

CRACKING THE NONVERBAL CODE

Intercultural Competence and Gesture Recognition Across Cultures

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The purpose of this set of studies was to assess whether the ability to distinguish between real and fake gestures in a foreign setting is positively associated with cultural adjustment to that setting. To do so, we created an original videotaped measure of gesture recognition accuracy (the GRT). Study 1 ($n = 508$) found positive associations between performance on the GRT and length of stay in the foreign setting and between GRT performance and self-reported intercultural communication competence. Study 2 ($n = 60$) replicated the positive association between GRT performance and self-reported intercultural communication competence. It also found a positive association between GRT performance and external perceptions of intercultural communication competence and motivation as rated by observers native to the new cultural setting. Together, findings from the two studies highlight the importance of gesture recognition in the cultural adaptation process and the potential of the GRT measure as a useful assessment tool.

Keywords: nonverbal; gestures; cross-cultural; cultural adaptation; acculturation; communication

Imagine what it would be like to not understand the meaning of a nonverbal gesture. Imagine that you are new to the North American culture and are interacting with a new colleague at work. In the flow of conversation, your colleague suddenly stops talking, smiles, points his index finger in the air about 5 to 6 inches from his right ear, and very quickly in a circular motion twirls and twists his finger. Although you understand that he means something very specific by his nonverbal gesture, you are unsure of the meaning. You feel awkward and uncomfortable, not only because you don't understand your colleague but also because you have the sense that your colleague assumes that you do.

A major challenge for individuals seeking to become competent in a foreign culture is learning its traffic rules of interpersonal communication. Becoming an accurate diagnostician of cultural differences in interpersonal communication requires competence in the verbal language of the new culture. It also requires proficiency in its nonverbal language (Elfenbein & Ambady, 2002). Among the most important facets of nonverbal communication are nonverbal gestures (Efron, 1941; Ekman & Friesen, 1969; Kendon, 1994, 1997). Gestures are part of the lexicon of nonverbal communication and serve the purpose of furthering shared understanding and communication (Archer, 1997; Collett, 1993; Morris,

AUTHORS' NOTE: Preparation of this article was supported by a NSF PECASE award (grant BCS-9733706) to Ambady and a NSF graduate student fellowship to Choi. For insightful comments on the article, the authors thank Heather Gray and Jennifer Steele. Please address correspondence to Andrew L. Molinsky, Brandeis University, Mail Stop 032, Waltham, MA 02454; e-mail: molinsky@brandeis.edu.

JOURNAL OF CROSS-CULTURAL PSYCHOLOGY, Vol. 36 No. 3, May 2005 380-395

DOI: 10.1177/0022022104273658

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Collett, Marsh, & O'Shaughnessy, 1979). As the anthropologist Edward Sapir (1949) has written, gestures are a key part of the "secret code" of a cultural group that is "written nowhere, known by none and understood by all" (p. 554). The focus of this article is on a particular form of gesture called an emblem (Efron, 1941; Ekman & Friesen, 1969) or an autonomous gesture (Kendon, 1983), a form of gesture that is (a) deliberately and consciously produced; (b) has a specific, precise meaning and translation in a particular cultural setting (Efron, 1941); and (c) varies widely across cultures (Archer, 1997).

Previous research has found that gestures, like other important facets of nonverbal communication, differ significantly across cultures (Archer, 1997; Payrató, 1993; Poortinga, Schoots, & Van de Koppel, 1993; Safadi & Valentine, 1988; Wolfgang & Wolofsky, 1991). To someone born and raised in the United States, for example, the gesture described in the example above would be identified as "He's crazy!" To someone raised in a culture in which this particular gesture was not part of the nonverbal lexicon, the hand motion would have no meaning at all. Previous research has explored the cultural variability of gestures, detailing the types of gestures used in a particular culture (Kendon, 1992; Payrató, 1993; Safadi & Valentine, 1988) or describing how cultures differ in terms of the gestures used (Archer, 1997; Efron, 1941). Little work, however, has explored gestures through the prism of cultural adaptation.

For individuals attempting to function effectively in a foreign cultural setting, nonverbal gestures are a critical facet of interpersonal communication they must master to effectively navigate foreign social situations. Whereas natives of a culture have the ability to seamlessly navigate the secret code of nonverbal gestures, having developed an implicit, expert understanding (Collett, 1993; Reber, 1989, 1993) through socialization (Archer, 1997), non-natives do not share this same luxury. As outsiders to the "sinewy web" (Geertz, 1973) of culturally shared meaning that binds together members of the same cultural group, non-natives must explicitly learn what natives process naturally and automatically (Elfenbein & Ambady, 2002). This article examines the association between gesture recognition in a foreign cultural setting and cultural adjustment to that setting.

