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## In-group Advantage in Recognition of Facial Emotional Expressions in Cross-cultural Societies

Kanika Sharma<sup>1</sup>, Hariom Sharma<sup>2</sup> and Samreen Naz<sup>3</sup>

<sup>1</sup>PG Student, Department of Psychology, Lovely Professional University, Punjab

<sup>2</sup>Associate Professor, Department of Psychology, Lovely Professional University, Punjab. Email: [hariom.19739@lpu.co.in](mailto:hariom.19739@lpu.co.in)

<sup>3</sup>Research Scholar, Department of Psychology, Lovely Professional University, Punjab

### ABSTRACT

People moving from their own cultural group to another culture face the challenges to learn the novel dialects of facial language of emotions. (Tomkins & McCarter, 1964). The current study investigated in-group advantages in correct recognition of facial emotional expressions across three cultures, i.e., Nigerians, Indians and Chinese (N = 180). Participants were exposed to male and female facial expressions of these cultures through computerized controlled random trials. Nigerians participants were able to recognize Nigerian facial emotional expressions maximum (37.4%) in comparison to the facial expressions of Indian (33.0%) and Chinese (29.6%) participants. Indians were also observed having the in-group advantage in correct recognition of facial emotional expressions of their own group (41.0%) rather than Nigerian (34.4%) and Chinese (24.6%). However, Chinese participants were not able to detect the correct facial emotional expressions of their own culture in higher percentage. Members of different cultural groups showed significant differences (Chi-Square = 23.33,  $df = 4$ ,  $p < .05$ ) among their responses of correct recognition of facial emotional expressions which proved the notion of in-group advantage in facial emotion correct recognition. Implications of facial emotional expressions in-group advantages in modern world are discussed.

**Keywords:** In-group advantage, facial emotional expressions, cross-cultural.

The present era is characterized with globalization, privatization and liberalization. Literacy rate all over the world is ever increasing. Developments in almost all fields of science are occurring at appreciable rate. Industrialization and urbanization are on increment. The numbers of multinational educational universities, organizations are increasing where people from different cultures are participating to accomplish the targets. That is why it is evident that humans travel from one region to another and interact with people

from various cultures. The success of these interactions linked to understanding of human emotions, particularly, facial emotional expressions become more relevant in effective human communication. Speedy and accurate response to emotional expressions is expected to achieve the desired level of output in any human interaction. Findings from cross-cultural studies suggested that people are more perfect in recognizing facial emotional expressions (Elfenbein & Ambady, 2002, Matsumoto, 2002) as well as faces (O'Toole, Peterson, & Deffenbacher, 1996) of cultural in-group members because they are well-known to their own race expressions (Elfenbein & Ambady, 2002).

The term 'emotion' has originated from Latin word 'emovere' which means to stirred up agitate or to excite. Thus, an emotion can be defined as a stimulated state of an organism which initiates and directs behavior. Definitions of emotion agree that emotions are complex reactions which involve three major components - physiological changes within bodies, cognitive states and expressive behavior.

Identification and measurement of emotions has become essential in this globalized world. In order to judge emotions, the easiest thing to do is to observe the facial expressions of the individuals. The face lights up delight due to muscular expansion, its pull down in sadness due to muscular contraction. In turn, these sensations are interpreted by the brain as particular kinds of emotional experiences. And this interpretation is known to be as the James-Lange theory of emotions (Izard, 1990). The common view is that emotions arise from perception (memory or imagination) of a situation and is experienced in the form of an organic reaction – emotion. Generally, people use to judge others' faces on the basis of their own culture based cues (Elfenbein, 2013). In Social Sciences studies in-group is the cultural group to which a person psychologically identifies as being a member of that group or culture. Thus, an out-group is a social group with which an individual does not identify. Cross cultural call discourses involving cultural interactivity, or to advance assorted forms of cultural interactivity. Cross-culturalism is anxious with barter above the boundaries of the nation or cultural group.

