The Effect of Culture on Biased Memory for Impressions

By
Lauren Grewal

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Abstract

Previous research has demonstrated that facial appearance biases source memory. Prior work has also shown that differences in social orientations between cultures influence cognitive processing. Combining these ideas, this study explored how culture may impact the use of appearance-based biases in source memory for different kinds of behaviors. This work investigated the contribution to source memory of babyfaceness, a facial quality known to elicit strong spontaneous trait inferences. Young adults originating from the US or East Asia viewed Caucasian and Chinese babyfaced and mature-faced individuals paired with sentences that were either congruent (e.g., babyfaced-submissive) or incongruent (e.g., babyfaced-dominant) with facial characteristics. Although the predicted effects did not emerge, we found some potentially interesting trends. When analyses were restricted to individuals whose “ingroup” was represented by the stimuli (i.e., only Chinese East Asians and all Americans), memory for dominant and submissive behaviors varied by face-behavior congruity. When faces were incongruent with behaviors, participants marginally remembered more mature-faced individuals who performed submissive behaviors than babyfaced individuals who performed dominant behaviors. This relationship was not apparent for congruent face-behavior pairs. This potentially supports previous evidence of a broad “expectancy violation system” in memory. Overall, this study serves as preliminary work that may motivate potential future work regarding many open questions about the roles of cultural upbringing and individual differences in the use of appearance-based inferences in source memory.
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Many people say that outward appearance is not indicative of anything about an individual’s personality or behavior. Despite knowing that outer appearance isn’t a reliable measure of behavior, however, people consistently use appearance-based inferences when forming impressions of others. Previous research has shown that people make appearance-based personality inferences in as little as a tenth of a second (Willis & Todorov, 2006). People also spontaneously categorize people by their faces through considering single attributes (e.g., race; sex), and infer personality characteristics in this quick moment (Stangor, Lynch, Duan, & Glass, 1992; Taylor, Fiske, Etcoff, & Ruderman, 1978). This can have important ramifications, as these judgments can unfairly bias judgments and actions towards others. For instance, appearance-based competence ratings of political candidates have been shown to predict outcomes of the U.S. congressional elections (Todorov, Mandisodza, Goren, & Hall, 2005). This demonstrates that initial appearance-based impressions have ramifications for how people evaluate others despite having more information available than simply appearance. Despite some biases that can be beneficial for navigating social interactions (e.g., noticing someone who appears safe or unsafe), overgeneralizations based on facial appearances can lead to inaccurate assessments of people (e.g., wrongly identifying someone as a criminal because of their appearance).

Appearance based inferences may particularly affect memory for sources. Source memory is the ability to remember not just what was presented, but to also remember its context (Johnson, Hashtroudi, & Lindsay, 1993). Thus, one might not only remember that a person has been encountered previously, but also remember that person’s behaviors. People often use background information (e.g., gender and sexual orientation) to determine source characteristics (Bayen, Nakamura, Dupuis, & Yang, 2000; Cook, Marsh, & Hicks, 2003; Cook & Hicks, 2006; Sherman & Bessenoff, 1999; Taylor, et al., 1978). Recent work has begun to focus on how
appearance-based stereotypes affect source memory (Nash, Bryer, & Schlaghecken, 2010, Kleider, Cavrak, & Knuycky, 2012; Suzuki & Suga, 2010; Cassidy, Zebrowitz, & Gutchess, 2012). For instance, when asked to choose between two potential sources of newspaper headlines, people tended to attribute plausible sounding headlines to a trustworthy-looking reporter, and more implausible headlines to an untrustworthy-looking reporter (Nash et al., 2010). It has been shown that different combinations of facial features (i.e., like looking trustworthy, babyfaced, or stereotypically “Black”) may potentially bias source memory (Nash et al., 2010; Cassidy et al., 2012; Kleider et al., 2012).