LEARNING TO RECOGNIZE GESTURES IN A FOREIGN CULTURE

Converging streams of research suggest an association between length of stay in a foreign culture and the ability to recognize nonverbal gestures. Research on implicit learning in a variety of domains, including chess playing, language learning, medical diagnosis, wine appreciation, and stock trading, suggests that people develop expertise in judgment through implicit learning and exposure (Cleeremans, 1993; Melcher & Schooler, 1996; Steenbarger, 2002). For example, in their research on implicit processes in language learning, Pacton, Perruchet, Fayol, and Cleeremans (2001) found that children improve over time at distinguishing between fake and actual linguistic patterns characteristic of their native language and culture. We expect a similar pattern for non-natives learning nonverbal gestures. To the extent that learning gestures in a foreign culture is similar to developing implicit knowledge of the new culture's nonverbal grammar (Elfenbein & Ambady, 2002), there should be a positive association for non-natives between length of time in a foreign culture and gesture recognition accuracy.

Recent work in emotion recognition also suggests an association between length of stay and gesture recognition accuracy. In their meta-analysis of the emotion recognition literature, Elfenbein and Ambady (2002) found that natives of a culture have an in-group advantage in recognizing the emotions of fellow natives. These findings echo previous work on the

in-group advantage with gestures (Wolfgang & Wolofsky, 1991). It is interesting that this in-group advantage for emotion recognition decreases as out-group members gain more exposure to the new culture. Elfenbein and Ambady (2003) found that recent Chinese immigrants were the least accurate group in judging American facial emotional expressions, but even first-generation Asian Americans (those born in the United States whose parents were immigrants) were less accurate than second- and third-generation Asian Americans (those whose parents or grandparents were born in the United States). Because knowledge of both emotions and gestures is acquired implicitly through cultural exposure and familiarity, we anticipate that similar patterns of implicit cultural learning will be observed in the domain of gesture recognition. Just as an expert coin collector is able to distinguish between coins that are counterfeit and coins that are genuine, so too should non-natives acculturated to a foreign setting be able to accurately distinguish between valid and invalid gestures. One goal of this article, therefore, is to examine whether exposure to and immersion in a foreign cultural setting is associated with gesture recognition ability.

GESTURE RECOGNITION AND INTERCULTURAL COMMUNICATION COMPETENCE

To be considered a meaningful indicator of cultural adjustment, gesture recognition ability should not only be associated with an individual's length of stay in that culture but also with perceptions of that individual's intercultural communication competence. Based on previous research in related domains, there is good reason to believe that such a relationship exists. Earlier work on measures of interpersonal communication skill, such as the Profile of Nonverbal Sensitivity (PONS; Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979) and the Interpersonal Perception Test (IPT; Costanzo & Archer, 1989), has demonstrated that the ability to accurately diagnose nonverbal behavior is related to positive interpersonal outcomes. People who scored higher on these measures reported having higher quality relationships and were perceived by their friends as more socially skilled than those with lower scores (Costanzo & Archer, 1989; Rosenthal et al., 1979). In the intercultural domain, research on the Cultural Assimilator model (Fiedler, Mitchell, & Triandis, 1971) has found that the ability to diagnose and interpret the deep cultural rules underlying patterns of behavior in a foreign setting is associated with successful performance as a non-native in that setting (Albert, 1986; Bhawuk, 1998, 2001; Harrison, 1992). In particular, non-natives who are able to diagnose the logic of a foreign culture's system of values and beliefs had more effective relationships with coworkers and higher levels of cooperation with host nationals (Fiedler et al., 1971; Worchel & Mitchell, 1972). We expect a similar relationship between gesture recognition ability and perceptions of intercultural communication competence.

CURRENT RESEARCH

The purpose of this research is to explore whether gesture recognition ability is positively associated with cultural adaptation. Specifically, we hypothesized the following:

Hypothesis 1: There will be a positive relationship for non-natives between length of stay in a foreign setting and gesture recognition accuracy.

Hypothesis 2: The ability to accurately distinguish between valid and invalid gestures in a foreign culture will be associated with higher levels of perceived intercultural communication competence assessed by (a) non-natives themselves and (b) native observers.

