, $SD = 1.37$, American accent: $M = 2.29$, $SD = 1.29$) and appearing more Middle Eastern (Iranian accent: $M = 3.51$, $SD = 1.67$, American accent: $M = 2.37$, $SD = 1.42$). For the appearance manipulation check question, there was also a main effect of culture, $F(1, 77) = 4.43$, $p = .04$, $\eta^2_p = .05$, such that the monocultural Americans perceived the virtual-confederate as appearing more Middle Eastern ($M = 3.12$, $SD = 1.61$) compared with the Iranian Americans ($M = 2.33$, $SD = 1.72$). There were no significant interactions.

Hypothesis Tests. The responses to the first question were used as the dependent variable in a 2 × 2 ANOVA, with similar factors as above (see Figure 3). There was a significant interaction between the two factors $F(1, 77) = 6.83$, $p = .01$, $\eta^2_p = 0.08$). Because of the unequal sample sizes, we performed Levene's test to analyze the homogeneity of variance of the two samples, which was not significant $F(3, 77) = 1.79$, $p = .16$. Iranian American participants who interacted with the virtual-confederate with an American accent ($n = 6$, $M = 4.83$, $SD = 1.17$) judged Anthony leaving before dinner as more appropriate than the Iranian Americans who interacted with the virtual-confederate with an Iranian accent ($n = 9$, $M = 3.33$, $SD = 1.73$), $t(13) = 1.85$, $p = .04$, $r^2 = 0.21$). In contrast, monocultural Americans who interacted with the Iranian accented virtual-confederate ($M = 4.76$, $SD = 1.52$) judged the situation as more appropriate

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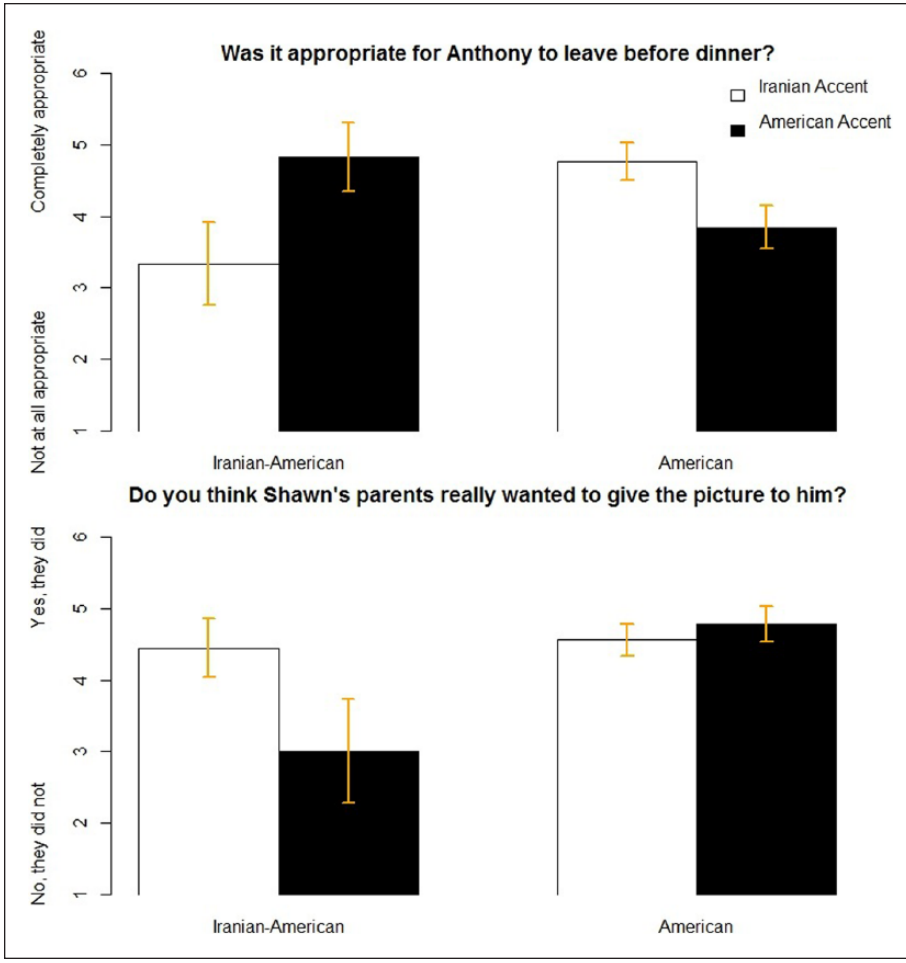