An interesting extension of this research could be to examine how cultural values reduce or strengthen the effects of congruity on source memory on both in-group (i.e., people of one’s own culture) and out-group (i.e., people of another culture) members. Culture factors into how people make more stereotype-based behavioral attributions when the person being observed belongs to the out-group (Triandis, 1995). While we predict that Americans may value, and thus have better memory for, dominant behaviors over submissive ones and East Asians may better remember more submissive behaviors due to differing cultural norms and values, these tendencies could be affected by whether the individual performing the behavior is a member of the in or out group and the congruency of the behavior with the face. An unexplored avenue of research regards whether a person’s cultural values (i.e., learning what information is valued, based on one’s cultural upbringing) influences memory for others’ behaviors, and the ways in which appearance-based inferences differently influence memory across cultures. The purpose of this study is to investigate how cultural values impact the persistence of appearance-based biases in memory while recalling behavioral information about members of one’s cultural in-group (i.e., an individual from the same culture) or outgroup (i.e., an individual from a different culture).
Cultures differ in social orientation, which influences cognitive processes. The two most widely studied types of social orientations involve the extent to which a person is independent or interdependent. Cultures that emphasize the self are considered independent while cultures that emphasize the good of the group over the individual are interdependent in orientation (Markus & Kitayama, 1991). Much research studying cognitive differences stemming from social orientations have compared American samples, which tend to be independent and individualistic, to East Asian samples, which tend to be interdependent and collectivist (Heine, 2001). American culture encourages a sense of self as “in control” (Iyengar & Lepper, 1999), corresponding with a dominant self-style where people focus on behaviors emphasizing leadership or putting themselves first. East Asians, in contrast, have an interdependent self that is involved with social relationships and roles, emphasizing responsivity to the needs of others and the obligations that go with those roles (Heine, 2001). Due to this identification with “dominant” behaviors, like leadership, Americans may have more accurate source memory for people who perform dominant behaviors. East Asians on the other hand, may have more accurate source memory for people who perform submissive behaviors. This is because dominant versus submissive behaviors differ in their relevance across cultures, and self-relevance has been shown to improve memory (Rogers, Kuiper, & Kirker, 1997; Symons & Johnson, 1997). The present study will assess if biases in source memory stemming from appearance-based inferences can be influenced by the extent to which behaviors are culturally valued. Individuals may have more accurate source memory for others’ behaviors that are incongruent (i.e., dissimilar from the traits conveyed from appearance) with appearance when previously learned behaviors reflect culturally valued behaviors. The submissive and dominant traits conveyed, respectively, from babyfaced and mature-faced individuals may provide insight into this idea, as stereotypically submissive
behaviors may have connotations of promoting the good of another or the group before the self, as would be expected to be valued by interdependent cultures, while stereotypically dominant behaviors emphasize the value of putting the self first or leading a group.

In terms of facial characteristics, babyfaced individuals have childlike features such as a round face and large eyes in comparison to those considered to be mature-faced (Zebrowitz, 1997). Perceptions of babyfaced individuals differ from those of mature-faced individuals in that babyfaced individuals are generally considered as more submissive than mature-faced people (Zebrowitz & Montepare, 2008). This overgeneralization from facial properties of babies to make assumptions about character in adults has been demonstrated across faces of different races, such that Caucasian, East Asian, and African-American babyfaced men are perceived by people of different races as more submissive and naïve than their more mature-faced peers (Zebrowitz, Montepare, & Lee, 1993). These appearance based inferences extend past the quick judgments of others, affecting both personal and professional lives. For example, babyfaced people are more likely to win cases when accused of purposeful negative actions but are more likely to lose cases involving negligent behavior (Zebrowitz & MacDonald, 1991). Babyfaceness may also affect hiring recommendations; applicants who are babyfaced are favored for jobs requiring qualities of warmth and submission, whereas people who are mature faced are favored for jobs requiring qualities of shrewdness and leadership (Zebrowitz, Tenenbaum, & Goldstein, 1991). Although these examples illustrate how babyfaceness may influence real-world outcomes, little research has focused on the mechanisms by which appearance-based inferences affect memory. Beyond exploring mechanisms of memory in light of appearance-based inferences, no research to date has explored culture’s impact on these mechanisms. Cultural impacts on memory may be interesting to study in tandem with inferences of babyfaceness, considering that
dominance and submissiveness may be valued differently across cultures, thereby affecting the conditions when appearance-based inferences may bias memory the most.

In the current study people will encode babyfaced and mature-faced Caucasian and East Asian individuals performing dominant or submissive behaviors. Thus behaviors can be considered congruent (i.e., a babyfaced person with a submissive behavior) or incongruent (i.e., a babyfaced person with a dominant behavior) with appearance. Participants will then complete a source memory task where they will identify which of two faces (a target and a lure) is considered either more dominant or submissive, based on what was previously learned about behaviors. Similar to previous work (Cassidy et al., 2012), we expect that the congruity of the face-behavior pairings will affect source memory, such that accuracy will be higher for congruent over incongruent targets.

We will also examine the strength of face-behavior congruity effects across in-group and out-group targets. Race has been shown to influence memory such that people better recognize own- over other-race faces (Shepherd, 1981; Brigham & Malpass, 1985; Bothwell, Brigham, & Malpass, 1989; Lindsay, Jack & Christian, 1991). We predict that own-race sources will be better identified than other-races sources, regardless of face-behavior congruity (i.e., a Caucasian participant will be worse at remembering East Asian faces than Caucasian faces). However, we additionally anticipate that participants will be more sensitive to incongruence among own-versus other-race faces due to the in-group versus out-group literature. We anticipate that individuals will show better memory for incongruent sources when the presented target is an own- versus other-race source. We do not anticipate the difference between own- and other-race faces to be as apparent for congruent face-behavior pairs, which would presumably be easier to remember overall.
We also predict that cultural values may interact with face pair congruence and face race by influencing how people prioritize behaviors in memory. Americans have been shown, in general, to value independence and leadership while East Asians have been shown to value interdependence and group cohesion (Triandis, 1989; Heine, 2001). Americans may identify more with more “dominant” behaviors and thus have more accurate source memory for incongruent face pairs when the behavior is dominant. Unlike Americans, East Asians may identify with more “submissive” behaviors and consequently may have more accurate source memory for incongruent face pairs when the behavior is submissive.

