

When Nonverbal Greetings “Make It or Break It”: The Role of Ethnicity and Gender in the Effect of Handshake on Social Appraisals

Yuta Katsumi¹ · Suhkyung Kim² · Keen Sung³ ·
Florin Dolcos⁴ · Sanda Dolcos¹

© Springer Science+Business Media, LLC 2017

Abstract Despite previous evidence identifying the role of ethnic and gender differences in nonverbal communication, few studies have comprehensively investigated the role of these factors in the effect of handshake on appraisals of social interactions. Here, 88 young adults (with equal proportions of Caucasians and East Asians, and women and men) observed and evaluated a series of movies illustrating guest–host interactions in a business setting. Each interaction started with a greeting protocol initiated by the host, which, in half of the trials, involved a handshake. The greeting was followed by a display of behaviors either encouraging (approach) or discouraging (avoidance) further interaction. Ethnicity and gender of the hosts were manipulated to depict the same categories represented by participants. First, the effect of handshake on appraisals of social interactions was more positive in Caucasian than in East Asian participants. Second, the effect of handshake on appraisals of social interactions was more positive for male than for female hosts in male participants, whereas such differences were not observed in female participants. Third, appraisals of social interactions involving approach and avoidance behaviors were more

Electronic supplementary material The online version of this article (doi:[10.1007/s10919-017-0257-0](https://doi.org/10.1007/s10919-017-0257-0)) contains supplementary material, which is available to authorized users.

✉ Yuta Katsumi
katsumi@illinois.edu

✉ Sanda Dolcos
sdolcos@illinois.edu

¹ Psychology Department and the Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign, 603 E Daniel St, Champaign, IL 61820, USA

² The Information School, University of Washington, Seattle, WA 98195, USA

³ College of Information and Computer Sciences, University of Massachusetts Amherst, Amherst, MA 01003, USA

⁴ Psychology Department, Neuroscience Program, and the Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign, 405 N Mathews Ave, Urbana, IL 61801, USA

positive in Caucasian than in East Asian participants. Finally, appraisals of social interactions involving approach behaviors were more positive in female than in male participants. Overall, these findings shed light on the role of ethnic and gender differences in the appraisal of nonverbal behaviors, and extend our understanding of factors that may lead to successful social interaction in the context of growing diversity in our society.

Keywords First impression · Greeting behavior · Nonverbal communication · Emotion · Intergroup process

Introduction

Handshaking is a form of nonverbal behavior that can dramatically influence the perception and appraisal of social interactions. While the exact origins of handshaking remain unclear, it has been historically regarded as a sign of friendliness, hospitality, formality, and trust (Hall and Hall 1983). Empirical investigations have consistently shown positive effects of handshakes on first impressions and other outcomes of interaction with other people in different contexts, including business interactions (Dolcos et al. 2012), employment interviews (Stewart et al. 2008), and negotiations (Schroeder et al. 2014). Notably, characteristics of handshakes (e.g., intensity, frequency) as well as their effects on person perception and evaluation seem to vary as a function of individual differences, such as ethnicity and gender (Bernieri and Petty 2011; Bowman and Okuda 1985; Stewart et al. 2008; Usmani 2005). However, few studies have comprehensively investigated the role of ethnicity and gender in the effect of handshakes on appraisals of social interactions, by systematically examining ethnic and gender differences both at the level of experimental stimuli (i.e., *target*) and participants (i.e., *perceiver*).

This is an important gap to fill in the literature, given that the current demographics of the United States are characterized by a state of increasing ethnic and gender diversity in the workforce, with ethnic minorities and women expected to gain greater representation in the next few decades (Cárdenas et al. 2011; Toossi 2013). Because of this continuing national demographic shift, social interactions with individuals from diverse backgrounds have become ubiquitous elements of everyday life. In such interactions, nonverbal behavior plays an important role in person perception and impression formation (Murphy 2012) and can also be influenced by ethnic and gender differences (Fischer and LaFrance 2015; Mast and Sczesny 2010; Matsumoto and Hwang 2012; Safdar et al. 2009). Therefore, clarification of how these factors influence the effect of handshakes on appraisals of social interactions is essential in better understanding the power of handshakes in the context of growing diversity in our society.

To address these issues, the present study used a novel experimental paradigm that allows comprehensive investigation of the role of ethnicity and gender both at the level of experimental stimuli and participants with respect to the appraisal of social interactions. The present study focused on the effect of handshake, while also examining general nonverbal affective behaviors signaling approach and avoidance intentions (Dolcos et al. 2012). Below, we will briefly review available evidence concerning the role of ethnic and gender differences in handshakes, in particular, and nonverbal communication, in general.

Handshaking and Cultural Differences

Handshaking is a greeting behavior commonly observed in many contemporary societies, but its practice and meaning also vary considerably across cultures (Hall and Hall 1983;

Mukherjee and Ramos-Salazar 2014; Usmani 2005). For instance, handshakes are traditionally very common in Western cultures, whereas non-contact greeting behaviors, such as bowing, are practiced more frequently in East Asian cultures (Bowman and Okuda 1985; Singh et al. 1998). A firm handshake accompanied by direct eye contact is associated with more positive first impressions (Chaplin et al. 2000; Stewart et al. 2008) and conveys positive individual characteristics such as extraversion, openness to experience, and emotional expressiveness in Western cultures (Chaplin et al. 2000). In contrast, softer handshakes and less eye contact are more customary and possibly favorable in some Asian cultures (Mukherjee and Ramos-Salazar 2014; Usmani 2005). Given evidence concerning the positive effect of handshake on interpersonal communication in Western cultures, we expected that the effect of handshake on appraisals of social interactions would be more positive in Caucasian than in East Asian participants. Regarding a possible role of target's ethnicity, there is evidence showing that Western/North American¹ cultures are associated with greater evaluative *ingroup* bias when group memberships are defined by categorical social groups (as opposed to personal relationships) (Yuki and Takemura 2014). Therefore, we expected that the positive effect of handshake on appraisals of social interactions would be larger for ethnically *ingroup* interactions than for *outgroup* interactions in Caucasian participants.

Hypothesis 1 The effect of handshake on appraisals of social interactions would be more positive in Caucasian than in East Asian participants. In Caucasian participants, this effect would be larger for appraisals of social interactions with ethnic *ingroup* than with *outgroup* members.

Handshaking and Gender Differences

Not only is handshaking considered more customary in Western/North American cultures, but it also has been traditionally viewed as a male activity. Therefore, men are usually expected to shake hands more frequently than women (Hall and Hall 1983). Consistent with this expectation, men are more likely to form positive impressions of others following a handshake with them than women (Chaplin et al. 2000). Moreover, whether handshaking is performed with male or female targets seems to influence the perceiver's appraisal of social interaction, but this may also depend on a specific context. For instance, handshaking with female targets increases a perceived sense of security when making risky financial decisions compared to handshaking with male targets, in both female and male participants (Levav and Argo 2010). However, in the context of employment interviews, the quality of handshaking with male targets was rated more positively than that with female targets, although interview assessments for female targets were not affected by their poorer handshakes (Stewart et al. 2008). In addition, handshaking was most commonly observed in male-male dyads (Greenbaum and Rosenfeld 1980), and an improvement in the accuracy of judging others' personality trait (i.e., conscientiousness) due to a handshake was significantly larger in male-male interactions compared to mixed-gender or female-female interactions (Bernieri and Petty 2011). Based on the available evidence reviewed above pointing to strong associations between handshaking and masculinity, we

¹ Here, and also generally in the literature, North American cultures refer to those of the United States and Canada that are more strongly influenced by *individualistic* cultural values. Although other countries such as Mexico are geographically located in North America, their cultures are typically considered more *collectivistic* (Masuda et al. 2012; Riemer et al. 2014; Safdar et al. 2009; Triandis 1989; Yuki and Takemura 2014).

expected that the effect of handshake on appraisals of social interactions would be more positive in male than in female participants, and that the positive effect of handshake would be largest in male–male social interactions.

Hypothesis 2 The effect of handshake on appraisals of social interactions would be more positive in male than in female participants. This effect would be the largest for male–male social interactions.

Nonverbal Communication (General) and Cultural Differences

Cultural differences regarding handshakes are consistent with those identified in nonverbal communication at a more general level (Matsumoto 2006; Matsumoto and Hwang 2012; Safdar et al. 2009). In North American cultures, spontaneous or even exaggerated emotional experiences and expressions are often encouraged as the individual's right; however, in East Asian cultures, emotions are seen as a reflection of one's social relations and thus tend to be expressed in a more context-specific, controlled manner (Markus and Kitayama 1991; Matsumoto 2006; Safdar et al. 2009). As a result, North Americans tend to judge and interpret others' nonverbal affective signals more positively and intensely compared to East Asians (Matsumoto 2006; Matsumoto and Hwang 2012; Matsumoto and Kudoh 1993). Moreover, North American cultures tend to endorse an approach motivational orientation (e.g., seeking positive outcomes that establish one's uniqueness compared to their groups), whereas East Asian cultures tend to endorse an avoidance orientation (e.g., avoiding negative outcomes in order to prevent disruption of group harmony) (Elliot et al. 2001; Hamamura et al. 2009; Mesquita and Walker 2003). Given that emotional information tends to be processed in a more positive light in North American culture, we expected that appraisals of social interactions involving approach and avoidance behaviors would be more positive in Caucasian than in East Asian participants.