## **1. REVIEW OF LITERATURE**

East and the West world were recorded with differences in emotional arousal in a study by Nangyeon (2016). The Westerners experiencing high arousal emotions are valued more. Low arousal emotions are experienced by the people in the East. Guarnera and Maria (2015) obtained findings on ability to diagnose anger, happiness, fear, surprise, sadness, disgust and neutral emotions from facial information. Suryawanshi and Rangdala (2015) investigated the facial expression recognition systems and facial expressions. It was concluded that system for expression recognition would improve superiority of recognition in increasing human-computer interactions. Jiang, Zhongqing (2014) analyzed the differences in static and dynamic faces fulfillment under pressure of time. Eighteen participants were classified into dynamic and static facial expressions (neutral, anger, happy) categories. To increase the goal directed attention, time pressure was announced. Result showed that static responses were speedier and correct than the responses in dynamic condition. Frith Chris (2009) suggested that people can recognize explicit robotic expressions, however, might not show automatic, implicit responses. The emotional expressions by faces have a communicative component rather being simply reflexive. Facial expressions are total of gestures such as the eyebrow flash, which hint the intention to communicate. Hillary (2004) examined a greater extent of cultural in-group

advantage in left hemisphere judgment of facial expressions than judgment of the right hemisphere of facial expressions. Differences in judgment were not only due to ethnic bias against out-group members but also due to attributes of judges, e.g., multiple languages speaking ability, relative skill and decoding rules, etc. Accuracy of recognizing right versus left hemifacial composites was not affected with any single factor. Left facial hemisphere used less universal expressive style and more culturally specific than right facial expression. Jose Angel Soto (2004) examined empathic accuracy and physiological linkage in emotion recognition in the presence of cultural match between rare and target face. One hundred sixty-one African American, Chinese American, European American or Mexican American college students were asked to judge empathic accuracy. Participants used a rating dial to present continuous, real time ratings of emotions in terms of valence and intensity. Calder (2003) investigated facial expressions recognition throughout adult human life span. Three experiments were conducted and it was noticed that as age increases there is a progressive devaluation in the recognition of fear and anger. Experiment 1 reflected older participants with excessive problem in recognizing fear and disgust facial expressions. Ekman (1971) studied the universality of emotions among the participants of a illiterate culture who had marginal exposure to literate cultures. Data were collected by telling a story and showing three different types of emotional facial expressions and asking to select a face which shows appropriate emotion as per the story. The research provided information that the association between particular facial muscular patterns and discrete emotions is universal.

## **2. SCOPE OF THE STUDY**

The present research examined the benefits of in-group advantage in terms of correct recognition of facial emotional expressions by the members of different cultural societies. Researcher focused on seven types of facial emotional expressions. In addition, the group differences among male and female participants with regard to in-group advantages are explored. Understanding of in-group advantage in identification of facial expression facilitates the human decision-making not only in day-to-day activities, but in work life also. The quality of interpersonal relationship in personal or professional life is dependent on the accuracy and latency of recognition of emotional expressions, especially, the facial expressions. In the above literature review it is observed that researchers have focused on the facial emotional expression patterns by studying participants' behavior from different regions of the world. However, post-independence India is also experiencing remarkable continuous improvements in education, employment and life style. Across border movements and interactions are on peak in Indian subcontinent. Interactions and exchange of expertise within different countries are on higher rate than earlier times and same is true for India also. Business and internet platforms have enabled these multicultural interactions and communications to be even more complex. There is lack of scientific body of evidences for universality or social in-group advantage for emotional responses among the individuals in Indian sub-continent. More interestingly, India is a country of diversity and within India there are differences of culture from one corner to another. This seems to be relevant to study Indian participant's performance on emotional facial expressions in terms of in-group advantage while they interact with other cultural group members to develop an insight into in-group advantage in facial emotional expression in recent multicultural Indian environment the following objectives were framed:

## Objectives

- To examine the in-group advantage in terms of correct recognition of facial emotional expressions by the members of different cultures, i.e., Indian, Nigerian and Chinese.
- To study the in-group advantage in connection with the time taken in correct recognition of facial emotional expressions by the participants.
- To investigate the group differences among male and female participants with regard to in-group advantage in facial emotional expression correct recognition.
- To yield the differences across seven types of facial emotional expressions with regard to in-group advantage in correct recognition.