To summarize our predictions, we expect that appearance-based inferences will bias memory for others’ behaviors. We anticipate this to be strongest when encoded behaviors are incongruent, versus congruent, with facial characteristics. We also predict that participants will better remember behaviors performed by own- versus other-race targets. In addition, we expect that face-behavior incongruence will exacerbate the effect of remembering own- versus other-race sources. Lastly we predict that cultural values will influence source memory, based on the self-relevance of behaviors.

**Method**

**Participants**

Forty-eight students recruited from Brandeis University participated. Twenty-four of the participants identified as Caucasian and lived their entire lives in America, while 24 identified as East Asian and were from China, Taiwan, South Korea, or Japan. Twelve East Asian participants and four Caucasian participants also took part in the study but their data was not included due to performance below chance. All Asian participants were international students who had lived in
the United States for less than five years. All participants provided written informed consent and were compensated for participation either with credit or $10.

Stimuli

**Faces.** Thirty-two photographs of Caucasian male faces were drawn from the PAL database (Minear & Park, 2004). The faces had neutral expressions and were selected for the final data set based on babyfaceness and attractiveness ratings from ten Caucasian and ten East Asian international students who did not participate in the full experiment. Thirty-two black and white photographs of East Asian male faces were drawn from the CAS-PEAL database (Gao, Cao, Shan, Chen, Zhou, Zhang, & Zhao, 2008). The faces had neutral expressions and were selected for the final data set based on the ratings received for babyfaceness and attractiveness by ten different Caucasian and ten East Asian international students. Due to the fact that the East Asian male faces were in black and white, the Caucasian male faces were edited to be black and white as well. All of the East Asian faces were also edited to be of similar size and shape of the Caucasian faces. These faces were rated on scales ranging from 1-7: extremely mature-faced (1)—extremely babyfaced (7) and extremely unattractive (1) to extremely attractive (7). Faces were viewed in blocks of set race-gender categories and raters were told to rate faces compared to other faces from the same race and gender. We averaged the ratings of the individual East Asian and Caucasian participants to obtain composite ratings of attractiveness and babyfaceness for each face. The final data set included faces that were rated the most extremely on the babyfaceness-mature face scale. Because we are running the full experiment in blocks split by race, we compared the babyfaceness and attractiveness of the 64 selected faces within each category that had been designated as babyfaced and mature-faced on the basis of the preliminary
ratings (Table 1). There were differences in babyfaceness ratings for the babyfaced and mature-faced individuals, but there were no differences in attractiveness ratings.

**Sentences.** Sixty-four unique sentences were used, some created in the lab and some used from a database of behaviors normed for trait implication (Uleman, 1989). The sentences were selected for the final data set based on the ratings received for dominance and submissiveness by eight Caucasian and eight East Asian international students who did not participate in the full experiment. These people rated 140 sentences on a scale of 1-7: extremely submissive (1) to extremely dominant (7). For the final data set, the sentences with the most extreme values were chosen. Thirty-two of the sentences were rated as dominant while the other 32 were rated as submissive. Positive and negative behaviors were evenly represented among dominant and submissive behaviors.

We used a 2x2 ANOVA using dominance (dominant, submissive) and valence (positive, negative) as factors to assess differences in the final 64 sentences. Dominant sentences ($M=5.57$, $SD=.46$) were rated as more dominant than submissive sentences ($M=2.84$, $SD=.51$), $F(1,60)=502.55$, $p<.001$, $\eta^2_p=.89$. Dominance ratings did not differ between positive ($M=5.46$, $SD=.36$), and negative ($M=5.67$, $SD=.36$) sentences, $F(1,60)=.07$, $p=.80$. There was no interaction between the variables $F(1,60)=2.18$, $p=.15$

**Face-behavior pairs.** There were equal numbers of babyfaced and mature-faced Asian and Caucasian faces represented in the final set of 64 faces. These faces were further evenly distributed across positive and negative stereotype-congruent (e.g., mature-faced/dominant) and positive and negative stereotype-incongruent (e.g., mature-faced/submissive) behaviors (See Fig 1 for examples). There were eight versions of the study counterbalancing the 64 faces across congruence and valence.
Procedure

**Encoding task.** After providing informed consent, participants practiced the encoding task. All stimuli were presented through E-Prime (Psychology Software Tools, Pittsburgh, PA). Participants were first shown a face by itself for two seconds to implicitly activate appearance-based stereotypes. Participants were instructed to press “1” after viewing each face. Then they would be shown a behavioral sentence below the same person for 5 seconds and were told to press the “2” button after reading the behavior. Participants were informed that pressing the buttons would not abort the program of the face-behavior pairs and they were instructed to maintain quick responses as reaction times were being recorded. Having participants press the buttons was an extra way to ensure attention to the task at hand of processing both the faces and behaviors and to provide credibility to this being a study that tested reaction times. They were told to form a behavior-based impression of the person. The sentences either implies submissive (e.g. “Despite his love of meat, he went to the vegetarian restaurant with his girlfriend”) or dominant (e.g. “He wouldn’t give his window seat to the child”) behaviors (Figure 1a.).