To test these hypotheses, we conducted two studies in which non-native business students in the United States were asked to judge the validity or invalidity of a series of nonverbal gestures. Building on previous research suggesting video as a tool to guide intercultural learning (Dinges & Baldwin, 1996; Mak, Westwood, Ishiyama, & Barker, 1999), particularly within the domain of gestures (Archer, 1997), we created a measure called the Gesture Recognition Task (GRT), which was made up of a series of nonverbal gestures, some of which were real or valid gestures—those commonly used in the American cultural context (e.g., “thumbs up”)—and others of which were fake or invalid gestures that were fabricated for the purpose of the study. These studies were conducted as part of a larger study on cultural adaptation and intercultural communication ability.

STUDY 1

The purpose of this first study was to examine whether the ability to accurately recognize valid and invalid gestures is associated with length of stay in a foreign culture (Hypothesis 1) and whether this ability is positively related to self-reported intercultural communication competence (Hypothesis 2a).

METHOD

PARTICIPANTS AND PROCEDURE

A total of 562 undergraduate business students at a large private university in the Western United States participated in the study as part of a voluntary classroom exercise (mean age = 21.5 years, $SD = 3.34$). The sample included 285 (56%) native-born American students and 223 (44%) non-native students. Fifty-four participants did not provide enough information to be classified as either native or non-native students and were removed from the sample. Table 1 summarizes the demographic information about the participants in this study. The GRT measure was administered in a large classroom setting as part of a larger study about cultural adaptation. Participants watched the gestures video and made their choices about whether each gesture on the GRT was real or fake. After taking the GRT measure, non-native participants filled out a questionnaire responding to a series of statements on a 7-point Likert-type scale (1 = *disagree strongly* to 7 = *agree strongly*) designed to measure (a) their level of intercultural communication competence (e.g., “It is often hard for me to understand the subtleties and nuances of everyday communication in the U.S.”), (b) their level of satisfaction in the new culture (“I am very satisfied with my progress in my courses at school.”), and (c) their general level of comfort abroad (e.g., “I feel more comfortable with people from my native culture than I do with Americans.”).

MEASURES

GRT. The purpose of the GRT measure was to test whether or not a participant could distinguish real gestures (those commonly used in American culture) from fake gestures (gestures that are not commonly used in American culture). Participants were shown a male actor performing 28 different nonverbal gestures. Participants were asked to decide whether each

TABLE 1
Participant Demographic Information for Study 1

Ethnicity	Gender			
	Female		Male	
	n	%	n	%
Native ^a				
African or African American	3	.59	5	.98
American Indian or Alaska native	1	.20	1	.20
Asian or Pacific Islander	28	5.51	22	4.33
Caucasian	77	15.16	92	18.11
Hispanic	20	3.94	16	3.15
Middle Eastern	3	.59	4	.79
Multiethnic	5	.98	4	.79
Missing	0	.00	4	.79
Total	137	26.97	148	29.13
Non-native ^b				
African or African American	3	.59	3	.59
American Indian or Alaska native	0	.00	1	.20
Asian or Pacific Islander	77	15.16	84	16.54
Caucasian	10	1.97	13	2.56
Hispanic	2	.39	13	2.56
Middle Eastern	2	.39	2	.39
Multiethnic	1	.20	2	.39
Missing	2	.39	8	1.57
Total	97	19.09	126	24.80

a. Natives were individuals born in the United States.

b. Non-natives were individuals born outside the United States.

gesture was a real or fake American gesture. Based on previous research on gestures in American culture (Archer, 1997) as well as personal experience, the research team created 15 real American gestures, all of which are commonly used in American culture, and 13 gestures that were not common to American culture (fake gestures). An example of a real American gesture would be a “thumbs up” sign, a shoulder shrug, or a gesture indicating quotation marks. A fake gesture would be a series of made-up motions performed by the same actor with no particular meaning to a native-born American (see Table 2 for description of real and fake gestures). Mean accuracy on each of the gestures in the GRT ranged from .69 to .98. All gestures but one were significantly correlated with the overall score ($p < .05$), and this nonsignificant gesture (gesture 21) was excluded from subsequent analyses. Item-total correlation coefficients for the remaining 27 gestures range from .10 to .39. The Cronbach alpha coefficient for the remaining 27 gestures was $\alpha = .63$, suggesting that it was reasonable to combine these items into one measure.