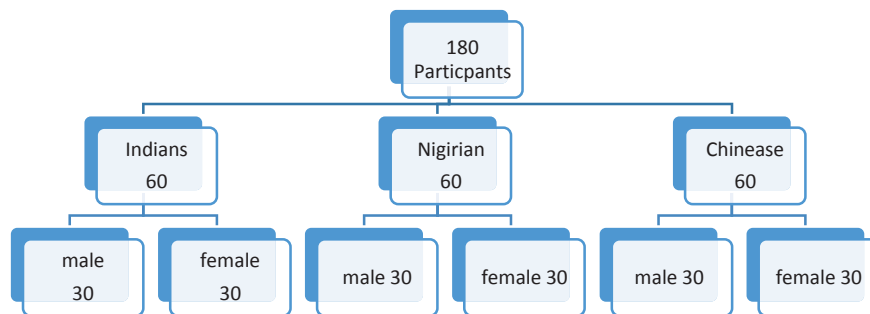
## Hypotheses

- There are no significant differences among the participants of different cultural groups (Indian, Nigerian and Chinese) in terms of in-group advantage in correct recognition of facial emotional expressions.
- There are no significant differences among the participants of different cultural groups in terms in-group advantage in time taken for correct recognition of different facial expressions.
- There are no significant differences among male and female participants with regard to in-group advantage in facial emotional expressions correct recognition.
- There are no differences in correct recognition responses across seven types of facial emotional expressions with regard to in-group advantage among Indian, Nigerian and Chinese participants.

## 3. METHOD

### Participants

Thirty men and thirty women were recruited from each of the three different cultural societies- Indian, Nigerian and Chinese. Total of 180 participants were in the age range of 20-30 years. Convenience sampling technique was used for the sample selection from three cultural groups. The participants were recruited from colleges, universities, offices and from Lovely Professional University in Phagwara and Jalandhar districts of Punjab, India. The distribution of sample is shown in the figure given below:



### Tools and Procedure

Keeping in view the aim and nature of the study and variables to be measured appropriate study design was prepared. To ensure the equal duration exposure, seven types of facial emotional expressions were presented randomly through computerized software on display. The software was designed in such a way that every time the sequence of facial pictures to appear on screen changed randomly to avoid any expectancy response. Thus single facial emotional picture was presented in seven different emotional expressions. The correct or incorrect responses of the participants were recorded in each trial by the help of designated keys on computer keyboard. As a second measure, the time taken to respond to hit the key on keyboard was recorded by the software automatically. When subject responded on one of the seven emotional options the next facial picture appeared and same process was repeated for all the seven types of faces of male and female of three cultures under study. In this manner there were 42 trials for one subject.

A password controlled four columns interface was designed to process the data in all the 42 trials for single subject. Demographic information was also recorded in the software interface. Thus, accuracy and time taken in recognition of facial emotional expression were taken as measures for in-group advantage analysis. The statistical analyses reflected the differences among participants from three cultural groups for their patterns of in-group advantage in facial expression recognition. Also with regard to in-group advantage in recognition gender advantage was explored.

### Results and Discussion

Table 1 summarize the count and percentage statistics of recorded data for Chinese, Nigerian and Indian participants for their incorrect and correct recognition of facial emotional expressions.

**Table 1**  
**Total number of correct and incorrect recognitions of three types of facial emotional expressions by different cultural groups**

<i>Recognition response</i>		<i>Cultural Groups</i>			<i>Total</i>
		<i>Chinese</i>	<i>Nigerian</i>	<i>Indian</i>	
Incorrect	Count	1928	1793	1164	4885
	%	39.5%	36.7%	23.8%	100.0%
Correct	Count	660	869	1146	2675
	%	24.7%	32.5%	42.8%	100.0%
Total	Count	2588	2662	2310	7560
	%	34.2%	35.2%	30.6%	100.0%