The faces were presented in four blocks, alternating by race, of 16 trials each (e.g., half of the participants would see Asian faces first, then Caucasian, then Asian, then lastly Caucasian again). Between each block, participants would see a black screen with a plus sign for 6 seconds. In the eight different versions of the task, the order of the blocks was counterbalanced. This was done to prevent order of presentation from influencing performance on the memory test. Participants viewed the faces twice over two runs to increase the chance of successful encoding, with each face viewed once per run. After finishing the encoding task, participants completed an unrelated digit counting measure to reduce recency effects.
Retrieval task. Participants next completed a self-paced source memory task. Participants were told that they would be viewing all of the previously seen faces with no new faces added and that they should base their responses on their memory of the behaviors. The instructions were read out loud to participants. The task instructions read, “You will see a question below two people from the previous task. Based on the question, you will decide which person is more dominant or more submissive. If you are not sure, go with your gut instinct. Decide based on your memory for their behaviors.” Participants were told the task would be self-paced and to try and their best to remember, and to go with their gut instinct if they did not explicitly remember.

Faces were presented two at a time in a random order. In each of the face pairings, one face was the target and the other was a lure (i.e., another face of the same race which had also been viewed at encoding). The lures were counterbalanced so that half of the lure faces would have the same facial characteristics as the target face (e.g., both faces would be babyfaced) and half the lure faces would have different facial characteristics as the target face (i.e., babyfaced-mature-faced). All the lure faces matching or differing in facial characteristics were counterbalanced equally among the stereotype congruent and stereotype incongruent targets. Every face was used once as a target and once as a lure at retrieval, but no two faces appeared together twice during the task. Targets that performed dominant behaviors were always paired with the dominant question and targets that performed submissive behaviors were always paired with the submissive question. Lure faces originally had been paired with an encoding behavior mismatching the question (e.g., someone who was paired with a submissive behavior is the lure in a question asking “Who is more dominant?”). This was done to ensure that the target was always the correct response (Figure 1b.).
Afterwards, participants completed a post task questionnaire, demographics, and additional cognitive measures to better characterize our sample (Table 2). A pattern matching task (Salthouse, 1996a) and an operation span, or OSpan, task (Unsworth, Heitz, Schrock, & Engle, 2005) were cognitive ability tasks used to ensure that our groups were matched on cognitive ability. The pattern-matching task tested participants’ abilities to decide which of four patterns matches a template pattern under a short period of time. Previous work has demonstrated that speed of processing is strongly related to levels of working memory and cognitive ability (Salthouse, 1996b). OSpan tested participants’ working memory by having people memorize a series of letters while simultaneously judging answers of simple math problems to be true or false. Working memory has been shown to be a factor that relates to attention and executive functioning (McCabe, Roediger, & Hambrick, 2010). The Relational Individual and Collective Self-Aspects, or RIC, Scale (Kashima & Hardie, 2000), was also used to characterize participants. The RIC scale measures participants’ descriptions of themselves in terms of individual, relational, and collective self-aspects. For each self-aspect, responses are measured on a Likert-type scale with responses varying from, “Does not describe me/Not true of me” and “Describes me/Very true of me.” In every self-aspect, the scores range from the lowest (1) to the highest (7). Higher scores on the individual self-aspect represent increasingly stronger beliefs in the importance of the self, personal responsibility, and identity as a unique person. Higher scores on the relational self-aspect represent stronger beliefs in the importance of personal relationships. Higher scores on the collective self-aspect represent stronger beliefs in the importance of the group, the well-being and development of the group, and loyalty to the group.
Results

We analyzed participants’ accuracy (proportion of correct responses in identifying dominant and submissive sources) in the retrieval task using a 2 (Participant Race: Caucasian, East Asian) \times 2 (Congruity: Congruent, Incongruent) \times 2 (Face Race: Caucasian, East Asian) \times 2 (Behavioral Content: Dominant, Submissive) mixed ANOVA. The results from the ANOVA for the retrieval accuracy are broken down by means and standard deviations for Caucasian and East Asian participants (Table 3a. and 3b.)

Contrary to our hypotheses, we did not find the expected main effect of Congruity, \( p = 0.44 \). Also contrary to our hypotheses, we did not find the expected interaction between Face Race and Participant Race, \( p = .17 \). There also was no interaction between Participant Race, Face Race, and Congruity, \( p = .40 \). Also inconsistent with our predictions, there was no interaction between Participant Race, Face Race, and Behavioral Content, \( p = .41 \). Also inconsistent with our predictions there was no interaction between Participant Race, Congruity, and Behavioral Content, \( p = .48 \). Finally, there was no interaction between Participant Race, Face Race, Congruity and Behavioral Content, \( p = .45 \).

Interestingly, there was a marginal effect of Participant Race, \( F (1, 46) = 3.518, p = .07, \eta^2_p = .07 \). Caucasians (\( M = .68, SD = .09 \)) displayed better source memory than East Asians (\( M = .63, SD = .09 \)) (Figure 2). Additionally, there was a marginal effect of Face Race, \( F (1, 46) = 3.470, p = .07, \eta^2_p = .07 \) (Figure 3), such that overall, participants had more accurate source memory for Caucasian (\( M = .67, SD = .11 \)) over East Asian faces (\( M = .63, SD = .12 \)). No other effects approached significance, \( ps > .13 \).