Intercultural communication competence. To assess self-reported intercultural communication competence, we conducted a Principal Components Analysis (PCA) with Varimax rotation on non-natives’ answers to the previously described cultural adjustment questionnaire. To obtain an appropriate sample size for the PCA, we combined samples from both Study 1 and Study 2. A cutoff of .40 was used for the factor loadings and all but one question (“I am rarely confused when interacting with Americans.”) loaded on at least one component. This item was not included in any of the factors. Three composite variables emerged:

TABLE 2
Description of Gestures, Item-Total Correlation Coefficients With Overall Accuracy, and Difference Between Native and Non-Native Overall Accuracy

<i>Gesture</i>	<i>Description</i>	<i>Real or Fake</i>	<i>ITC</i>	<i>M</i>	$M_{\text{nat}} - M_{\text{non}}$
1	Shoulder shrug	real	.31	.95	.04
2	Cup left hand around left ear (can't hear you; or repeat that)	real	.25	.90	.14
3	Twirl right finger in front of body from chest level to above head	fake	.26	.91	.07
4	Curl fingers toward palm on right hand with thumb down; tilt thumb and hand toward floor; move up and down toward floor (thumbs down)	real	.13	.91	.05
5	Grab each side of top of head with cupped hands; rub head by pushing hands inward in repetitive cupping motion	fake	.19	.90	.03
6	Wave hand back and forth	real	.21	.93	.09
7	Curl fingers and thumb toward palm on right hand with second finger sticking out; place right hand alongside right ear and twirl finger and hand in counterclockwise circle (you're crazy)	real	.29	.82	.18
8	Push front of nose inward with second finger of right hand	fake	.15	.91	.03
9	Quickly move right hand and arm in front of body from shoulder level on the right side of body to waist level on left side of body, as if pushing air toward the ground	fake	.26	.94	.02
10	Slice throat with second finger on right hand from left to right (cut or you're dead)	real	.22	.93	.07
11	Simultaneously push backs of each ear forward with the right and left hands	fake	.11	.90	.02
12	Thumbs up	real	.19	.98	.04
13	Using first two fingers of each hand to make the "quotations" gestures	real	.27	.96	.07
14	Right hand in front of face, palm facing in; make downward motion like guillotine	fake	.29	.89	.06
15	Face fist on right hand forward with arm extended and pull fist and arm into the body	fake	.39	.91	.07
16	Quickly brush second finger on left hand up toward the tip of the finger several times with second finger on right hand (shame on you)	real	.31	.75	.44
17	Tap side of head with second finger on right hand several times (think about it)	real	.18	.96	.07
18	Jut two hands forward away from body with arms straight and fingers cupped, facing outward	fake	.30	.93	.06
19	Palm of left hand under chin; twist head using palm in clockwise motion	fake	.26	.82	.06
20	Open and close right hand against right thumb in front of right ear, with fingers gently curled in a semicircle	fake	.12	.83	-.10
21	Cup right hand between eyes and above nose; look down and gently nod head from side to side (are you kidding? or I can't believe this)	real	removed	.93	-.04

(continued)

TABLE 2 (continued)

<i>Gesture</i>	<i>Description</i>	<i>Real or Fake</i>	<i>ITC</i>	<i>M</i>	$M_{\text{nat}} - M_{\text{non}}$
22	“A-OK” gesture, making circle with right thumb and second finger	real	.21	.98	.03
23	Place two hands, palms facing each other, arms extended, in front of body; suddenly twist each hand up, the right one in a counterclockwise motion, and the left one in a clockwise motion; bring hands back together with palms facing each other again	fake	.17	.98	.03
24	Cup fist of one hand with other hand and twist fist toward ground; repeat with opposite hand and fist	fake	.19	.69	.10
25	Extend arm and right hand and curl second finger out and move it back toward palm of hand repeatedly in a “come here” gesture	real	.27	.96	.09
26	Wipe brow from left to right (pew)	real	.23	.98	.01
27	Jut right elbow outward with hand and front part of arm facing body; touch right elbow with left hand	fake	.10	.85	-.04
28	Jut right hand outward, away from body with arm extended, palm facing forward, fingers extended toward the ceiling	real	.13	.87	.14

NOTE: ITC = item-total correlation coefficient; M = overall accuracy; $M_{\text{nat}} - M_{\text{non}}$ = difference between mean accuracy of natives and mean accuracy of non-natives.

TABLE 3
Self-Report Composites and Factor Loadings

<i>Factor</i>	<i>Loading</i>	<i>M</i>	<i>SD</i>
Intercultural communication competence			
I often feel that I am missing the meaning of what Americans are saying ^a	.69	4.75	1.80
I have a lot of trouble understanding and speaking English ^a	.79	5.41	1.63
It is often hard for me to understand the subtleties and nuances of everyday communication in the United States ^a	.79	4.77	1.77
I think that Americans tend to perceive me as awkward ^a	.62	4.80	1.59
Satisfaction			
I am very satisfied with my progress in my courses at school	.68	5.06	1.50
I am very satisfied with my social life (friends) in the United States	.71	5.22	1.45
Comfort abroad			
I would choose to live in the United States after finishing school	.51	4.92	1.78
I feel more comfortable with people from my native culture than I do with Americans ^a	.51	3.23	1.65
It is easy for me to meet and get to know Americans	.40	4.52	1.67

a. Reverse-scored items.