Figure 3. Results from the social decision-making task plotted by participant culture on the abscissa and different colored bars for the accent conditions. Top: Responses to the question about not accepting hospitality. Bottom: Responses to the question about refusing a gift, both of which go against traditional Iranian cultural norms.

than monocultural Americans who interacted with the American English accented virtual-confederate ($M = 3.84$, $SD = 1.69$), $t(64) = 2.33$, $p = .02$, $r^2 = 0.08$), suggesting identity assertion. The Iranian accent seems to have conflicted with monoculturals' ethnolinguistic identity, thereby making their own Western identity salient.

A similar ANOVA was conducted on responses to the second question; Levene's test of unequal variances was not significant, $F < 1$. There was a main effect of culture $F(1, 77) = 5.60$, $p = .02$, $\eta^2_p = 0.07$, where Iranian-Americans ($M = 3.87$, $SD = 1.59$) ranked this item as being less appropriate than monocultural Americans

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(M = 4.67, SD = 1.35). As predicted, there was an interaction between culture and accent of the virtual-confederate $F(1, 77) = 4.33$, $p = .04$, $\eta^2_p = 0.05$. Iranians who interacted with the American accented virtual-confederate ($M = 3.00$, $SD = 1.79$) indicated that Shawn's parents did not want to give the picture to Anthony compared with those in the Iranian accent condition ($M = 4.44$, $SD = 1.24$), $t(13) = 1.86$, $p = .04$, $r^2 = 0.21$.

Discussion

This experiment provides further evidence of how accent can induce cultural frame-shifts in bicultural individuals. In a fully factorial design, Iranian Americans who interacted with a virtual-confederate that spoke Middle Eastern accented English used a congruent cultural frame to interpret a social decision-making scenario. Experiment 2 also suggests that an out-group accent conflicted with monoculturals' social identity and made their native Western cultural frame more salient.

The previous two studies demonstrated how accent can influence cognitive processing and social decision making across two different bicultural groups. Experiment 3 extends this line of research to yet another cultural group, that being Mexican Americans. In order to further test the robustness of the effect of accent on frame-switching, we introduce another measure that indexes individualistic and collectivistic psychological characteristics (Hui, 1988).

Experiment 3

Method

Participants. Sixty Mexican American participants (mean age = 42.1 years, 30 female participants) and 60 monocultural Americans (mean age = 32.6 years, 30 female participants) were recruited online through Qualtrics web panels (with exclusion criteria similar to Experiment 1). This experiment applied the same criteria used to identify monocultural American participants in Experiment 1. Each person received $5 at the end of the experiment for participating. The subjects were not aware that they were participating in a culture study.

Design. We used the same between subject 2 × 2 × 2 design as in Experiment 1, where the first factor was the culture of the participants (monocultural American or Mexican American), the second factor was the virtual-confederate's accent (standard American English or Mexican English accent), and the third factor was the speaker of each accent (Speaker A or Speaker B). Participants were randomly assigned to the accent condition with one of the two speakers for each accent.

Stimuli and Procedure. Participants watched a video of a virtual-confederate that thanked them for participating in the study and gave them brief instructions about the task (http://youtu.be/PR_6XcdzdKQ). The virtual-confederate appeared ethnically ambiguous and was a middle-aged male with only his upper torso visible. Audio length and volume as

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well as visual appearance of the confederate were identical across all conditions. The American accented speakers were 24 and 29 years old and the Mexican accented speakers were 46 and 27 years old. The mean pitch of three of the voices was very similar (137 Hz; the 27-year-old Mexican American speaker had a lower pitch voice at 105 Hz). Moreover, given that the length of the audio recording was similar across all speakers, and all speakers read the same instructions, speech rate was similar across all conditions (155 words per minute). In order to control for possible effects of particular voice/accent, for each accent condition we used two different prerecorded voices. For the Mexican English accented condition, we recorded the voices of two Mexican Americans reading the instruction paragraph of the experiment. For the American English condition, we used voice recordings of two native American English speakers.