We additionally analyzed participant’s retrieval accuracy using the same 2 x 2 x 2 x 2 mixed ANOVA described above. Because some of our hypotheses involved source memory of
one’s “ingroup,” it’s possible that for these participants, no “ingroup” existed in the task, as we used only American Caucasian faces and Chinese East Asian faces. For this analysis we removed East Asian participants who did not identify as originating from China, Hong Kong, or Taiwan. This resulted in the removal of three East Asian participants. No American participants were removed from the sample, as all were Caucasian. The results from this analysis were generally consistent with our previous ANOVA. Deviating from the previous ANOVA, however, was a main effect of Face Race, $F(1, 43) = 4.83, p = .03, \eta^2_p = .10$, such that participants had more accurate source memory for Caucasian ($M = .68, SD = .11$) over East Asian ($M = .63, SD = .13$) sources. (Figure 4) The main effect of Participant Race was no longer significant, $p = .11$.

Interestingly, unlike our previous ANOVA, we found a marginal interaction between Congruity and Behavioral Content, $F(1, 43) = 3.124, p = .08, \eta^2_p = .07$ (Figure 5). Pairwise comparisons showed that for incongruent face-behavior pairs, participants tended to have better source memory for individuals who had performed submissive ($M = .68, SD = .12$) versus dominant ($M = .63, SD = .15$) behaviors, $p = .08$. In contrast, there was no difference in source memory when behaviors were submissive ($M = .64, SD = .14$) versus dominant ($M = .67, SD = .14$) for congruent face-behavior pairs $p = .27$. No other effects approached significance, $ps > .17$.

**Discussion**

While people often emphasize the need to get to know someone before formulating an opinion, previous research has shown that people quickly form impressions of others based on appearances (Stangor et al., 1992; Taylor et al., 1978; Willis & Todorov, 2006). Research has also shown how people are more likely to have more accurate source memory for people who share similarities with themselves (e.g., someone who is of the same race) (Shepherd, 1981; Brigham & Malpass, 1985; Bothwell et al., 1989; Lindsay et al., 1991; Rogers et al., 1997;
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Symons & Johnson, 1997). This study aimed to extend research on the use of appearance based biases in memory by studying how culture may modulate the use of these biases in certain situations. Being able to understand how ones’ culture could potentially influence appearance based biases in memory could be very useful. As globalization occurs, it is becoming increasingly likely that people will be placed in situations with others very different from themselves. Therefore, learning about cultural influences on the use of appearance based biases on memory, and allowing for the development of ideas on how to combat them, could be valuable. We examined this idea by investigating how culture may impact the ability to remember congruent versus incongruent face-behavior information, using Caucasian and East Asian faces varying on their relative babyfaceness.

We predicted congruity biases would be strongest when encoded behaviors were incongruent, rather than congruent, with facial characteristics, as shown in previous work (Nash et al., 2010; Cassidy et al., 2012; Kleider et al., 2012). This was not supported by our results. We also predicted that participants would better remember behaviors performed by own- versus other-race faces, which was also unsupported by our findings. Moreover, we predicted that face-behavior incongruence would exacerbate the effect of remembering own- versus other-race sources, which was also not supported by the results. Lastly, we predicted that differing cultural values on one’s dominant or more submissive behaviors would influence source memory, based on the self-relevance of behaviors to individuals within Eastern and Western cultures. This was also unsupported by our findings.

There are a number of potential explanations for why none of the main hypotheses were supported in this study. First, this study had a relatively small sample size (Ns = 24). Running this study with larger samples of Caucasian and East Asian participants could potentially tease
out subtle cultural differences in person perception, particularly when processing congruent versus incongruent face-behavior information. Previous studies that have looked at the effects of culture in terms of judging appearances and impression formation have used larger groups of participants (Albright, Malloy, Dong, Kenny, & Fang, 1997; Rule et al., 2010; Zebrowitz et al., 2012), suggesting the need for larger sample sizes to tease out the sometimes subtle influences of culture on perception. Moreover, the study that the current work is modeled on was able to find significant effects involving congruity using a sample of 48 participants, the majority of whom were raised in the United States (Cassidy et al., 2012). It could be that testing 24 Western participants in the current study was not powerful enough to replicate previous findings, making it less likely to detect any between-culture differences. Doubling the participants in the current study may be an important next step to further examine our hypotheses.

Secondly, our sample of East Asians may not have been representative of the larger East Asian community and culture. While all East Asians were born outside of the United States and had been in the United States for fewer than five years, our sample of Brandeis University students may have differed from East Asians who have chosen to stay in their country of origin. Living in America, even for a short time, could have affected participants’ values (i.e., emphasizing independence and dominance versus group cohesiveness and submissiveness). Previous research has shown that more isolated cultural groups show a greater “ingroup” effect than cultural groups that were more assimilated to different groups (Zebrowitz et al., 2012). The lack of cultural differences seen in the study could potentially be due to the fact the East Asians and Caucasians who participated in the study have all lived in the U.S. for some period of time. East Asians who live in the U.S. have most likely had more perceptual experience with faces from a variety of ethnic groups than a group of East Asian participants who have lived in their
native country their whole lives, reducing the possibility of detecting an own-race bias in source memory.