“intercultural communication competence” ($\alpha = .84$), “satisfaction” ($\alpha = .67$), and “comfort abroad” ($\alpha = .58$). Table 3 provides the questions included in each composite as well as the factor loadings.

RESULTS

Accuracy on the GRT was assessed as the percentage of real and fake gestures that were classified correctly. Overall, accuracy was high for the entire sample ($M = .90$, $SD = .088$), with natives ($M = .92$, $SD = .096$) outperforming non-natives ($M = .86$, $SD = .072$), $t(506) = 8.48$, $p < .0001$, $d = .75$. To determine whether the difference in accuracy between natives and non-natives was driven by only a few gestures, we analyzed each gesture individually. For 19 of the 27 gestures, natives were more accurate than non-natives with least marginal significance ($p < .1$) and 16 of the gestures had significant differences at $p < .05$. Non-natives were significantly more accurate ($p < .05$) on one gesture. Finally, there were 7 gestures with no significant differences between native and non-natives. We then removed the 7 gestures (25% of all gestures) with the largest difference scores between native and non-native, all of which were significant at $p < .0001$. Even in the absence of these 7 gestures, natives still outperformed non-natives ($M = .92$, $SD = .096$ for natives and $M = .89$, $SD = .088$ for non-natives). A t test indicated that this effect is significant, $t(506) = 3.6$, $p = .0004$, although the effect size is smaller ($d = .32$) than with all gestures included.

It will be recalled that we predicted a positive association between years in the United States for non-native participants and performance on the GRT (Hypothesis 1). To examine the association, we performed a linear regression with GRT performance as the dependent variable and years in the United States as the predictor for the 189 non-native participants who provided this information ($M = 6.63$, $SD = 5.78$). Results confirmed that performance on the GRT measure was significantly predicted by years spent in the United States, $\beta = .0064$, $t(187) = 5.94$, $p < .0001$, $R^2 = .15$. A generation analysis on native participants indicated that there were no significant differences between second-generation ($n = 114$; participants born in the United States; parents not born in the United States) and third-

TABLE 4
Study 1: Correlations of Length of Stay, Adjustment Measures, and Accuracy

<i>Variable</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
1. Gesture accuracy	—	.41***	.10	.33***	.39***
2. Intercultural communication competence		—	.32***	.59***	.52***
3. Satisfaction			—	.29***	.28***
4. Comfort abroad				—	.57***
5. Years in United States					—

*** $p < .001$.

generation ($n = 171$; participants and parents born in the United States) natives, $t(283) = .10$, $p = .92$.

We also expected a positive relationship between performance on the GRT and self-rated intercultural communication competence (Hypothesis 2a). To examine this predicted relationship, we first examined patterns of correlations between GRT performance and the three composite variables from the self-report questionnaire. These three composite variables, which were determined by combining data from Study 1 and Study 2, were all reliable in this data set alone ($\alpha = .87$ for intercultural communication competence, $\alpha = .69$ for satisfaction, and $\alpha = .66$ for comfort abroad). As Table 4 illustrates, performance on the GRT (mean accuracy) was correlated with self-reported intercultural communication competence and with comfort abroad. Intercultural communication competence was correlated with both comfort abroad and satisfaction, and comfort abroad and satisfaction are correlated with each other. Each factor was also correlated with the years spent in the United States.

Ordinary least squares linear regressions were performed to determine whether the intercultural communication competence and comfort abroad factors were predictive of GRT performance above and beyond years spent in the United States. Two participants were missing self-report data and were excluded from the regression analysis. A model with intercultural communication competence, $\beta = .0196$, $t = 3.75$, $p = .0002$, and years in the United States, $\beta = .0383$, $t(182) = 2.97$, $p = .0039$, explained a significant portion of the variance, $R^2 = .20$, $F(2, 182) = 23.35$, $p < .0001$. The change in R^2 from a model containing only years in the United States to a model containing both variables is significant, $\Delta R^2 = .05$, $F(1, 182) = 9.48$, $p = .002$. A model with the comfort abroad factor and years in the United States explained less variance, $R^2 = .157$, $F(2, 182) = 16.94$, $p < .0001$, and comfort abroad was only moderately predictive, $\beta = .01$, $t(182) = 1.74$, $p = .083$, when controlling for years in the United States, $\beta = .005$, $t(182) = 3.59$, $p = .0004$. The addition of the comfort abroad factor to a model containing years in the United States results in a nonsignificant change in R^2 , $\Delta R^2 = .007$, $F(1, 182) = 1.86$, $p = .18$.