After watching the video, participants were asked to answer three questions from the Hui (1988) Individualism and Collectivism scale. We chose these three items in particular because they have the highest total-item correlation with the rest of the scale. This criteria was based on the results reported in Hui (1988). Specifically, participants rated agreement on a 0 to 5 scale for the following items:

1. It is reasonable for a son to continue his father's business.
2. I would not share my ideas and newly acquired knowledge with my parents.
3. I would help, within my means, if a relative told me that he/she is in financial difficulty.

Furthermore, to our knowledge there is no prior evidence suggesting that the Individualism and Collectivism scale is sensitive to priming. Therefore, we chose a small subset of items from the scale so as to give the accent prime a chance to work, if at all.

Finally, participants were asked manipulation check questions in random order about whether the virtual character appeared and sounded Western or Mexican. Each question was answered on a 6-point scale (1 = *very much Western*, 6 = *very much Mexican*; 1 = *very much American*, 6 = *very much Mexican*).

Results

Manipulation Checks. Responses for both manipulation check questions were dependent variables in a 2 × 2 × 2 ANOVA, where the first factor was the accent of the virtual-confederate (American or Mexican), the second factor was the participants' culture (monocultural American or Mexican-American), and the third factor was the speaker of each accent (speaker A or B). There was no effect of speaker, $F(1, 112) = 1.65$, $p = .20$, nor was there a 3-way interaction, $F < 1$, on perceptions of the virtual-confederate's appearance, and the virtual-confederate's accent, $F < 1$. Therefore, we collapsed across the two different speakers for each accent and conducted a 2 (participant culture) × 2 (virtual-confederate accent) ANOVA. For both questions, there was a main effect of the accent of the virtual-confederate: appearance—$F(1, 116) = 16.77$, $p < .01$, $\eta^2_p = 0.13$; accent—$F(1, 116) = 86.77$, $p < .01$, $\eta^2_p = 0.43$; where participants who listened to the virtual-confederate with a Mexican English accent rated the virtual-confederate to appear and sound more Mexican.

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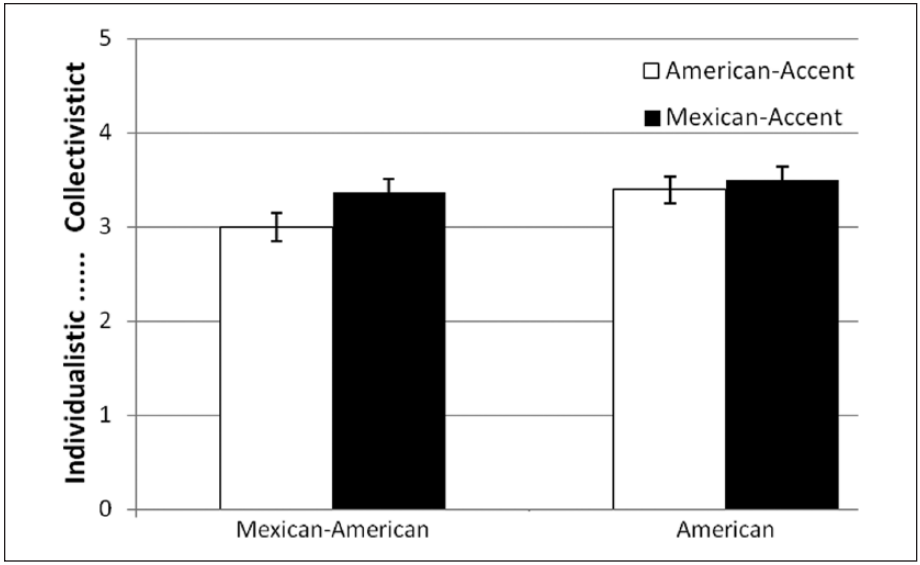

Figure 4. Results from the individual–collectivistic scale plotted by participant culture on the abscissa and different colored bars for the accent condition.

Hypothesis Tests. Similarly, for the individualistic-collectivistic measure, we first performed a 2 (culture: monocultural American, Mexican American) × 2 (accent: American English, Mexican English) × 2 (speaker: one of two same accented speakers) ANOVA. There was no effect of speaker or a significant 3-way interaction so we collapsed across the two different speakers from each accent group ($F < 1$). Figure 4 shows the results of a 2 (culture: monocultural American, Mexican American) × 2 (accent: American English, Mexican English) ANOVA. There was no significant effect of culture F(1, 116) = 3.1, $p = .08$, (monocultural Americans, $M = 3.44$, $SD = 0.7$; Mexican Americans, $M = 3.17$, $SD = 0.9$). There was no main effect of accent, $F(1, 116) = 2.55$, p = .11. There was also no significant interaction between culture and accent $F(1, 116) = 0.87$, $p = .35$.