As well, many international students who attend Brandeis have also attended some sort of international high school (e.g., a British or an American school) in their home countries to better prepare them for an American university, resulting in increased exposure to traditionally Western values over students who do not attend such a high school. Thus, one interesting avenue for future research could be to compare performance on this task between East Asians currently at a Chinese or Taiwanese university with the sample obtained for the present study. A study sample within China and Taiwan could potentially be a more representative East Asian sample, and their performance on this source memory task may more closely mirror our hypotheses. As well, if these studies were done in China or Taiwan, the information presented at encoding could be in peoples’ native language rather than English. Learning the behaviors provided with the faces in English could potentially have primed East Asian participants to think in a more Western mindset rather than their native mindset.

We also did not produce evidence of an own- versus other- race bias in source memory. This may again be related to the task’s relatively low sample size. Interestingly, the means comprising this hypothesized interaction visually appeared to support our hypotheses of a potential own-race bias in source memory. Caucasian participants had more accurate source memory for Caucasian faces than for East Asian faces, whereas this difference was not evident among East Asian participants (Figure 6). Speculatively, this may be very preliminary evidence of an own-race bias in memory for Caucasian, but not East Asian participants. This may be because the Caucasian participants might be more accustomed to seeing more Caucasian versus East Asian faces in everyday life. In contrast, East Asians participants may be accustomed to
seeing both Caucasian and East Asian faces, making neither group visually unfamiliar. The results could potentially be different if the East Asian sample was actually from China or Taiwan as that sample would not necessarily be as visually predisposed to Caucasian faces. As well, variability among the current relatively small sample of Caucasian and East Asian participants may have decreased our ability to detect this own-race bias. Potentially adding more participants and having a larger, more representative sample of international East Asian participants tested in their native country could lend more insight into the possibility of a potential relationship between the race of the faces seen and the race of the participants.

Another potential reason for our unsupported hypotheses could be due to task difficulty. Lower overall accuracy in the current task (65%) versus previous tasks (75% in Cassidy et al., 2012) in our task suggests that it may have been more difficult than previous work. One reason for this increased difficulty could be because this study presented the faces in black and white rather than in color. Many other studies that employ faces for impression formation use color photographs (Nash et al., 2010; Kleider et al., 2012; Cassidy et al., 2012). Using black and white photos rather than color photos may have made the task more difficult for participants as it may have been more difficult to spot defining features and characteristics that could distinguish faces from one another during the encoding or retrieval task. Many students mentioned in a post-task questionnaire that “all the faces started to look the same”. This could be because without color, details that people may focus on when remembering people (such as eye color, hair color, skin tone, etc.) were not available for people to use. Therefore, when participants were attempting the retrieval task, there may have been situations where nothing prominent existed to help distinguish the target from the lure faces, causing participants to have worse source memory than in previous studies. In a future study, the use of color faces may allow for overall better source
memory. Notably, Suzuki and Suga (2010) did use black and white faces and found congruity biases in memory. Notably, this work differs from the current study due to the encoding task’s enhanced emotional salience (i.e., playing an economic game versus a reaction time task) and number of stimuli to be encoded (32 versus 64 faces). Therefore, if this study was to be redone using black and white photos, fewer faces may need to be encoded to aid source memory or more salience may need to be added to the task.

Something interesting found in the study was the tendency for Caucasian Americans to have better source memory than East Asian participants. In addition to the East Asian participants having overall worse source memory, there were more East Asian participants who needed to be dropped from the study compared to Caucasian participants due to guessing below chance on the retrieval task (e.g., 4 Caucasian participants compared with 12 East Asian participants). This could be due to a number of factors. One potential reason for the difference could be due to the fact that East Asian participants completed the task in English, which for most people, was not their native language. Another factor could be the environment of the task. All of the Caucasian participants came from the Introduction to Psychology class where students are accustomed to participating in psychology experiments while the majority of East Asian participants (22 out of 24) were paid participants, many of whom had never participated in a psychology experiment before. An alternative potential explanation for this difference in performance by participant race could be that for the East Asian sample, not every individual who participated had an “ingroup,” while every Caucasian had an “ingroup.” Potentially related to this idea was our unpredicted finding that participants tended to have marginally better source memory for Caucasian over East Asian faces. This could possibly be due to overall better source accuracy performance of the Caucasian relative to the East Asian participants. If Caucasian
participants had a stronger “ingroup” connection to the faces than the East Asian subjects did, this could partially explain why people had better source memory for Caucasian faces. To test these possibilities, we conducted an additional analysis that eliminated the few non-Chinese East Asians who may not have identified the Chinese face stimuli as members of their “ingroup.”