DISCUSSION

The results of Study 1 suggest that the ability to recognize gestures in a foreign setting is positively associated with cultural adaptation. In support of Hypothesis 1, we found a positive relationship between length of stay in the United States and performance on the GRT task. In support of Hypothesis 2a, we found a positive relationship between GRT performance and self-reported intercultural communication competence, even when controlling for length of stay in the United States. A second study was performed to examine whether the

positive association between GRT performance and intercultural communication competence holds when assessments of intercultural communication competence are made not by non-natives themselves but by natives of the new culture.

STUDY 2

METHOD

PARTICIPANTS AND PROCEDURE

Sixty non-native master's students in business administration and finance at a small, internationally focused business school in the northeastern United States participated in this study. All participants were international students who had recently come from foreign countries to study in the United States. The mean age for the participants was 25.07 years ($SD = 2.50$). They had spent an average of 1.67 years in the United States, ranging from 1 month to 7 years. Forty percent were from Asia, 42% from Europe, 9% from Africa, 7% from South America, and 2% from the Middle East. Students were administered the GRT in small groups of 3 to 5 over several sessions. They then filled out the same cultural adjustment questionnaire as in Study 1.

MEASURES

GRT. The 60 non-native participants in Study 2 had a mean accuracy rate of .79 on the GRT ($SD = .10$) and the Cronbach alpha was $\alpha = .54$.

Self-reported intercultural communication competence. Of the three self-rated composite scores created with the combined data sets from Study 1 and Study 2, the intercultural communication competence factor ($\alpha = .74$) and the satisfaction factor ($\alpha = .69$) were still reliable on this dataset alone. The third factor, comfort abroad, was not reliable on this smaller dataset ($\alpha = .32$), so it was not included in subsequent analyses.

Externally rated perceptions of intercultural communication competence. To create a measure of native perceptions of non-natives' intercultural communication competence, we arranged to have the director and assistant director of Career Services at the business school (both female and American-born) each make a rating of non-natives' intercultural communication skill. The rating instrument these judges used was a five-item version of the student self-reported questionnaire, modified so that questions could be worded in terms of external perceptions rather than self-perceptions. Examples of items on this instrument included the following: "This person seems very comfortable interacting with Americans," and "This person can smoothly adapt behavior to accommodate an American style." The external raters responded to each item on a 7-point Likert-type scale (1 = *disagree strongly* to 7 = *agree strongly*). For the analysis of the external ratings, 17 participants were removed because neither of the counselors was able to provide an assessment. An additional 8 were removed because neither counselor rated the participant above a score of "3" (on a 1-7 Likert-type scale) on how well she knows the participant. The remaining 35 participants, all of whom

TABLE 5
Study 2: Counselor Rating Composites and Factor Loadings

<i>Factor</i>	<i>Loading</i>	<i>M</i>	<i>SD</i>
Perceived intercultural communication			
This person really seems to get American culture	.91	5.37	.99
This person seems very comfortable interacting with Americans	.92	5.47	1.02
This person can smoothly adapt behavior to accommodate an American style	.88	5.32	1.19
Perceived motivation			
This person seems resistant to the idea of adapting behavior to accommodate an American style ^a	.53	5.70	.94
This person seems highly motivated to initiate interactions with Americans	.41	5.23	1.01

a. Reverse-scored item.

TABLE 6
Study 2: Correlations of Adjustment Measures, Observer Ratings, and Gesture Accuracy

<i>Variable</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
1. Gesture accuracy	—	.31*	.43**	.27**	.24*
2. Perceived intercultural communication		—	.59***	.36**	.29*
3. Perceived motivation			—	.30*	.17
4. Self-rated communication competence				—	.22*
5. Self-rated satisfaction					—

* $p < .1$. ** $p < .05$. *** $p < .001$.

were well known to at least one of the counselors, had a slightly higher mean accuracy on the GRT ($M = .82$, $SD = .09$) than the mean accuracy of the entire sample.

Using the Spearman-Brown Prophecy formula, the effective interrater reliability between the two counselors was .63; thus, averaged scores were used in subsequent analyses. When only one counselor provided ratings for a participant, the ratings from the single counselor were used. We conducted a PCA with Varimax rotation on the five-item external perceptions questionnaire, which yielded a two-factor solution. The perceived intercultural communication competence composite is made up of three items relating to comfort with Americans ($\alpha = .95$) and the perceived motivation (to learn American culture) composite is made up of two items relating to non-natives' perceived motivation to understand American culture ($\alpha = .74$). All factor loadings were greater than .70 on each factor (see Table 5).