Hypothesis 3 Appraisals of social interactions involving approach and avoidance behaviors would be more positive in Caucasian than in East Asian participants.

Nonverbal Communication (General) and Gender Differences

Gender differences also exist at the level of nonverbal communication in general (de Lemus et al. 2012; Fischer and LaFrance 2015; Kret and De Gelder 2012; Meyers-Levy and Loken 2015). Compared to men, women are generally more expressive in their display of nonverbal behaviors (Briton and Hall 1995; LaFrance et al. 2003; Mast and Sczesny 2010), and are also more accurate in decoding others' emotional expressions (Collignon et al. 2010; Hall and Matsumoto 2004; Krumhuber et al. 2007; Lambrecht et al. 2014), particularly when the expressions are negative or subtle (Hoffmann et al. 2010; Meyers-Levy and Loken 2015). Moreover, there is evidence showing that at least in North American cultures women are more avoidance-oriented, whereas men tend to be more approach-oriented (Llewellyn et al. 2013; Meyers-Levy and Loken 2015). Given females' greater attention to subtle nonverbal affective cues, we expected that appraisals of social interactions involving approach behaviors would be more positive, whereas those of interactions involving avoidance behaviors would be more negative, in female participants than in male participants. The latter effect would also be consistent with females' tendency to focus on avoidance-oriented motivations.

Hypothesis 4 Appraisals of social interactions involving approach behaviors would be more positive, whereas those of interactions involving avoidance behaviors would be more negative, in female than in male participants.

The Present Study

As summarized above, previous studies have provided evidence that ethnic and gender differences play an important role in the perception and evaluation of nonverbal behavior, including handshakes. However, very few studies have comprehensively investigated the effects of these factors on the appraisal of social interactions involving handshakes, by systematically examining these variables both at the level of experimental stimuli and participants. Therefore, the main goal of the present investigation was to clarify how ethnic (Caucasian vs. East Asian) and gender (female vs. male) differences influence appraisals of social interactions involving handshakes with dynamic characters, while also examining the role of general whole-body nonverbal affective cues signaling approach and avoidance intentions (Dolcos et al. 2012). Clarification of how ethnic and gender differences influence the effect of handshakes during social interaction is essential, as it would extend our understanding of the power of handshakes in the context of growing diversity in our society.

In the present study, participants viewed and evaluated a series of movies illustrating guest–host interactions in a business setting. Each interaction started with a greeting protocol initiated by the host, which, in half of the trials, involved a handshake. The greeting was followed by a display of behaviors either encouraging or discouraging further interaction (i.e., approach and avoidance behaviors, respectively). Ethnicity and gender of the hosts were manipulated to depict the categories represented by participants. In keeping with a previous investigation (Dolcos et al. 2012), participants rated the (1) *competence* of the host as a business representative, and their (2) *interest in doing business* with the host following observation of each interaction. Throughout the present report, the average of competence and interest ratings is referred to as “social appraisal.” Higher scores indicate more positive social appraisals and first impressions of hosts in social interaction.

Method

Participants

Eighty-eight right-handed healthy young adults consisting of 44 Caucasians (22 women) and 44 East Asians (22 women) living in the United States participated in the study ($M_{\text{age}} = 20.4$ years, age range 18–28). Sample size in each ethnic/gender group was determined using an independent sample based on a desired power of 0.8 and alpha of 0.05 to test the multi-way interactions as described in our analyses (see “Data Analysis” section below). Participants had no history of neurological, psychological, or psychiatric disorders. The experimental protocol was approved by the University of Illinois Institutional Review Board, and all participants provided written informed consent and received either course credit or payment for their participation, depending on the source of recruitment.

Participants’ ethnicity was determined through self-report, and those who identified their ethnic background as *White* and *Asian/Pacific Islander* were broadly considered Caucasians and East Asians in the present study, respectively. Of the 44 East Asian

participants, 28 of them identified their native language as Chinese (~64%), 14 Korean (~32%), 1 Thai (~2%), and 1 English (~2%). To minimize further the effect of exposure to North American cultures, eligibility for potential East Asian participants was restricted to international students studying at the university whose overall period of their stay in the US was no more than 3 years at the time of their participation. In the case of Caucasian participants, eligibility was restricted to those who have lived in the US for a minimum of 12 consecutive years, and to those who speak English as one of their native languages; no Caucasian international students, regardless of their nationality, were eligible for participation in this group.

Experimental Design

Stimuli consisted of movies used in a previous investigation (Dolcos et al. 2012), supplemented by additional movies incorporating clear manipulations of characters' ethnicity. Stimuli were created in Poser 7.0 (<http://my.smithmicro.com/poser-3d-animation-software.html>), and presented using the CIGAL software (Voyvodic 1999). Similar to the Dolcos et al. (2012) study, the task consisted of a series of 10-s whole-body animated movies illustrating nonverbal guest–host interactions in a business setting (Fig. 1). Participants viewed the guest being greeted by a host (social interaction condition) or a cardboard

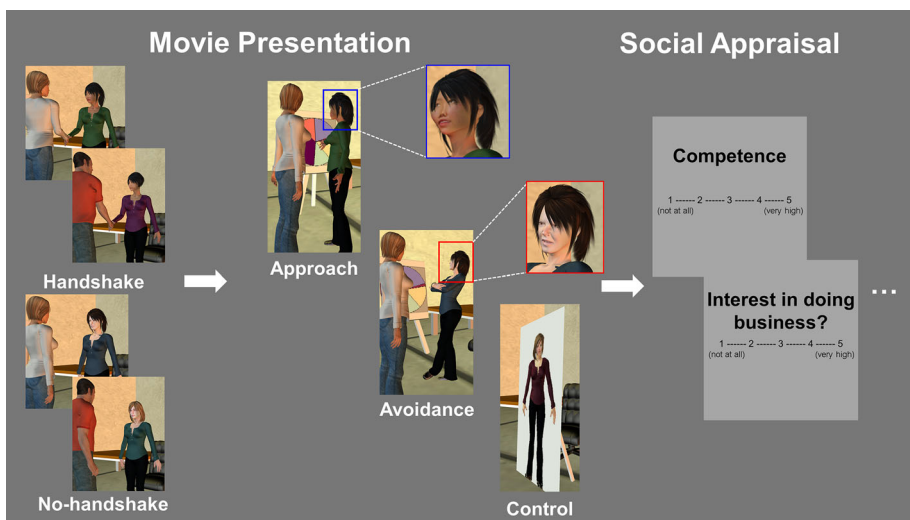


Fig. 1 Schematic of the task. Participants viewed movies of guest–host interactions, in which hosts greeted guests with or without a handshake as part of the greeting protocol, followed by a display of whole-body nonverbal behaviors that either encourage (*approach*: open postures) or discourage (*avoidance*: closed postures) further social interactions. Accompanying approach and avoidance behaviors, faces of host avatars turned from neutral expressions into a subtle smile or grimace, respectively. A no social interaction condition was also used as control. Following the movie presentation, participants rated the hosts on competence as business representatives, and their own interest in doing business with the hosts. The figure above illustrates examples of social interactions with (1) East Asian hosts with a handshake and involving approach behaviors, and (2) Caucasian hosts without a handshake and involving avoidance behaviors. Host ethnicities also included South Asian and African-American, although the main comparison of interest in the present investigation was on Caucasian and East Asian. There were equal numbers of female and male guest movies; all guests were Caucasian characters (see also “[Method](#)” section and Dolcos et al. 2012)

cutout of a host (control condition). In half of trials within the social interaction condition, social interaction between the guest and host started with a handshake initiated by the host as part of the greeting protocol; the order of trials with and without a handshake was counterbalanced across participants. Following this greeting protocol, the host displayed nonverbal behaviors that either encouraged (approach condition) or discouraged (avoidance condition) further social interaction. Specifically, the hosts in the approach condition stepped toward the guest while displaying open postures and smiling faces, whereas those in the avoidance condition stepped away from the guest while displaying closed postures and grimaces (for a dynamic illustration of similar stimuli, see Sung et al. 2011). Of the 160 movies used in the present investigation, 128 movies illustrated the dynamic social interaction condition, whereas the remaining 32 movies illustrated the control condition. Within the 128 movies in the social interaction condition, there were equal numbers of movies illustrating social interactions with and without a handshake, and interactions involving approach and avoidance behaviors.