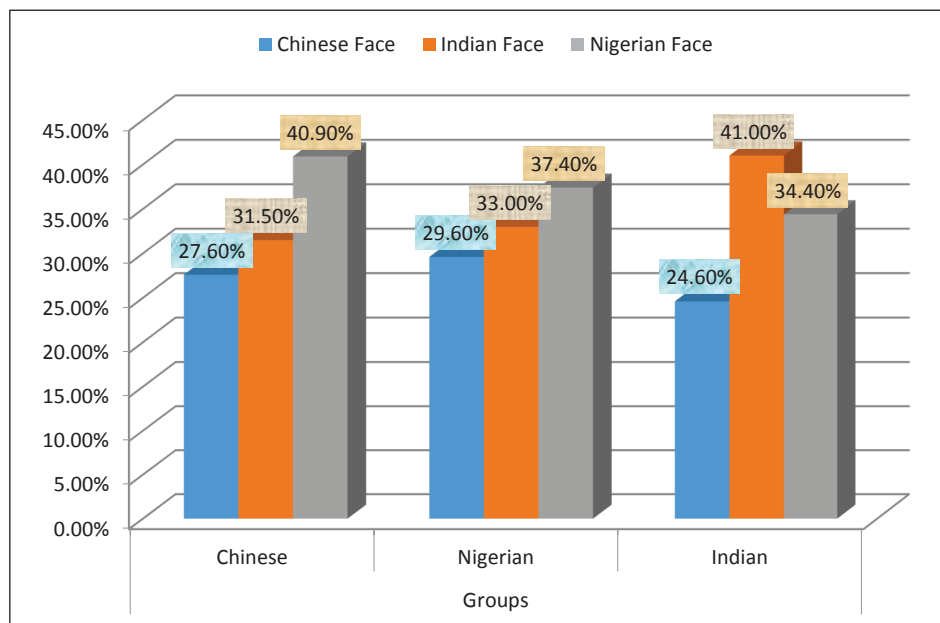
The above Table shows that total number of emotional facial expression presented were 7560. Each participant was shown 42 different emotional facial expressions by computer generated software in a random order. Out of 7560 trials presented only 2675 emotional facial expressions were correctly recognized by the participants. Further results were analyzed only for correct recognitions of facial emotional expressions to find out the extent of in-group advantage in recognition by the participants of cross-cultural societies.

**Objective 1:** To examine the in-group advantage in terms of correct recognition of facial emotional expressions by the members of different cultures, i.e., Chinese, Indian, and Nigerian.

**Table 2**  
**In-group advantage in terms of correct recognition of facial emotional expression**  
**by the members of three cultural groups**

Participant Group		Facial Emotional Expressions			Total
		Chinese	Indian	Nigerian	
Chinese	N	182	208	270	660
	%	27.6%	31.5%	40.9%	100.0%
Nigerian	N	257	287	325	869
	%	29.6%	33.0%	37.4%	100.0%
Indian	N	282	470	394	1146
	%	24.6%	41.0%	34.4%	100.0%
Total	N	721	965	989	2675
	%	27.0%	36.1%	37.0%	100.0%

Table 2 tells about in-group advantage in terms of correct recognition by the participants of different cultural groups. It is observed that Indian participants were able to recognize correctly more emotional facial expressions of Indian face (41.0%) comparatively to Nigerian (34.0%) and Chinese (31.5%) face, which confirmed the in-group benefits. Nigerians were observed having the in-group advantage as they were able to detect rightly more emotional facial expressions of their own cultural group (37.4%) in comparison to Indians face (33.0%) and Chinese (29.60%) face. However, Chinese participants failed (27.6%) to show the in-group advantage for correct recognition responses of Chinese face. All three cultural groups were noticed showing significant differences (Chi Square = 23.33,  $df = 4$ ,  $p < .05$ ) among their responses for correct recognition of facial expressions. First null hypothesis about no significant differences among participant cultural group is hereby rejected. The results are in line of the findings of earlier research for facial emotions conducted by Elfenbein & Ambady, (2002). The findings are exhibited in Figure 1.



**Figure 1: In-group advantage in terms of correct recognition of facial emotional expression**  
**by the members of different cultural groups**

**Objective 2:** To study the in-group advantage in connection with the time taken in correct recognition of facial emotional expressions by the participants.

**Table 3**  
**In-group advantage in connection with the time taken in correct recognition of facial emotional expression by the participants of three cultures**

<i>Participant Groups</i>	<i>Facial Expressions</i>	<i>N</i>	<i>Mean Time to Respond (in Second)</i>	<i>SD</i>
Chinese	Chinese	182	3.10	2.99
	Indian	208	3.34	2.67
	Nigerian	270	3.59	3.98
	Total	660	3.38	3.35
Nigerian	Chinese	257	3.19	2.80
	Indian	287	3.75	3.21
	Nigerian	325	3.29	2.80
	Total	869	3.41	2.95
Indian	Chinese	282	5.94	4.88
	Indian	470	4.37	2.42
	Nigerian	394	5.61	4.53
	Total	1146	5.18	3.97