RESULTS

Due to the small variance in the length of time in the United States ($M = 1.67$, $SD = 2.09$), we found no correlation between the number of years in the United States and performance on the GRT measure ($r = .04$, $p = .75$) in Study 2. However, the accuracy for the entire sample from Study 2 ($M = .79$, $SD = .10$) is consistent with those participants in Study 1, who had been in the United States less than 2 years ($M = .80$, $SD = .11$, $n = 35$).

As in Study 1, it was found that self-reported intercultural communication competence is correlated with GRT performance, in support of Hypothesis 2a (see Table 6). In this sample, self-reported satisfaction is also correlated with performance on the GRT. However, due to

correlation between the two factors, only the communication factor remains nearly significant ($\beta = .020$, $t = 1.8$, $p = .07$) in a stepwise linear regression model with both factors.

It will be recalled that we also expected a positive association between performance on the GRT and perceived intercultural communication competence (Hypothesis 2b). To assess this relationship, we examined correlations among the two composite variables capturing external perceptions of the non-natives (perceived intercultural communication competence and perceived motivation), the two self-rated composite variables (self-reported satisfaction and self-reported intercultural communication competence), and performance on the GRT. This analysis uses the smaller sample of 35 participants, as described above. The perceived motivation factor was correlated with performance on the GRT, as was the perceived intercultural communication competence factor. Self-rated intercultural communication competence was correlated with perceived intercultural communication competence and perceived motivation. Self-rated satisfaction was only marginally correlated with perceived intercultural communication competence and not significantly correlated at all with perceived motivation.

A stepwise regression with both self-rating composites (self-rated satisfaction and self-rated intercultural communication competence) and both counselor-rating composites (perceived intercultural communication competence and perceived motivation) was performed with mean accuracy on the GRT as the dependent variable. The two factors remaining in the model, counselor-rated perceived motivation, $\beta = .038$, $t(32) = 2.15$, $p = .040$, and self-rated intercultural communication competence, $\beta = .023$, $t(32) = 1.69$, $p = .10$, explained a significant portion of the variance, $R^2 = .25$, $F(2, 32) = 5.32$, $p = .01$.

DISCUSSION

The purpose of Study 2 was to examine whether the positive association between gesture recognition ability and assessments of intercultural communication competence from Study 1 would replicate when such assessments were made not by non-natives themselves but by external observers native to the foreign culture. Results indicate that this is indeed the case. Externally assessed intercultural communication competence was positively associated with performance on the GRT, as was externally assessed motivation to learn the new culture.

GENERAL DISCUSSION

Previous research has explored the cultural variability of gestures, detailing the types of gestures used in a particular culture or describing how cultures differ in terms of the gestures used. Little work, however, has explored gestures through the prism of cultural adaptation. The purpose of this set of studies was to take a first step in this direction by assessing whether the ability to distinguish between real and fake gestures in a foreign setting is positively associated with cultural adjustment to that setting. In support of Hypothesis 1, we found a significant relationship between time spent in the United States (the foreign cultural setting for non-natives in Study 1) and the ability to accurately distinguish between real and fake gestures on the gesture recognition task (GRT). In support of Hypothesis 2a, we found that recognition ability on the GRT was positively related to self-reported intercultural communication competence. In support of Hypothesis 2b (Study 2), we found that GRT performance was positively associated with both self-rated and other-rated perceptions of intercultural

communication competence. We also found in Study 2 that GRT performance was positively associated with perceived motivation to learn (American culture). This latter finding about perceived motivation is interesting in light of Earley and Ang's (2003) recent work on the importance of skills and motivation as critical components of "cultural intelligence." In our studies, performance on the GRT task was not only positively associated with perceptions of intercultural communication competence (capturing Earley and Ang's notion of skill) but also positively associated with perceptions of motivation to learn American culture. This suggests that learning gestures in a foreign setting may occur not only implicitly, through cultural immersion, but also through explicit, conscious, purposeful effort. More research is needed to further explain this distinction and to disentangle the function each type serves in the cultural adaptation process.