The removal of participants lacking an “ingroup” in the task changed our results in a few potentially interesting directions. When Caucasians were compared to East Asians that were in the same “ingroup” as the Chinese faces, overall source memory did not differ between the Caucasian and East Asian participants, in contrast to a between-groups difference when using the full sample of participants. Speculatively, this supports the idea that source memory differed between the full samples of Caucasian and East Asian participants because there were several East Asian participants who may not have fully identified with either face group. Also intriguing was that without the three Korean participants, participants had better source memory for Caucasian over East Asian faces overall. There are a number of potential rationales for this finding. One reason could be that East Asian participants from Brandeis University are simply more accustomed to Caucasian faces. As Caucasian students are in the majority here at Brandeis University; these faces may just seem more familiar now than East Asian faces. As well, there could be differences in the stimuli that stood out more to participants. For example, there may have been differences in facial hair for Caucasian faces that helped them stand out in a way the East Asian faces did not. There may also be an “ingroup” versus “outgroup” relationship that might be affecting source memory and impression formation. Further research would be needed to explore what could be driving the effects.

Intriguingly, we also found that source memory for congruent versus incongruent face-behavior information was modulated by the content of the behavior (i.e., whether the behavior
conveyed dominance or submissiveness). When a face was congruent with a behavior (e.g., a babyfaced person who performed a submissive behavior), memory for dominance and submissiveness did not differ. In contrast, when a face was incongruent with a behavior (e.g., a mature faced person who performed a submissive behavior); people had marginally better source memory for those performing submissive over dominant behaviors. This may be consistent with work showing enhanced memory for trustworthy-looking cheaters (Suzuki & Suga, 2010), which suggests the presence of a “cheater-detection system” in memory. Someone who looks trustworthy but is actually a cheater may be considered more deceptive than someone who looks untrustworthy but is actually fair, given that one might be more likely to trust the trustworthy-looking person in the first place. This may indicate a sort of preparedness mechanism allowing people to better remember the faces and behaviors of people who could deceive them in a harmful versus harmless way. In the current study, people may have had better source memory for mature-faced people who performed submissive behaviors because a mature-faced individual could be considered to serve a more helpful function than a babyfaced person (Zebrowitz & MacDonald, 1991). If a person assumes a mature-faced person is dominant, he or she may believe that person is someone they should remember, as they can be helpful as a leader and provider. The individual who appeared dominant and helpful who actually behaved submissively may have felt more deceptive to participants. In contrast, when someone who appears submissive and un-helpful actually turns out to be dominant, it may not have really fazed people, as that deception is less harmful than its alternative. Interestingly, beyond a “cheater-detection system” as Suzuki and Suga (2010) suggest, our data may offer preliminary evidence that this system can be extended to a broader “expectancy violation system” in memory. This idea, however, is only
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 speculative given the marginal nature of this relationship. Future research can follow up on this potentially intriguing finding.

Our overall findings did not support cultural differences impacting how people exhibit appearance-based biases in source memory. This could be due to limitations, like low sample size and assimilation of East Asian participant in Western culture, as previously described, rather than a lack of actual cultural differences. An alternative explanation, however, could be that the ideas of submissiveness and dominance do not map onto the constructs of interdependence and independence in the way we believed. Regardless of culture, individual personality differences (i.e., whether one considers him or herself to be dominant or more submissive) may influence source memory for individuals performing dominant or submissive behaviors. Previous work has shown that self-relevance improves memory (Rogers et al., 1997; Symons & Johnson, 1997). While this study assumed that self-relevance to dominance and submissiveness may have come from a person’s cultural upbringing; this could be an issue that has to do entirely with individual differences. The ideas of people having more accurate source memory for behaviors and faces that are similar to themselves may still hold true, just not necessarily through a cultural lens. Future research may want to assess how individual differences in personality characteristics (e.g., relative dominance or passivity) impact appearance-based stereotype use in source memory.

Overall, this study did not show that cultural backgrounds influence the use of appearance based inferences in source memory. There was however, the interesting trend of a relationship between the congruity of the face-behavioral content of the sentences and the specific content of the sentences themselves when participants all belonged to an “ingroup” or “outgroup” such that there was better overall source memory for mature-faced and submissive
individuals versus babyfaced and dominant individuals, and no differences in source memory when the content of behaviors was congruent with facial appearance. This potentially suggests the presence of a broader “expectancy violation system” in memory. Overall, this study may serve as interesting preliminary work lending itself to a number of open questions about the roles of cultural upbringing, individual differences, and their roles in affecting how appearance based inferences bias memory of others.
References


*Unpublished raw data.*


Table 1. Comparison of mean babyfaceness and attractiveness ratings of faces classified as babyfaced or mature-faced, split by racial group

<table>
<thead>
<tr>
<th></th>
<th>Babyfaced (M,SD)</th>
<th>Mature-faced (M,SD)</th>
<th>T statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Babyfaceness rating</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian Male</td>
<td>4.95 (.64)</td>
<td>2.61 (.28)</td>
<td>13.5</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Caucasian Male</td>
<td>4.28 (.50)</td>
<td>2.85 (.41)</td>
<td>8.93</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>B. Attractiveness rating</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian Male</td>
<td>3.53 (.37)</td>
<td>3.24 (.66)</td>
<td>1.53</td>
<td>.138</td>
</tr>
<tr>
<td>Caucasian Male</td>
<td>3.89 (.99)</td>
<td>3.76 (.74)</td>
<td>.423</td>
<td>.675</td>
</tr>
</tbody>
</table>
Table 2. Mean (Standard Deviation) Test Scores and Demographic Information for Americans and East Asians