However, based on an a priori prediction, a one-tailed independent samples t test showed that Mexican Americans scored higher on the collectivism scale in the Mexican English accent condition ($M = 3.37$, $SD = .88$) compared with the American English accent condition, ($M = 3.00$, $SD = .87$), $t(58) = 1.63$, $p = .05$, $r^2 = 0.04$. There was no difference for the monocultural Americans, $t(58) = -.53$, $p = .3$.

Discussion

Experiment 3 demonstrates that accent alone can induce a cultural frame-shift in Mexican American biculturals. As with the other studies, the virtual-confederate delivering the accent was completely matched for visual appearance across all conditions. Furthermore,

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this effect was observed with a widely used collectivist/individualistic measure. To our knowledge, this result is the first to show a priming effect on a subset of the Hui (1988) collectivism scale.

General Discussion

This work provides evidence of how accent can affect people's cognition. In three experiments, bicultural participants adopted culturally congruent frames when interacting with an accented virtual-confederate. Experiment 1 demonstrated that accent can induce cultural frame-switching in a causal attribution task which has been used in other studies to measure collectivistic and individualistic tendencies. Experiment 2 confirmed this finding in a more deliberative cognitive processing task. Experiment 3 was an identical conceptual replication of Experiment 1, but with a different cultural group and dependent measure.

Self-categorization theory accounts for the psychological mechanisms of how the accents caused frame-switching in the biculturals (Turner & Reynolds, 2012). The accents are salient cues to individuals' social identities. For the biculturals, both accents are instances of an in-group social identity. Depending on the accent that biculturals heard, different social identities became more salient and biculturals internalized the respective norms of that given identity which was primed. As for the monoculturals, the foreign accents were instances of an out-group. When the monoculturals heard an out-group foreign accent that conflicted with their social identity, then they reacted by asserting their default cultural norms. While other researchers have used static images of cultural artifacts to prime culture, this study only used a subtle English language accent and otherwise controlled for all other factors of the stimulus. The compelling aspect of this effect is that the accented virtual-confederate's visual appearance was identical across experimental conditions within each study and the only manipulation was the virtual-confederate's accent.

In the first two experiments, monocultural American participants in the control group displayed a pattern of responses in the foreign accent conditions that were akin to those from their own Western culture. Experiment 1 showed that the control group in the Chinese English accent condition responded using an individualistic interpretive frame. Experiment 2 showed that the control group in the Iranian English accent condition interpreted a situation using a Western frame. These accents conflicted with the monocultural Americans' social identity, which led them to more strongly affirm their individualistic values. This is conceptually similar to the ethnic affirmation reported by Chen and Bond (2007) where they reported that Chinese bilinguals responding in English identified more with Chinese culture. It is notable that monoculturals in the Mexican accent condition did not adopt stronger individualistic values. Even though Mexican Americans are an out-group to monocultural Americans, one possibility is that the Mexican social identity does not conflict as much with monocultural Americans' identity compared with Chinese and Iranian identities. While the current research started with the goal of studying whether an accent can prime biculturals to

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switch frames, we are currently designing future studies to systematically explore this identity assertion in monocultural Americans.

In order to provide a more critical discussion of the set of results in these studies, it is relevant to discuss the metacontrast principle of SCT (Turner & Reynolds, 2012). Depending on the salience of the comparative contrast (e.g., Mexicans compared with Americans vs. Iranians compared with Americans) the similarity between the two categories determines whether individuals identify with a group or not.

Taking this together with Chen and Bond (2007), the reason that the bicultural participants exhibit frame-switching is most likely because of the subtlety of the cultural prime. After all, the virtual-confederate always spoke English but with a subtle accent. Because the accent manipulation is covert, Chinese, Mexican, and Iranian Americans assimilate to the given self-category that matches the accent. For monocultural Americans, the accent prime is more noticeable, so they contrast and assert their individualistic identity, a process we are referring to as identity assertion.