Differences in the characteristics of the non-native participants between Study 1 and Study 2 likely contributed to some of the differences in results between the two studies. For example, the Study 1 sample had a longer average length of stay in the United States and a larger variance than the Study 2 sample. Compared with the international student population in Study 2, Study 1 participants were more of a heterogeneous blend of immigrants and international students. Whereas Study 1 results supported a relationship between years in the United States and performance on the GRT (Hypothesis 1), we did not find such a relationship in Study 2. This is likely due to the small variance in years in the United States in Study 2. Another difference between the two studies is that the comfort abroad factor was reliable in Study 1 but not in Study 2. It is possible that for the international student population in Study 2, many of whom return to their native countries following their studies, such a factor, which includes items such as "I would choose to live in the U.S. after finishing school" may not be relevant for capturing their experience abroad.

These studies make both empirical and methodological contributions to the cultural adjustment literature. Although previous cross-cultural research has catalogued how gestures differ across cultural settings, our work is the first, to our knowledge, that leverages the cultural variability of gestures to examine them within the context of cultural adjustment. Our findings highlight the importance of nonverbal gestures in the intercultural adjustment process, suggesting not only that individuals pick up on these subtle aspects of interpersonal communication over time in a foreign culture but also that the ability to accurately recognize gestures is associated with meaningful outcomes.

Our study also contributes an original diagnostic measure, the GRT, that uses the type of rich, videotaped stimuli suggested by previous researchers (Archer, 1997; Dinges & Baldwin, 1996; Mak et al., 1999). Previous research in the acquisition of micro social skills in intercultural communication has primarily used self-report measures of competence (Ward & Kennedy, 1999). Our work offers a diagnostic tool that may be less liable to the problems inherent in self-report measures.

Despite the potential usefulness of the GRT measure and the suggestive results from these first two studies, there are important issues to be addressed in future research. First, further work should be conducted to improve the reliability and internal consistency of the GRT. With a higher level of reliability, the GRT would likely show even stronger correlations, as unreliability attenuates the size of observed correlations. Thus, future improvements in the reliability of the GRT would likely strengthen these results and also allow for a wider application of this measurement instrument. In addition, it would be worthwhile to consider adding gesture interpretation to the GRT as a complement to gesture recognition. Although with gesture recognition alone, the GRT measure distinguished natives from non-natives and performance on the GRT was associated with both self and other-assessed measures of

intercultural communication competence, there were ceiling effects in both studies, with high levels of recognition accuracy for both natives and non-natives. Adding gesture interpretation to the GRT in future research might further enhance its predictive ability.

There were also some limitations of the two studies presented here that could be addressed in further research. One such limitation is the fact that we tested an essentially longitudinal hypothesis about cultural learning (Hypothesis 1) using a cross-sectional design. There also could have been consistency or carry-over effects in both studies, as participants' responses to the intercultural communication competence items may have been influenced by their perceptions of their own performance on the GRT. Because the group of non-native students in Study 1 was a somewhat heterogeneous blend of international students and immigrants, we can only make tentative conclusions about the generalizability of the findings. We must also be careful to generalize from this Study 1 sample because most of the non-natives were Asian or Pacific Islander (72.2%), whereas few of the native participants were (17.5%). Finally, it is important to note that cultural adjustment likely involves not only cracking the nonverbal code of a culture but also understanding and accepting the values that underlie such codes. Future research should address these limitations, using a longitudinal design on the individual level to examine change over time, employing more external measures of intercultural communication competence to avoid carry-over measurement effects, using a more homogeneous set of foreign participants, and assessing not only recognition and identification of nonverbal behavior but also non-natives' acceptance and understanding of underlying cultural values. Despite these limitations, however, the GRT appears to be a useful measure for capturing gesture recognition ability and assessing its importance in the cultural adaptation process.

In addition to its theoretical and methodological implications, the GRT also has implications for cross-cultural training. Typically, individuals are trained in the verbal language of a foreign culture and about that culture's norms, values, and patterns of behavior (Bhawuk, 1998, 2001; Fiedler et al., 1971). Rarely are people trained in nonverbal behavior and even more rarely in nonverbal gestures (see Archer, 1997, for an exception). Given the importance of nonverbal behavior in the communication process, the fact that a growing number of researchers are finding important differences across cultures in patterns of nonverbal behavior, and the results of our study that suggest that diagnostic accuracy in one particular domain of nonverbal behavior (gestures) is strongly associated with perceptions of intercultural communication competence, it would make sense for cross-cultural trainers to incorporate nonverbal behavior into training for expatriates and sojourners. In his research on cultural differences in gestures, Dane Archer (1997) suggests that foreigners practice "gestural humility" when interacting abroad with an incomplete knowledge of the foreign gestures. Our research suggests that in addition to practicing humility, non-natives would also benefit from developing recognition skills to become and be perceived as effective in their interactions abroad.

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