Manipulation of Host Characteristics

Host ethnicity was manipulated following previous studies using similar procedures (Krämer et al. 2013; Stepanova and Strube 2009), by applying unique facial characteristics and skin tones representing particular ethnic groups, including Caucasian and non-Caucasian (i.e., East Asian, South Asian, and African-American) groups in proportions similar to the representation of these ethnicities in the local student population (i.e., 50% Caucasian, 18.75% Asian, 18.75% South Asian, 12.5% African-American). Host ethnicity was validated by a subset of the present sample ($n = 85$) who rated the host's ethnicity in each movie using 10-point scales (1 = *Definitely not Caucasian*, 10 = *Definitely Caucasian*). These participants provided their ratings of host ethnicity after they had completed the main social appraisal task, in order to avoid task contamination. Results showed that Caucasian stimuli were significantly more likely to be perceived as Caucasian ($M = 8.22$, $SD = 1.17$) compared to non-Caucasian stimuli as a whole ($M = 2.92$, $SD = 1.42$) [$t(84) = 23.71$, $p < 0.001$, $d = 4.08$], and compared to East Asian stimuli ($M = 3.87$, $SD = 1.73$) [$t(84) = 20.41$, $p < 0.001$, $d = 3.01$]. Similarly significant differences were also confirmed separately in Caucasian participants [Caucasian hosts: $M = 8.78$, $SD = 0.93$; non-Caucasian hosts: $M = 2.74$, $SD = 0.85$; East Asian hosts: $M = 3.96$, $SD = 1.40$; Caucasian vs. non-Caucasian hosts: $t(43) = 31.39$, $p < 0.001$, $d = 6.80$; Caucasian vs. East Asian hosts: $t(40) = 22.13$, $p < 0.001$, $d = 4.13$] and in East Asian participants [Caucasian hosts: $M = 7.71$, $SD = 1.15$; non-Caucasian hosts: $M = 3.10$, $SD = 1.79$; East Asian hosts: $M = 3.73$, $SD = 2.01$; Caucasian vs. non-Caucasian hosts: $t(43) = 12.62$, $p < 0.001$, $d = 3.13$; Caucasian vs. East Asian hosts: $t(43) = 11.25$, $p < 0.001$, $d = 2.52$].

Furthermore, validation of subtler non-Caucasian ethnicities (i.e., East Asian, South Asian, and African-American) was conducted using an independent sample ($N = 12$). More specifically, following the completion of the same ethnicity validation task as described above, these participants viewed only those movies in which they had identified the host as non-Caucasian (i.e., trials with the ratings of 5 or lower), and were asked to further categorize the host into one of the non-Caucasian ethnic groups (1 = *East Asian*, 2 = *South Asian*, 3 = *African-American*). First, replicating the results discussed above, significant differences were observed in the ratings of perceived ethnicity between Caucasian ($M = 7.71$, $SD = 1.06$) versus non-Caucasian hosts ($M = 1.54$, $SD = 0.41$) [$t(11) = 21.79$, $p < 0.001$, $d = 8.40$], and between Caucasian versus East Asian hosts ($M = 1.64$, $SD = 0.60$) [$t(11) = 23.54$, $p < 0.001$, $d = 7.28$]. Second, a one-way

repeated-measures ANOVA comparing the ratings of subtler ethnicities yielded a significant effect of host ethnicity: $F(1.34, 14.72) = 1151.88$, $p < 0.001$, $\eta_p^2 = 0.99$. Post-hoc t tests showed that East Asian ($M = 1.08$, $SD = 0.09$), South Asian ($M = 2.34$, $SD = 0.19$), and African-American hosts ($M = 2.85$, $SD = 0.10$) were perceived as significantly different from one another: East Asian versus South Asian [$t(11) = -29.27$, $p < 0.001$, $d = -9.03$], East Asian versus African-American [$t(11) = -85.04$, $p < 0.001$, $d = -18.86$], South Asian versus African-American [$t(11) = -11.27$, $p < 0.001$, $d = -3.59$].

To ensure reliability of measures obtained from this sample, we estimated the intraclass correlation (ICC) as an index of agreement in the ratings of perceived host ethnicity. Specifically, we used a two-way random effects model to assess the absolute agreement in the ratings across 12 participants—that is, the extent to which different participants assigned the same rating (i.e., Caucasian, East Asian, South Asian, or African-American) to the same movie/host. Results identified a high degree of reliability in the rating assignments. The average measure ICC estimate was 0.990, with a 95% CI from 0.987 to 0.992: $F(136, 1496) = 109.00$, $p < 0.001$. According to the available guideline (Koo and Li 2016), this ICC estimate along with its confidence interval indicate that the reliability of our ethnicity ratings is “excellent”. Taken together, these results confirm successful manipulation of host ethnicity, both at the level of Caucasian versus non-Caucasian comparison and when comparing among the non-Caucasian ethnic groups, and therefore provide strong support for the appropriateness of terming the East Asian stimuli as such. Regarding host gender, Caucasian and non-Caucasian hosts consisted of equal proportions of female and male characters.

Guest characters depicted Caucasian individuals (one female and one male), and guest gender was manipulated to have equal numbers of female and male characters, as also employed before (Dolcos et al. 2012). Each movie was followed by rating screens, which prompted participants to provide the following ratings using 5-point scales (1 = *Not at all*, 5 = *Very high*): business competence of the host (“Competence”) and their own interest in doing business with the host (“Interest”). Each rating screen was displayed for 2 s, and the order of the ratings was counterbalanced across trials. It is important to note further that manipulation of stimuli based on multiple ethnicities, gender, handshake, and more general nonverbal affective behaviors was essential in increasing the ecological validity in the present task. While within-subject designs may render research hypotheses more transparent than between-subjects designs (Kahneman and Frederick 2005; Tversky and Kahneman 1983), the former is also associated with increased statistical power. Within-subject comparisons of responses for two or more social groups are also common, for instance, in studies of ethnic biases (e.g., Kubota et al. 2012), possibly to account for high individual variation in such biases (Amodio et al. 2003). Therefore, the diverse set of host characteristics not only contributed to the perceptual novelty of the task, but also allowed participants to make social appraisals in contexts mimicking real-life social situations that reflect increasing diversity in our society.

Procedure

Upon providing written informed consent, participants were seated in front of a standard LCD monitor where all stimuli were presented during the task. Participants were told that the study examined the effect of first impressions formed in brief social interactions on the subsequent decision to further engage in business relations. Prior to the beginning of the task, participants were instructed to use the whole rating scale and to give their ratings

based solely on the observed social interactions, as well as to make their responses as quickly and accurately as possible using a computer keyboard. Response speed and accuracy were both emphasized so that participants would make sure that their responses correspond exactly to their appraisals. Participants completed eight runs of 20 trials each for a total of 160 trials, and were assigned different run orders. The trials within each run were pseudo-randomized so that no more than three trials of the same kind were presented consecutively. Once the task was completed, participants were asked to view the same set of stimuli again for the validation of host ethnicity, after which they were thoroughly debriefed about the true purpose of the study.

Data Analysis

Prior to statistical analyses, the data were examined for possible outlier values in the average ratings at the level of the whole sample ($N = 88$), ethnic groups (Caucasian vs. East Asian), and gender groups (female vs. male). No outliers were identified using a criterion of three standard deviations from the mean in the average ratings. In addition, the normality of data distributions was assessed using a series of Shapiro–Wilk tests (Razali and Wah 2011). Results confirmed that the frequency distribution of the ratings in the present sample (both as a whole and in subsamples based on ethnic and gender groups) did not significantly differ from a normal distribution (all p 's > 0.10). Therefore, the use of parametric tests was justified for statistical analyses of the data.

The main goal of the present investigation was to clarify the role of ethnicity and gender both at the level of the target and perceiver on the appraisal of social interactions, with a focus on the effect of handshake as well as approach and avoidance behaviors. To this end, a series of mixed ANOVAs were conducted to assess the differences in participants' appraisals using the following factors as the independent variables: *handshake* (handshake vs. no-handshake), *behavior* (approach vs. avoidance), *participant ethnicity* and *host ethnicity* (Caucasian vs. East Asian), and *participant gender* and *host gender* (female vs. male). In each ANOVA, the dependent variable was the average of competence and interest ratings, given a high correlation observed in the present sample ($r = 0.84$, $p < 0.001$) and across samples (Dolcos et al. 2012). As noted above, the average of ratings in these two categories was defined as “social appraisal” in the present investigation, where higher scores indicate more positive social appraisals and first impressions of hosts in social interaction.

Due to the unequal proportions of the trials with Caucasian versus East Asian hosts in the experimental design (with the latter being a subset of larger “non-Caucasian” stimuli), follow-up analyses with equal numbers of Caucasian and East Asian stimuli were also performed. More specifically, a subset of Caucasian stimuli was selected pseudo-randomly, such that the sets of Caucasian and East Asian stimuli consisting of equal numbers of movies would be equated in terms of other manipulations part of our present data analyses—i.e., handshake and no-handshake, approach and avoidance behaviors, female and male hosts. This procedure ensured that differences in the appraisal observed between the two sets of stimuli would be attributed as much as possible to host ethnicity and not to other factors. Finally, for replication purposes, these analyses targeting the effects of ethnicity and gender were preceded by an ANOVA examining basic differences as a function of handshake and approach/avoidance behaviors, regardless of ethnicity and gender of the hosts and participants (Dolcos et al. 2012).