**Summary ANOVA Table**

		<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
Time Taken x Groups	Between Groups	2082.87	2	1041.43	84.12	.000
	Within Groups	33079.35	2672	12.38		
	Total	35162.23	2674			

Table 3 demonstrates in-group advantage in time taken for correct recognition of facial emotional expression by the participants. Chinese participants took less time in recognizing their own members' emotional facial expressions (M = 3.10, SD = 2.99) in comparison to Indians (M = 3.34, SD = 2.67) and Nigerians (M = 3.59, SD = 3.98). Also, Indian participants took less time in recognizing Indian emotional facial expressions (M = 4.37, SD = 2.42) in comparison to the face different from Indian culture. However, Nigerian participants took more time in recognizing the emotional facial expressions of their own group. Also significant differences ( $F(2, 267) = 84.12, p < .05$ ) were observed for time taken in correct recognition of emotional facial expressions among the members of three cross cultural societies. Null hypothesis about no significant differences in terms of time taken to recognize correctly the facial emotional expression is also terminated. Phenomenon of in-group advantage improved the speed to respond on familiar facial emotions. Above findings are demonstrated in the Figure 2.

**Objective 3:** To investigate the group differences among male and female participants with regard to in-group advantage in facial emotional expressions recognition.

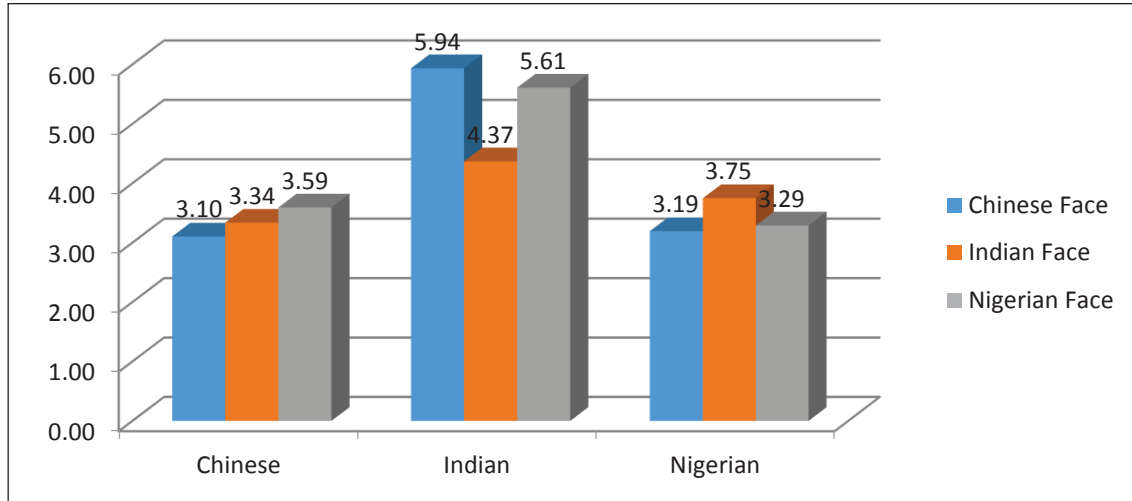


Figure 2: In-group advantage in connection with the time taken in correct recognition of facial emotional expression by the participants of three cultural groups.