<table>
<thead>
<tr>
<th></th>
<th>Americans</th>
<th>East Asians</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>24</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>6M, 18 F</td>
<td>10 M, 14 F</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>18.78 (.998)</td>
<td>20.04 (1.33)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>OSpan Math Accuracy</td>
<td>4.40 (2.48)</td>
<td>5.78 (4.14)</td>
<td>.980</td>
</tr>
<tr>
<td>OSpan Total</td>
<td>62.40 (14.60)</td>
<td>62.48 (7.24)</td>
<td>.174</td>
</tr>
<tr>
<td>Pattern Matching Total</td>
<td>26.29 (4.36)</td>
<td>29.83 (2.90)</td>
<td>.002</td>
</tr>
<tr>
<td>RIC Scale Individual</td>
<td>60.00 (6.26)</td>
<td>57.79 (6.63)</td>
<td>.241</td>
</tr>
<tr>
<td>RIC Scale Relational</td>
<td>62.67 (3.77)</td>
<td>57.13 (6.94)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>RIC Scale Collective</td>
<td>56.63 (6.61)</td>
<td>53.04 (8.45)</td>
<td>.109</td>
</tr>
<tr>
<td>Country of Origin</td>
<td>24 America</td>
<td>1 Taiwan, 3 Korea, 20 China or Hong Kong</td>
<td></td>
</tr>
</tbody>
</table>

Notes: The N represents the total number of participants included in the study, although some participants did not complete all of the measures. The p values in the final column correspond to independent samples t-tests comparing Americans and East Asians on each measure.
Table 3a. Mean (Standard Deviation) Scores of retrieval accuracy from the 2x2x2x2 mixed ANOVA for Caucasian participants

<table>
<thead>
<tr>
<th>American Caucasian Participants</th>
<th>Caucasian Faces</th>
<th>East Asian Faces</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dominant Behavior</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congruent</td>
<td>.70 (.20)</td>
<td>.65 (.18)</td>
</tr>
<tr>
<td>Incongruent</td>
<td>.69 (.18)</td>
<td>.62 (.19)</td>
</tr>
<tr>
<td><strong>Submissive Behavior</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congruent</td>
<td>.74 (.16)</td>
<td>.63 (.18)</td>
</tr>
<tr>
<td>Incongruent</td>
<td>.72 (.17)</td>
<td>.67 (.22)</td>
</tr>
</tbody>
</table>

Table 3b. Mean (Standard Deviation) Scores of retrieval accuracy from the 2x2x2x2 mixed ANOVA for East Asian participants

<table>
<thead>
<tr>
<th>East Asian Participants</th>
<th>Caucasian Faces</th>
<th>East Asian Faces</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dominant Behavior</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congruent</td>
<td>.66 (.20)</td>
<td>.59 (.18)</td>
</tr>
<tr>
<td>Incongruent</td>
<td>.61 (.18)</td>
<td>.63 (.21)</td>
</tr>
<tr>
<td><strong>Submissive Behavior</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congruent</td>
<td>.62 (.14)</td>
<td>.58 (.20)</td>
</tr>
<tr>
<td>Incongruent</td>
<td>.65 (.18)</td>
<td>.69 (.16)</td>
</tr>
</tbody>
</table>
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Figure 1a. Example encoding stimuli: Participants saw each face alone, followed by the face paired with a behavioral sentence. Behaviors were congruent or incongruent with facial characteristics, but participants did not see this information. b. Example retrieval stimuli: Participants viewed two faces from the previous task on the screen along with a prompt. All faces were previously viewed and no new faces were viewed during retrieval. Each face was used once as a target and once as a lure. Lure facial characteristics either matched or were different from the target on babyfaceness. The target’s encoding behavior always matched the question, while the lure’s encoding behavior never matched the question.
Figure 2. Overall, Caucasian participants had marginally better source memory than East Asian participants.
Figure 3. Overall, participants, regardless of race, were marginally more likely to accurately remember Caucasian faces over East Asian faces.
Figure 4. Participants, regardless of race, were significantly able to accurately remember Caucasian faces over East Asian faces. In this graph, only Chinese East Asian participants and Caucasian Americans were included. Three Korean East Asian participants and no Caucasian Americans were removed from the original analysis. This was done so that all participants were part of an “ingroup” with the viewed faces.
Figure 5. Overall, when all participants were members of an “ingroup” it appears that there is a trend for a relationship between the congruity of the face-behavioral content pairing and the specific content of the sentence. When a face is congruent with a behavior, memory for dominance and submissiveness does not differ. However when a face is incongruent with a behavior, it appears as though people are marginally more like to remember dominant people who did submissive behaviors better than submissive people who did dominant behaviors.
Figure 6. Overall, when all participants were members of an “ingroup” there visually appears to be a relationship between Face Race and Participant Race. It appears as though there is a slight, but non-significance for an own-race bias for Caucasian participants, but not East Asians participants.