Results

Means and standard deviations for the conditions part of non-significant ANOVA interactions are reported in the Supplemental Materials section.

Effects of Handshake and Approach/Avoidance Behavior on Appraisals of Social Interactions

To confirm replication of the previous findings using a similar paradigm (Dolcos et al. 2012), we first performed a 2 (Handshake vs. No-handshake) \times 2 (Approach vs. Avoidance) repeated-measures ANOVA, using Handshake and Behavior as the independent variables. As expected, social appraisals for interactions with a handshake ($M = 3.26$, $SD = 0.51$) were overall significantly more positive than those for interactions without a handshake ($M = 3.00$, $SD = 0.52$), as confirmed by a main effect of Handshake: $F(1,87) = 42.70$, $p < 0.001$, $\eta_p^2 = 0.33$ [$t(87) = 6.54$, $p < 0.001$, $d = 0.50$]. Additionally, social appraisals for interactions involving approach behaviors ($M = 3.71$, $SD = 0.56$) were more positive than those for interactions involving avoidance behaviors ($M = 2.54$, $SD = 0.62$), as confirmed by a significant main effect of Behavior: $F(1,87) = 252.79$, $p < 0.001$, $\eta_p^2 = 0.74$ [$t(87) = 15.90$, $p < 0.001$, $d = 1.97$].

The ANOVA also yielded a significant Handshake \times Behavior interaction: $F(1,87) = 3.97$, $p = 0.05$, $\eta_p^2 = 0.04$. Post-hoc analyses showed that the effect of handshake on social appraisals was more positive for interactions involving approach behaviors (Handshake: $M = 3.86$, $SD = 0.61$ vs. No-handshake: $M = 3.56$, $SD = 0.61$) than for those involving avoidance behaviors (Handshake: $M = 2.66$, $SD = 0.63$ vs. No-handshake: $M = 2.43$, $SD = 0.66$); comparison of differences: $t(87) = 1.95$, $p = 0.05$, $d = 0.18$. Overall, these findings confirm the previous evidence regarding the positive effects of handshake and approach behaviors on the appraisal of social interactions. The observed stronger effect of handshake on the appraisal of social interactions involving approach behaviors than those involving avoidance behaviors is also consistent with the previous findings (Dolcos et al. 2012).

Effects of Handshake, Participant Ethnicity, and Host Ethnicity on Appraisals of Social Interactions

To investigate the effect of handshake and participant/host ethnicity on the appraisal of social interactions, we conducted a 2 (Handshake vs. No-handshake) \times 2 (Caucasian vs. East Asian Participants) \times 2 (Caucasian vs. East Asian Hosts) mixed ANOVA using Handshake, Participant Ethnicity, and Host Ethnicity as the independent variables. As expected, there was a significant interaction between Handshake \times Participant Ethnicity: $F(1,86) = 10.25$, $p = 0.002$, $\eta_p^2 = 0.11$. Post-hoc t tests revealed that the difference in social appraisals between interactions with a handshake and those without it was more positive in Caucasian participants (Handshake: $M = 3.44$, $SD = 0.46$ vs. No-handshake: $M = 3.06$, $SD = 0.55$) than in East Asian participants (Handshake: $M = 3.08$, $SD = 0.50$ vs. No-handshake: $M = 2.94$, $SD = 0.49$); comparison of differences: $t(43) = 3.08$, $p = 0.003$, $d = 0.66$ (Fig. 2). A two-way interaction between Handshake \times Host Ethnicity was not significant: $F(1,86) = 2.10$, $p = 0.15$, $\eta_p^2 = 0.02$. Likewise, a three-way interaction between Handshake \times Participant Ethnicity \times Host Ethnicity was not significant: $F(1,86) = 0.50$, $p = 0.48$, $\eta_p^2 = 0.01$. Taken together, these results partially confirm

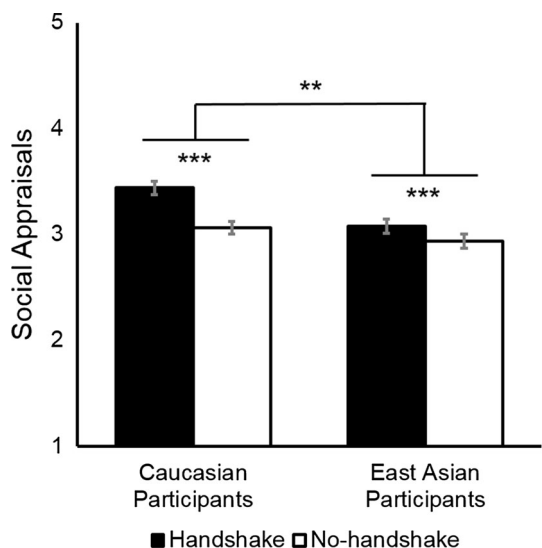
our first hypothesis that the effect of handshake on social appraisals of interactions would be more positive in Caucasian than in East Asian participants.

Effects of Handshake, Participant Gender, and Host Gender on Appraisals of Social Interactions

Next, we conducted a 2 (Handshake vs. No-handshake) \times 2 (Female vs. Male Participants) \times 2 (Female vs. Male Hosts) mixed ANOVA using Handshake, Participant Gender, and Host Gender as independent variables. As expected, the ANOVA yielded a significant three-way interaction between Handshake \times Participant Gender \times Host Gender: $F(1,86) = 6.92, p = 0.01, \eta_p^2 = 0.07$. Post-hoc analyses revealed that, among male participants, the effect of handshake on social appraisals was more positive for interactions with male hosts (Handshake/Male Host: $M = 3.14, SD = 0.52$ vs. No-handshake/Male Host: $M = 2.91, SD = 0.52$) than for those with female hosts (Handshake/Female Host: $M = 3.21, SD = 0.49$ vs. No-handshake/Female Host: $M = 3.08, SD = 0.51$); comparison of differences: $t(43) = 2.97, p = 0.005, d = 0.27$. In contrast, the effect of handshake on social appraisals did not differ as a function of host gender among female participants [Handshake/Female Host: $M = 3.40, SD = 0.55$ vs. No-handshake/Female Host: $M = 3.05, SD = 0.58$; Handshake/Male Host: $M = 3.28, SD = 0.51$ vs. No-handshake/Male Host: $M = 2.95, SD = 0.55$; comparison of differences: $t(43) = 0.87, p = 0.39, d = 0.07$].

Notably, the observed three-way interaction was significant only in Caucasian participants [$F(1,42) = 11.86, p = 0.001, \eta_p^2 = 0.22$] (Fig. 3), but not in East Asian participants [$F(1,42) = 0.56, p = 0.46, \eta_p^2 = 0.01$]. Interestingly, in Caucasian male participants, the effect of handshake on social appraisals was specific to appraisals of interactions with male hosts [Handshake/Male Host: $M = 3.40, SD = 0.43$ vs. No-handshake/Male Host: $M = 3.07, SD = 0.52$; $t(21) = 3.85, p = 0.001, d = 0.69$], and was not observed for appraisals of interactions with female hosts [Handshake/Female Host: $M = 3.42, SD = 0.41$ vs. No-handshake/Female Host: $M = 3.27, SD = 0.51$; $t(21) = 1.60,$

Fig. 2 Effects of handshake and participant ethnicity on appraisals of social interactions. The effect of handshake on social appraisals was more positive in Caucasian ($n = 44$) than in East Asian participants ($n = 44$). $**p < 0.01$; $***p < 0.001$



$p = 0.13$, $d = 0.31$]; comparison of differences: $t(21) = 5.52$, $p < 0.001$, $d = 0.45$. In Caucasian female participants, however, the effect of handshake on social appraisals was observed in interactions both with female and male hosts [Handshake/Female Host: $M = 3.54$, $SD = 0.51$ vs. No-handshake/Female Host: $M = 3.01$, $SD = 0.62$; $t(21) = 5.58$, $p < 0.001$, $d = 0.92$; Handshake/Male Host: $M = 3.40$, $SD = 0.52$ vs. No-handshake/Male Host: $M = 2.89$, $SD = 0.58$; $t(21) = 5.06$, $p < 0.001$, $d = 0.93$; comparison of differences: $t(21) = 0.26$, $p = 0.80$, $d = 0.03$]. Taken together, these findings partially support our second hypothesis and show that, among male participants, the effect of handshake on social appraisals was more positive for interactions with male than with female hosts, whereas such differences as a function of host gender were not observed in female participants.