In summary, the contributions of this work are twofold. First, the study adds to the literature in cross-cultural psychology by showing that accent alone can induce cultural frame shifts. Across three experiments the results show that accent is a cue for marking cultural nuances and invoking sociocognitive effects. This finding has possible repercussions for studies that employ experimenters with different accents because our results suggest that accent alone can influence cognition. Second, this work makes a methodological contribution to the field of human–computer interaction and experimental psychology. Specifically, by using advanced virtual human technology, researchers can more effectively implement individual cultural characteristics, such as accents or certain appearances. The results also have implications for teaching cross-cultural communication by making individuals aware of potential biases caused by accents.

Appendix

In Experiment 2, before interacting with the virtual-confederate, participants were first asked to read the following short story, which incorporated both Iranian and American cultural products:

Yesterday was an interesting day. I got out of class at around 4:30. The weather was great and spring was in the air. My classmate Shawn, who I'm not really good friends with and don't know too well, invited me to a *bonfire at the beach*. I told him that I was hungry and needed to get something to eat before going to the beach. He was going to his parent's house for dinner and invited me over. I don't know him well, so I initially refused his offer. But he kept on insisting that it's the *beginning of spring and I should go and have dinner with his family*, he said then we can all go to the bonfire together. On the way to his house, Shawn asked why I was *wearing almost all green*. I thought it was a strange question as *a lot of students were wearing green that day.*

I went over to his house and met his dad at the living room. I thought to myself that *the apple doesn't fall far from the tree*. Upon seeing his father, Shawn introduced me to him, saying "This is my good friend Anthony". He seemed surprise by my presence.

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Now I wasn't sure if they were expecting a guest for dinner. Then Shawn's mother came to the living room. I had met her before. She used to work in the registrar of the school. I said hi to her and she greeted me back saying that it looked like *water had gone under my skin*.

They had some apples on the table, they also had some coins right by the apple. He offered some salad to me, I asked if it was okay to chop up the garlic which was conveniently already on the table by the apples, which I think he had forgotten to put in the salad. He hesitated and took a few seconds before saying yes . . .

Earlier when I was at Jamba juice, I had seen the same green grass that Shawn had on his table. I asked his dad whether they drink the juice of the green grass. He looked at me as if he had not understood what I was talking about. So, I told him that grass juice is very nutritious and includes a broad spectrum of vitamins, minerals and antioxidants. As he was looking out the window, he said that *water is past his head*.

I finished my salad and asked Shawn when we can leave to see the *bonfire*. Suddenly Shawn and his family members all started saying that I should stay for dinner and go back to their place after the bonfire because my apartment was far from their house. I didn't understand why they were asking me to stay for dinner, because I think they didn't have any dinner prepared. I told Shawn that I need to go and watch the game later at night. My *favorite college team* was in the second round of a *tournament*. A bunch of the guys from the baseball team were going to watch the game at the *local watering hole*. I really needed to go to blow off some steam. But he said that his dad is already making food for us. Shawn then asked me how I've lost so much weight in the past couple of months. I told him you will not lose weight until you give up carbs, and I suggest you *go cold turkey*.

I saw a very small art piece on the wall of their hallway. It was a *picture of some Chinese looking guys playing with a ball on horses*. I told his dad that this is a lovely picture. He thanked me and told me that I could take it. I first thought he was kidding, but he seemed serious and told me that *he wants me to take it*. Shawn's mother also said that it will look better in my house and I should take it. Given that they were insisting so much, and the piece didn't look expensive I took it and thanked them for it.

Shawn's parents told Shawn that they had to wait for another hour and a half to serve dinner because some family friends had just called and were coming to visit them for the first day of spring. Given that I had plans to go watch the game and couldn't wait that long, I got up thanked them for the picture and salad, and had my friend pick me up. Shawn and his parents insisted that I should wait and have dinner with them. But my friend was already there to pick me up. She had put green papers all over her car, and had beer too.

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Notes

1. We replicated this finding in another sample of 62 bicultural Chinese American participants (mean age = 34.24 years) recruited through Qualtrics Panels (5 participants excluded from the analysis because they failed the bicultural criteria). Specifically, in the replication study Chinese American participants who interacted with the Chinese-accented virtual-confederate rated the fish as being followed by the other fish, compared with those who interacted with the American accented virtual-confederate $t(57) = 1.632$, $p = .054$, $r^2 = 0.045$.
2. We acknowledge the low number of Iranian Americans participants in our study. However, we would like to note that the probability of replication of a result is dependent on p levels but not affected by sample size (e.g., Killeen, 2005).
3. St. Patrick's Day is widely celebrated in North America.

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