Effects of Approach/Avoidance Behavior, Participant Ethnicity, and Host Ethnicity on Appraisals of Social Interactions

In addition to the effects of handshakes, we also conducted analyses targeting the effects of approach and avoidance behaviors on social appraisals. First, we performed a 2 (Approach vs. Avoidance) \times 2 (Caucasian vs. East Asian Participants) \times 2 (Caucasian vs. East Asian Hosts) mixed ANOVA using Behavior, Participant Ethnicity, and Host Ethnicity as the independent variables. The ANOVA identified a main effect of Participant Ethnicity: $F(1,86) = 5.77$, $p = 0.02$, $\eta_p^2 = 0.06$. Follow-up analyses showed that social appraisals in Caucasian participants ($M = 3.25$, $SD = 0.46$) were significantly more positive than those in East Asian participants ($M = 3.01$, $SD = 0.48$); $t(86) = 2.40$, $p = 0.02$, $d = 0.52$. Of note, more positive social appraisals in Caucasian than in East Asian participants were observed for both approach [Caucasian: $M = 3.82$, $SD = 0.52$ vs. East Asian: $M = 3.60$, $SD = 0.58$; $t(86) = 1.82$, $p = 0.04$, $d = 0.39$] and avoidance behaviors [Caucasian:

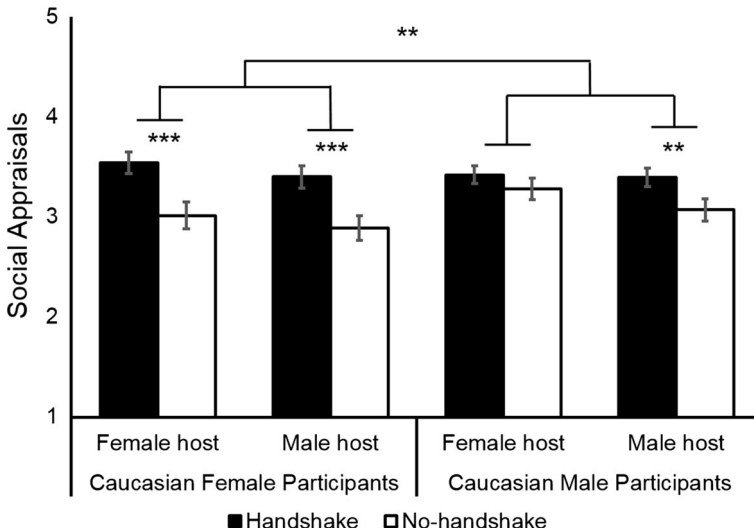


Fig. 3 Effects of handshake, participant gender, and host gender on appraisals of social interactions. In Caucasian male participants ($n = 22$), the effect of handshake on social appraisals was specific to interactions with male hosts and was absent for those with female hosts, whereas no such differences by host gender were observed for Caucasian female participants ($n = 22$). $**p < 0.01$; $***p < 0.001$

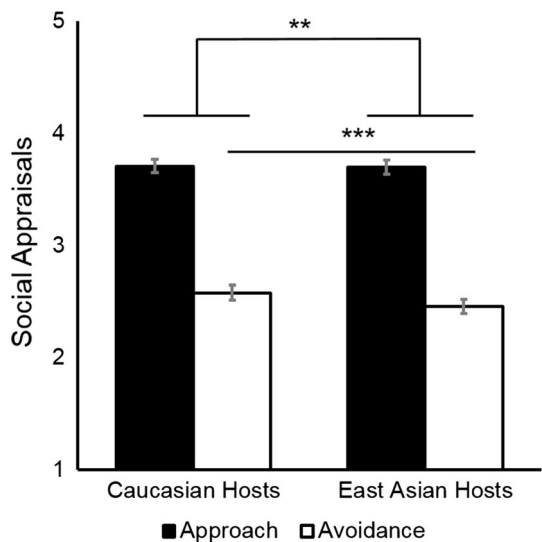
$M = 2.68$, $SD = 0.63$ vs. East Asian: $M = 2.41$, $SD = 0.59$; $t(86) = 2.04$, $p = 0.02$, $d = 0.44$]. A two-way interaction between Behavior \times Participant Ethnicity was not significant: $F(1,86) = 0.06$, $p = 0.81$, $\eta_p^2 = 0.001$. These findings confirm our third hypothesis and show that social appraisals of interactions are overall more positive in Caucasian than in East Asian participants, for both interactions involving approach and avoidance behaviors.

In addition, the ANOVA also identified a significant interaction between Behavior \times Host Ethnicity: $F(1,86) = 10.23$, $p = 0.002$, $\eta_p^2 = 0.11$. Post-hoc t tests showed that, while social appraisals for interactions involving approach behaviors did not differ between Caucasian hosts ($M = 3.71$, $SD = 0.58$) and East Asian hosts ($M = 3.70$, $SD = 0.56$) [$t(87) = 0.24$, $p = 0.81$, $d = 0.01$], social appraisals for interactions involving avoidance behaviors were significantly more positive for Caucasian hosts ($M = 2.58$, $SD = 0.63$) than for East Asian hosts ($M = 2.46$, $SD = 0.62$) [$t(87) = 4.67$, $p < 0.001$, $d = 0.19$]; comparison of differences: $t(87) = -3.35$, $p = 0.001$, $d = -0.43$ (Fig. 4). A three-way interaction between Behavior \times Participant Ethnicity \times Host Ethnicity was not significant: $F(1,86) = 0.46$, $p = 0.50$, $\eta_p^2 = 0.01$.

Effects of Approach/Avoidance Behavior, Participant Gender, and Host Gender on Appraisals of Social Interactions

Finally, we performed a 2 (Approach vs. Avoidance) \times 2 (Female vs. Male Participants) \times 2 (Female vs. Male Hosts) mixed ANOVA using Behavior, Participant Gender, and Host Gender as the independent variables. The ANOVA yielded a significant interaction between Behavior \times Participant Gender: $F(1,86) = 3.97$, $p = 0.05$, $\eta_p^2 = 0.04$. Post-hoc analyses identified a trend showing that social appraisals of interactions involving approach behaviors were more positive in female participants ($M = 3.82$, $SD = 0.61$) than in male participants ($M = 3.60$, $SD = 0.49$) [$t(86) = 1.93$, $p = 0.06$, $d = 0.41$], whereas social appraisals of interactions involving avoidance behaviors did not differ between female ($M = 2.51$, $SD = 0.60$) and male participants ($M = 2.58$, $SD = 0.65$)

Fig. 4 Effect of approach/avoidance behaviors and host ethnicity on appraisals of social interactions. Social appraisals of interactions involving avoidance behaviors were more positive for Caucasian hosts than for East Asian hosts, whereas no differences were observed for social appraisals of interactions involving approach behaviors ($N = 88$). $**p < 0.01$; $***p < 0.001$



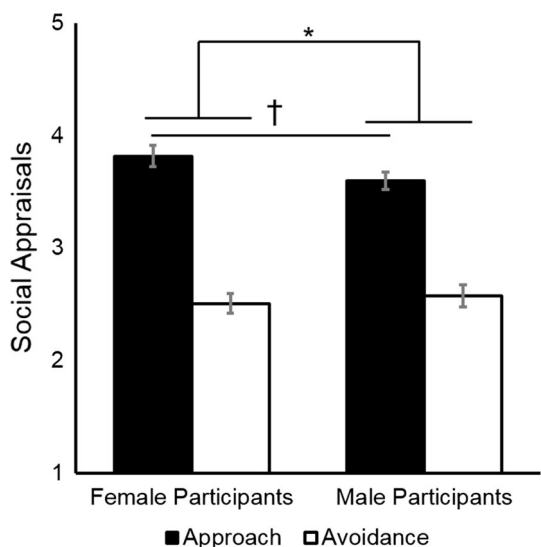
[$t(86) = -0.46, p = 0.65, d = -0.10$] (Fig. 5). A two-way interaction between Behavior \times Host Gender was not significant: $F(1,86) = 1.75, p = 0.19, \eta_p^2 = 0.02$. Likewise, a three-way interaction between Behavior \times Participant Gender \times Host Gender was not significant: $F(1,86) = 0.17, p = 0.68, \eta_p^2 = 0.002$. Taken together, these findings partially support our fourth hypothesis and show that social appraisals of interactions involving approach behaviors were more positive in female than in male participants.

To address the issue of the unequal proportions of stimuli with Caucasian and East Asian hosts, follow-up analyses were conducted using a subset of the stimuli with Caucasian hosts to see if similar findings would be observed with equal numbers of Caucasian and East Asian stimuli. Overall, these analyses yielded similarly significant results, with the exception that the Behavior \times Participant Gender interaction reported above in “Effects of Approach/Avoidance Behavior, Participant Gender, and Host Gender on Appraisals of Social Interactions” was only marginally significant [$F(1,86) = 2.94, p = 0.09, \eta_p^2 = 0.03$] when equal proportions of Caucasian and East Asian stimuli were used. Therefore, the observed differences in social appraisals regarding this ANOVA interaction should be treated with caution.

Discussion

Substantial changes in ethnic and gender diversity in the workplace highlight the need to better understand the nature of social interactions with individuals from different backgrounds. Extending the previous evidence in the literature, four novel findings emerged from the present investigation, thus providing strong support for the role of ethnicity and gender in the effect of handshakes, and of general approach and avoidance behaviors, on social appraisals. First, the effect of handshake on social appraisals was more positive in Caucasian than in East Asian participants. Second, the effect of handshake on social appraisals was more positive for interactions with male hosts than for those with female hosts in male participants, whereas such differences as a function of host gender were not

Fig. 5 Effects of approach/avoidance behaviors and participant gender on appraisals of social interactions. Social appraisals of interactions involving approach behaviors were more positive in female participants ($n = 44$) than in male participants ($n = 44$) at a marginally significant level, whereas such differences by participant gender were not observed for avoidance behaviors. * $p = 0.05$; † $p = 0.06$



observed in female participants. Third, social appraisals of interactions involving approach and avoidance behaviors were overall more positive in Caucasian than in East Asian participants. Fourth, social appraisals of interactions involving approach behaviors were more positive in female than in male participants. These findings will be discussed in turn below.

Effects of Handshake, Participant Ethnicity, and Host Ethnicity on Appraisals of Social Interactions

In Western/North American cultures, handshaking is a common greeting behavior associated with positive first impressions and personality characteristics (Chaplin et al. 2000; Stewart et al. 2008). There is also evidence showing that North American (individualistic) cultures, compared to East Asian (collectivistic) cultures, are generally associated with greater evaluative ingroup bias based on greater attention to categorical group membership (Yuki and Takemura 2014). Therefore, we expected that the effect of handshake on social appraisals would be more positive in Caucasian participants than in East Asian participants, and that this effect would be larger for interactions with ethnically ingroup hosts than with outgroup ones. The results partially lent support to this hypothesis, and confirmed a greater positive effect of handshake on social appraisals in Caucasian than in East Asian participants; however, no significant effect of host ethnicity was identified.

The finding that handshaking improves social appraisals to a greater extent in Caucasian than in East Asian participants is consistent with the notion that this nonverbal greeting behavior is more common in North American than in East Asian cultures (Bowman and Okuda 1985; Singh et al. 1998). It is possible that our Caucasian participants perceived handshakes more naturally given their familiarity with this greeting behavior, whereas East Asian participants might not have internalized the value of handshakes during social interaction at the time of their participation in the current study as much as our Caucasian participants. In addition, North American cultures are also associated with greater emphasis on approach-oriented (as opposed to avoidance-oriented) information processing (Elliot et al. 2001; Hamamura et al. 2009). Therefore, another possibility is that Caucasian participants attended more to handshakes as a social cue that signals approaching intentions during social interaction.

Interestingly, host ethnicity did not significantly influence the effect of handshake on social appraisals in the present investigation, thus suggesting a similarly positive effect of handshake regardless of whether social interactions involve ethnically ingroup or outgroup members. This finding is consistent with previous evidence showing that, in the context of interpersonal communication, observation of culturally-congruent nonverbal behavior was associated with higher appraisals of social interaction partners, whereas ethnicity of these interaction partners did not influence such appraisals (Dew and Ward 1993). One possibility, therefore, is that cultural congruency or familiarity with nonverbal behaviors exerts more powerful influences on social appraisals than ethnicity. However, as discussed below, the present study also found that the gender composition of dyads in social interactions influences the effect of handshake on social appraisals.

Effects of Handshake, Participant Gender, and Host Gender on Appraisals of Social Interactions

Handshaking is historically part of males' greeting behaviors, and therefore tends to be far more commonly observed in male–male interactions than in female–female or mixed-

gender interactions (Greenbaum and Rosenfeld 1980). In this context, we expected that the effect of handshake on social appraisals would be more positive in male than in female participants, and that this effect would be largest in male–male interactions. Our results provided some support to this hypothesis and showed that, among male participants, the effect of handshake on social appraisals was more positive for same-gender than for mixed-gender interactions, whereas no such differences as a function of host gender were observed among female participants.

The results also revealed that this effect was driven by Caucasian participants, as reflected in a non-significant effect of handshake on social appraisals of interactions with female hosts observed in Caucasian male participants. In other words, Caucasian males' social appraisals were negatively affected by the absence of a handshake from male hosts. These findings are consistent with the notion that handshaking is most commonly observed in male–male social interactions among a Caucasian sample (Greenbaum and Rosenfeld 1980). It is possible that Caucasian male participants in the present investigation had more expectations for a handshake to occur in male–male interactions in a business context, and that the absence of it violated their expectations about the greeting behavior between men, leading to their less positive social appraisals for interactions with male hosts without a handshake.

Alternatively, given that both North Americans (compared to East Asians) and men (compared to women) are generally associated with relatively greater approach-oriented motivational tendencies (Hamamura et al. 2009; Meyers-Levy and Loken 2015), Caucasian male participants may have attended the most to the presence or absence of handshakes as a behavior signaling approaching intentions, compared to the other subgroups of our participants. The present findings discussed in this section so far suggest that, although ethnic group membership does not seem to influence the effect of handshake on social appraisals, gender composition exerts a powerful influence on social appraisals, particularly among Caucasian males for whom handshaking may be the most customary greeting behavior in a business context. This finding extends evidence from previous studies of handshakes (Chaplin et al. 2000; Stewart et al. 2008), and highlights the importance of considering both ethnic and gender groups together in investigating the role of handshakes on social appraisals.

Effects of Approach/Avoidance Behavior, Participant Ethnicity, and Host Ethnicity on Appraisals of Social Interactions

Available evidence concerning ethnic/cultural differences in nonverbal affective behavior suggests that North Americans tend to process emotional information more positively and intensely compared to East Asians (Matsumoto and Hwang 2012). Given that North American/individualistic and East Asian/collectivistic cultures are associated with a greater focus on approach-oriented versus avoidance-oriented information processing, respectively (Hamamura et al. 2009), we expected that social appraisals of interactions involving approach and avoidance behaviors would be more positive in Caucasian than in East Asian participants; the results lent support to this hypothesis. This finding is overall consistent with previous evidence showing that North Americans tend to appraise emotional situations as more pleasant than East Asians (Mesquita and Walker 2003).

Interestingly, social appraisals for interactions involving avoidance behaviors were significantly more positive for Caucasian than for East Asian hosts in both Caucasian and East Asian participants. This might be due to different criteria for categorizing ingroup versus outgroup members across cultures. Specifically, North Americans are more likely to

exhibit evaluative ingroup bias based on the perceived social group categories than East Asians, who may do so on the basis of relational connections (Brewer and Chen 2007; Yuki and Takemura 2014). Therefore, it is possible that Caucasian participants in the present sample attended more to ethnic differences in host avatars, and appraised avoidance behaviors displayed by their ingroup members more favorably compared to those displayed by outgroup members.

The extent to which our East Asian participants perceived East Asian hosts as ingroup members may be less clear. Nevertheless, the finding that East Asians' social appraisals of avoidance behaviors displayed by ethnically ingroup members were less positive (more negative) than those by outgroup members is consistent with the values typically endorsed by East Asian collectivistic cultures. In particular, collectivistic cultures tend to value group harmony, conformity, and belongingness (Brewer and Chen 2007; Markus and Kitayama 1991), and are also associated with decreased tolerance for deviant or unfair behaviors by ingroup members (Hornsey et al. 2006; Mu et al. 2015). Thus, it is possible that East Asians' more negative appraisals of ingroup members signaling a lack of interest in further business interaction may be due to their sensitivity to norm violation associated with collectivistic cultural values.

Effects of Approach/Avoidance Behavior, Participant Gender, and Host Gender on Appraisals of Social Interactions

Women are generally more expressive in their nonverbal affective behaviors and are more sensitive to those displayed by others compared to men (Fischer and LaFrance 2015; Hall and Matsumoto 2004; Mast and Sczesny 2010). Given women's greater attention to subtle nonverbal cues, we expected that social appraisals for interactions involving approach behaviors would be more positive and those involving avoidance behaviors would be more negative in female than in male participants. The results provided partial support to this hypothesis, and showed that social appraisals of interactions involving approach behaviors were more positive in female than in male participants, although there were no significant differences in social appraisals of interactions involving avoidance behaviors between female and male participants.

The finding regarding gender differences in approach behaviors is overall consistent with previous evidence suggesting that women are generally more sensitive and reactive to others' dynamic positive emotional expressions (e.g., smiling) than men (Krumhuber et al. 2007). The absence of significant differences in social appraisals of avoidance behaviors is somewhat surprising, given evidence identifying females' biases toward negative emotional information (Meyers-Levy and Loken 2015). One possible explanation for this null result concerns the role of stimulus type, given that gender differences have not always been observed in explicit recognition of dynamic negative emotional expressions (Kret and De Gelder 2012). It should be noted, however, that these results regarding the interaction of participant gender and approach/avoidance behaviors should be treated and interpreted with caution, as the observed effect becomes only marginally significant with equal numbers of Caucasian and East Asian stimuli.

In discussing the results concerning our manipulation of the approach and avoidance conditions, it is important to note that participants' social appraisals of these behaviors were mostly based on *whole-body* nonverbal behaviors signaling approach and avoidance intentions, respectively (see also Fig. 1), rather than on subtle differences in facial expressions that conveyed emotions congruent with each behavior. This is based on post-experiment debriefings in which the majority of the participants explicitly commented that

their appraisals were influenced by the posture or body language of the hosts. These findings not only confirm the successful manipulation of the “approach” and “avoidance” behaviors through our whole-body nonverbal behavior cues, but also speak to the validity and appropriateness of this manipulation to investigate the role of ethnic and gender differences in social appraisals.

Limitations and Future Directions

The following limitations of the present study should be mentioned. First, although justified by the composition of the local targeted subject population, the present analyses were based on a subset of the experimental stimuli consisting of the unequal proportions of Caucasian and East Asian hosts. Importantly, however, analyses carried out with equal proportions of Caucasian and East Asian stimuli overall yielded similar results, thus showing that the findings reported here are not driven by the difference in the number of stimuli representing the two ethnic groups. To minimize the effect of possible confounds due to disproportionate number of trials, future studies may consider using experimental paradigms with a balanced design for targeted comparisons of specific ethnic groups (e.g., Dew and Ward 1993; Matsumoto and Kudoh 1993), even though this might reduce the ecological validity given by the stimulus proportion that mimics the ethnic composition of the targeted subject population.

Another limitation is related to the composition of the present subject sample. Our East Asian subsample consisted predominantly of international students from China and South Korea with limited experience of living abroad. However, strictly targeting one ethnic/cultural group may yield more robust differences in social appraisals when compared to a Caucasian subsample. In addition, there is evidence suggesting that, while Asian international students recruited in North America show attentional biases consistent with Asian cultural values, the magnitude of such biases is weaker than those exhibited by a sample recruited in Asia (Masuda et al. 2012). This suggests a potential effect of bicultural exposure on social cognition. Future studies would benefit from multi-site investigations, which may help minimize the effect of acculturation.

Furthermore, in the present study, we were unable to collect data regarding the detailed assessment of host ethnicity from the original sample. Although the data obtained from an independent sample yielded promising results, future studies should thoroughly examine the perception of host ethnic characteristics within the same samples.

Finally, with respect to gender differences in social appraisals, one manipulation of possible interest concerns the role of context. For instance, women are more sensitive not only to nonverbal cues than men, as reviewed above, but also to subtle differences in the experimental context, as shown by previous studies of social cognition and decision-making (Croson and Gneezy 2009). Therefore, future research examining gender differences in social appraisals should consider exploring the possible role of social context (e.g., formal business interaction vs. informal casual interaction) in social appraisals.

Conclusions

Despite these limitations, the present investigation makes important novel contributions to the literatures on handshaking, in particular, and nonverbal communication, in general. By using a comprehensive experimental design with ethnicity and gender examined both at the

level of the target and perceiver, the present study sheds light on the role of ethnicity and gender in the effect of handshake and approach/avoidance behaviors on social appraisals, in the context of business interactions. Our results provide evidence regarding the role of these factors in the perception and evaluation of handshakes, as a customary greeting behavior in Western cultures particularly among males, and in those of general nonverbal affective cues signaling approach and avoidance intentions. Overall, these findings advance our understanding of the interaction of ethnicity and gender on the appraisals of nonverbal behaviors, and have implications for clarifying factors that may lead to successful social interactions in the context of growing diversity in our society.

Acknowledgements This research was carried out in part at the Beckman Institute for Advanced Science and Technology at the University of Illinois. During the preparation of this manuscript, YK was supported by the Honjo International Scholarship Foundation, and FD was supported by a Helen Corley Petit Endowed Scholarship in Liberal Arts and Sciences and an Emanuel Donchin Professorial Scholarship in Psychology from the University of Illinois. The authors thank Gina Giase for assistance with stimulus creation.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

References

- Amodio, D. M., Harmon-Jones, E., & Devine, P. G. (2003). Individual differences in the activation and control of affective race bias as assessed by startle eyeblink response and self-report. *Journal of Personality and Social Psychology, 84*(4), 738–753. doi:[10.1037/0022-3514.84.4.738](https://doi.org/10.1037/0022-3514.84.4.738).
- Bernieri, F. J., & Petty, K. N. (2011). The influence of handshakes on first impression accuracy. *Social Influence, 6*(2), 78–87. doi:[10.1080/15534510.2011.566706](https://doi.org/10.1080/15534510.2011.566706).
- Bowman, J. P., & Okuda, T. (1985). Japanese-American communication: Mysteries, enigmas, and possibilities. *Business Communication Quarterly, 48*(4), 18–21. doi:[10.1177/108056998504800407](https://doi.org/10.1177/108056998504800407).
- Brewer, M. B., & Chen, Y. R. (2007). Where (who) are collectives in collectivism? Toward conceptual clarification of individualism and collectivism. *Psychology Review, 114*(1), 133–151. doi:[10.1037/0033-295x.114.1.133](https://doi.org/10.1037/0033-295x.114.1.133).
- Briton, N. J., & Hall, J. A. (1995). Beliefs about female and male nonverbal communication. *Sex Roles, 32*(1–2), 79–90. doi:[10.1007/bf01544758](https://doi.org/10.1007/bf01544758).
- Cárdenas, V., Ajinkya, J., & Léger, D. G. (2011). *Progress 2050: New ideas for a diverse America*. Washington: Center for American Progress.
- Chaplin, W. F., Phillips, J. B., Brown, J. D., Clanton, N. R., & Stein, J. L. (2000). Handshaking, gender, personality, and first impressions. *Journal of Personality and Social Psychology, 79*(1), 110–117. doi:[10.1037/0022-3514.79.1.110](https://doi.org/10.1037/0022-3514.79.1.110).
- Collignon, O., Girard, S., Gosselin, F., Saint-Amour, D., Lepore, F., & Lassonde, M. (2010). Women process multisensory emotion expressions more efficiently than men. *Neuropsychologia, 48*(1), 220–225. doi:[10.1016/j.neuropsychologia.2009.09.007](https://doi.org/10.1016/j.neuropsychologia.2009.09.007).
- Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature, 47*(2), 448–474. doi:[10.1257/jel.47.2.448](https://doi.org/10.1257/jel.47.2.448).
- de Lemus, S., Spears, R., & Moya, M. (2012). The power of a smile to move you: Complementary submissiveness in women's posture as a function of gender salience and facial expression. *Personality and Social Psychology Bulletin, 38*(11), 1480–1494. doi:[10.1177/0146167212454178](https://doi.org/10.1177/0146167212454178).

- Dew, A., & Ward, C. (1993). The effects of ethnicity and culturally congruent and incongruent nonverbal behaviors on interpersonal attraction. *Journal of Applied Social Psychology, 23*(17), 1376–1389. doi:[10.1111/j.1559-1816.1993.tb01038.x](https://doi.org/10.1111/j.1559-1816.1993.tb01038.x).
- Dolcos, S., Sung, K., Argo, J. J., Flor-Henry, S., & Dolcos, F. (2012). The power of a handshake: Neural correlates of evaluative judgments in observed social interactions. *Journal of Cognitive Neuroscience, 24*(12), 2292–2305. doi:[10.1162/jocn_a_00295](https://doi.org/10.1162/jocn_a_00295).
- Elliot, A. J., Chirkov, V. I., Kim, Y., & Sheldon, K. M. (2001). A cross-cultural analysis of avoidance (relative to approach) personal goals. *Psychological Science, 12*(6), 505–510. doi:[10.1111/1467-9280.00393](https://doi.org/10.1111/1467-9280.00393).
- Fischer, A., & LaFrance, M. (2015). What drives the smile and the tear: Why women are more emotionally expressive than men. *Emotion Review, 7*(1), 22–29. doi:[10.1177/1754073914544406](https://doi.org/10.1177/1754073914544406).
- Greenbaum, P. E., & Rosenfeld, H. M. (1980). Varieties of touching in greetings: Sequential structure and sex-related differences. *Journal of Nonverbal Behavior, 5*(1), 13–25. doi:[10.1007/bf00987051](https://doi.org/10.1007/bf00987051).
- Hall, J. A., & Matsumoto, D. (2004). Gender differences in judgments of multiple emotions from facial expressions. *Emotion, 4*(2), 201–206. doi:[10.1037/1528-3542.4.2.201](https://doi.org/10.1037/1528-3542.4.2.201).
- Hall, P. M., & Hall, D. A. S. (1983). The handshake as interaction. *Semiotica, 45*(3–4), 249–264. doi:[10.1515/semi.1983.45.3-4.249](https://doi.org/10.1515/semi.1983.45.3-4.249).
- Hamamura, T., Meijer, Z., Heine, S. J., Kamaya, K., & Hori, I. (2009). Approach–avoidance motivation and information processing: A cross-cultural analysis. *Personality and Social Psychology Bulletin, 35*(4), 454–462. doi:[10.1177/0146167208329512](https://doi.org/10.1177/0146167208329512).
- Hoffmann, H., Kessler, H., Eppel, T., Rukavina, S., & Traue, H. C. (2010). Expression intensity, gender and facial emotion recognition: Women recognize only subtle facial emotions better than men. *Acta Psychologica, 135*(3), 278–283. doi:[10.1016/j.actpsy.2010.07.012](https://doi.org/10.1016/j.actpsy.2010.07.012).
- Hornsey, M. J., Jetten, J., McAuliffe, B. J., & Hogg, M. A. (2006). The impact of individualist and collectivist group norms on evaluations of dissenting group members. *Journal of Experimental Social Psychology, 42*(1), 57–68. doi:[10.1016/j.jesp.2005.01.006](https://doi.org/10.1016/j.jesp.2005.01.006).
- Kahneman, D., & Frederick, S. (2005). A model of heuristic judgment. In K. J. Holyoak & R. G. Morrison (Eds.), *The Cambridge handbook of thinking and reasoning* (pp. 267–293). Cambridge, UK: Cambridge University Press.
- Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine, 15*(2), 155–163. doi:[10.1016/j.jcm.2016.02.012](https://doi.org/10.1016/j.jcm.2016.02.012).
- Krämer, K., Bente, G., Luo, S., Pfeiffer, U. J., Han, S., & Vogeley, K. (2013). Influence of ethnic group-membership and gaze direction on the perception of emotions. A cross-cultural study between Germany and China. *PLoS ONE, 8*(6), e66335.
- Kret, M. E., & De Gelder, B. (2012). A review on sex differences in processing emotional signals. *Neuropsychologia, 50*(7), 1211–1221. doi:[10.1016/j.neuropsychologia.2011.12.022](https://doi.org/10.1016/j.neuropsychologia.2011.12.022).
- Krumhuber, E., Manstead, A. S. R., & Kappas, A. (2007). Temporal aspects of facial displays in person and expression perception: The effects of smile dynamics, head-tilt, and gender. *Journal of Nonverbal Behavior, 31*(1), 39–56. doi:[10.1007/s10919-006-0019-x](https://doi.org/10.1007/s10919-006-0019-x).
- Kubota, J. T., Banaji, M. R., & Phelps, E. A. (2012). The neuroscience of race. *Nature Neuroscience, 15*(7), 940–948. doi:[10.1038/nn.3136](https://doi.org/10.1038/nn.3136).
- LaFrance, M., Hecht, M. A., & Paluck, E. L. (2003). The contingent smile: A meta-analysis of sex differences in smiling. *Psychological Bulletin, 129*(2), 305–334. doi:[10.1037/0033-2909.129.2.305](https://doi.org/10.1037/0033-2909.129.2.305).
- Lambrecht, L., Kreifelts, B., & Wildgruber, D. (2014). Gender differences in emotion recognition: Impact of sensory modality and emotional category. *Cognition and Emotion, 28*(3), 452–469. doi:[10.1080/02699931.2013.837378](https://doi.org/10.1080/02699931.2013.837378).
- Levay, J., & Argo, J. J. (2010). Physical contact and financial risk taking. *Psychological Science, 21*(6), 804–810. doi:[10.1177/0956797610369493](https://doi.org/10.1177/0956797610369493).
- Llewellyn, N., Dolcos, S., Iordan, A. D., Rudolph, K. D., & Dolcos, F. (2013). Reappraisal and suppression mediate the contribution of regulatory focus to anxiety in healthy adults. *Emotion, 13*(4), 610–615. doi:[10.1037/a0032568](https://doi.org/10.1037/a0032568).
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review, 98*(2), 224–253. doi:[10.1037/0033-295x.98.2.224](https://doi.org/10.1037/0033-295x.98.2.224).
- Mast, M. S., & Sczesny, S. (2010). Gender, power, and nonverbal behavior. In J. C. Chrisler & D. R. McCreary (Eds.), *Handbook of gender research in psychology* (pp. 411–425). New York, NY: Springer New York.
- Masuda, T., Wang, H., Ishii, K., & Ito, K. (2012). Do surrounding figures' emotions affect judgment of the target figure's emotion? Comparing the eye-movement patterns of European Canadians, Asian Canadians, Asian international students, and Japanese. *Frontiers in Integrative Neuroscience, 6*, 72. doi:[10.3389/fnint.2012.00072](https://doi.org/10.3389/fnint.2012.00072).

- Matsumoto, D. (2006). Culture and nonverbal behavior. In V. Manusov & M. L. Patterson (Eds.), *The SAGE handbook of nonverbal communication* (pp. 219–235). Thousand Oaks, CA: SAGE Publications, Inc.
- Matsumoto, D., & Hwang, H. S. (2012). Culture and emotion: The integration of biological and cultural contributions. *Journal of Cross-Cultural Psychology, 43*(1), 91–118. doi:10.1177/0022022111420147.
- Matsumoto, D., & Kudoh, T. (1993). American-Japanese cultural differences in attributions of personality based on smiles. *Journal of Nonverbal Behavior, 17*(4), 231–243. doi:10.1007/BF00987239.
- Mesquita, B., & Walker, R. (2003). Cultural differences in emotions: A context for interpreting emotional experiences. *Behaviour Research and Therapy, 41*(7), 777–793. doi:10.1016/S0005-7967(02)00189-4.
- Meyers-Levy, J., & Loken, B. (2015). Revisiting gender differences: What we know and what lies ahead. *Journal of Consumer Psychology, 25*(1), 129–149. doi:10.1016/j.jcps.2014.06.003.
- Mu, Y., Kitayama, S., Han, S., & Gelfand, M. J. (2015). How culture gets embraided: Cultural differences in event-related potentials of social norm violations. *Proceedings of the National Academy of Sciences of the United States of America, 112*(50), 15348–15353. doi:10.1073/pnas.1509839112.
- Mukherjee, S., & Ramos-Salazar, L. (2014). “Excuse us, your manners are missing!” The role of business etiquette in today’s era of cross-cultural communication. *TSM Business Review, 2*(1), 18–28.
- Murphy, N. A. (2012). Nonverbal perception. In S. T. Fiske & C. N. Macrae (Eds.), *The SAGE handbook of social cognition* (pp. 191–210). London, UK: SAGE Publications Ltd.
- Razali, N. M., & Wah, Y. B. (2011). Power comparisons of Shapiro–Wilk, Kolmogorov–Smirnov, Lilliefors and Anderson–Darling tests. *Journal of Statistical Modeling and Analytics, 2*(1), 21–33.
- Riemer, H., Shavitt, S., Koo, M., & Markus, H. R. (2014). Preferences don’t have to be personal: Expanding attitude theorizing with a cross-cultural perspective. *Psychological Review, 121*(4), 619–648. doi:10.1037/a0037666.
- Safdar, S., Friedlmeier, W., Matsumoto, D., Yoo, S. H., Kwantes, C. T., Kakai, H., et al. (2009). Variations of emotional display rules within and across cultures: A comparison between Canada, USA, and Japan. *Canadian Journal of Behavioural Science, 41*(1), 1–10. doi:10.1037/a0014387.
- Schroeder, J., Risen, J., Gino, F., & Norton, M. I. (2014). Handshaking promotes cooperative dealmaking. Harvard Business School NOM Unit Working Paper No. 14-117; Harvard Business School Marketing Unit Working Paper No. 14-117. doi:10.2139/ssrn.2443674.
- Singh, N. N., McKay, J. D., & Singh, A. N. (1998). Culture and mental health: Nonverbal communication. *Journal of Child and Family Studies, 7*(4), 403–409. doi:10.1023/A:1022946925134.
- Stepanova, E. V., & Strube, M. J. (2009). Making of a face: Role of facial physiognomy, skin tone, and color presentation mode in evaluations of racial typicality. *The Journal of Social Psychology, 149*(1), 66–81. doi:10.3200/SOCP.149.1.66-81.
- Stewart, G. L., Dustin, S. L., Barrick, M. R., & Darnold, T. C. (2008). Exploring the handshake in employment interviews. *Journal of Applied Psychology, 93*(5), 1139–1146. doi:10.1037/0021-9010.93.5.1139.
- Sung, K., Dolcos, S., Flor-Henry, S., Zhou, C., Gassior, C., Argo, J., et al. (2011). Brain imaging investigation of the neural correlates of observing virtual social interactions. *Journal of Visualized Experiments*. doi:10.3791/2379.
- Toossi, M. (2013). Labor force projections to 2022: The labor force participation rate continues to fall. *Monthly Labor Review*. Washington: U.S. Department of Labor, Bureau of Labor Statistics. doi:10.21916/mlr.2013.40.
- Triandis, H. C. (1989). The self and social behavior in differing cultural contexts. *Psychological Review, 96*(3), 506–520.
- Tversky, A., & Kahneman, D. (1983). Extensional versus intuitive reasoning: The conjunction fallacy in probability judgment. *Psychological Review, 90*(4), 293–315. doi:10.1037/0033-295X.90.4.293.
- Usmani, T. (2005). Doing business with other Asian countries. *Asia Pacific Business Review, 1*(1), 76–83. doi:10.1177/097324700500100109.
- Voyvodic, J. T. (1999). Real-time fMRI paradigm control, physiology, and behavior combined with near real-time statistical analysis. *NeuroImage, 10*(2), 91–106. doi:10.1006/nimg.1999.0457.
- Yuki, M., & Takemura, K. (2014). Intergroup comparison and intragroup relationships: Group processes in the cultures of individualism and collectivism. In M. Yuki & M. Brewer (Eds.), *Culture and group processes*. New York, NY: Oxford University Press.