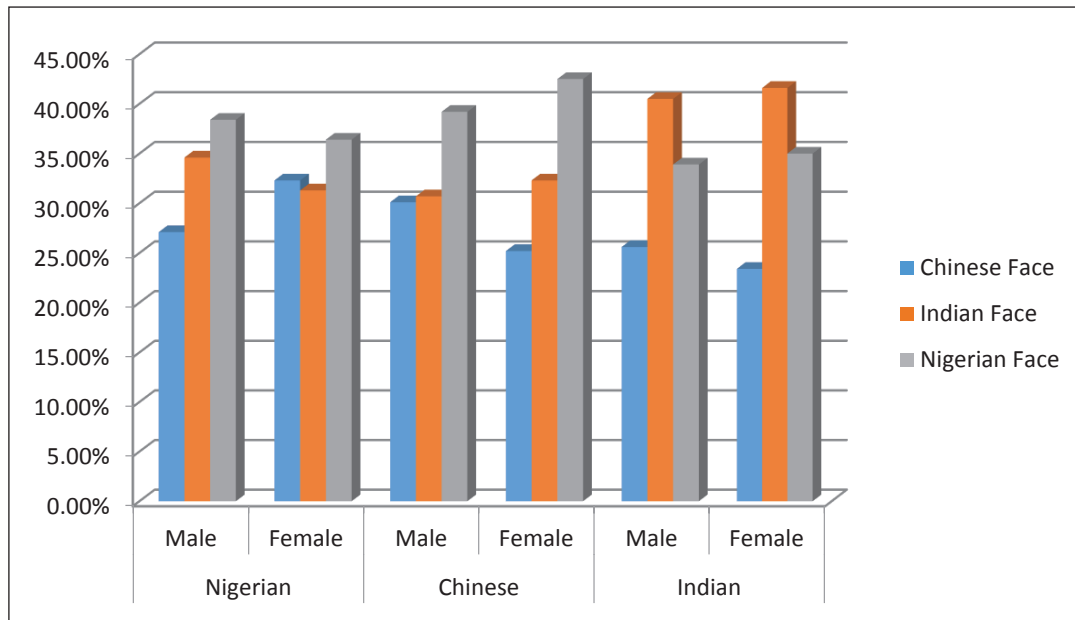
**Table 4**  
Distribution of male and female participants with regard to the facial emotional expressions recognition of thee cultures

<i>Responses * Photo National Code * Gender * Groups Cross tabulation</i>					
<i>Participant Groups</i>		<i>Facial Emotional Expressions</i>			<i>Total</i>
		<i>Chinese Face</i>	<i>Indian Face</i>	<i>Nigerian Face</i>	
Chinese	Male	96 30.1%	98 30.7%	125 39.2%	319 100.0%
	Female	86 25.2%	110 32.3%	145 42.5%	341 100.0%
Nigerian	Male	122 27.1%	156 34.6%	173 38.4%	451 100.0%
	Female	135 32.3%	131 31.3%	152 36.4%	418 100.0%
Indian	Male	158 25.6%	250 40.5%	209 33.9%	617 100.0%
	Female	124 23.4%	220 41.6%	185 35.0%	529 100.0%
		721 27.0%	965 36.1%	989 37.0%	2675 100.0%

Table 4 reflects the in-group advantage among male and female participants in recognizing the emotional facial expressions of their own cultural group face. Both, male and female participants of Nigerian group were able to recognize more of Nigerian emotional facial expressions (male = 38.4%, female = 36.4%) in comparison to Indian face (male = 34.6%, female = 31.3%) and Chinese face (male = 27.1%, female = 32.3%). Similar patterns were also observed for Indian group that they were also successful to detect more of Indian emotional facial expressions (male = 40.5%, female = 41.6%) whereas Nigerian face (male = 33.9%, female = 35.0%) and Chinese face (male = 25.6%, female = 23.4%) were comparatively poor for



the correct recognition. Chinese male and female participants recognized more of Nigerian face (males = 39.2%, female = 42.5%) and less Chinese face (male = 30.1%, female = 25.2%) which might be attributed to the poor facial cue availability to facilitate the in-group advantage and reading the emotional expressions. Thus anatomy appearance of facial components might have its role in correct recognition for facial expressions. Moreover, null hypothesis that male and female have no differences on in-group advantage in facial expression recognition is hereby accepted since male as well as female participants were noticed to have higher recognition for their own cultural group face. The findings are exhibited in the Figure 3.



**Figure 3: In-group advantage in male and female participants with regard to correct recognition of facial emotional expressions of three cultural groups.**

**Objective 4:** To examine the differences across seven types of emotional expressions with regard to in-group advantage.

**Table 5**  
**Correct recognition of facial expressions across seven types of emotions with regard to in-group advantage**

<i>Responses * Types of Emotion * Types Face expression * Groups Cross tabulation</i>									
<i>Groups</i>	<i>Face expression</i>	<i>Types of Emotion</i>							<i>Total</i>
		<i>Anger</i>	<i>Disgust</i>	<i>Fear</i>	<i>Happy</i>	<i>Sad</i>	<i>Shame</i>	<i>Surprise</i>	
Chinese	Chinese	12	19	4	53	42	26	26	182
		6.6%	10.4%	2.2%	29.1%	23.1%	14.3%	14.3%	100.0%
Nigerian	Nigerian	36	36	20	86	53	40	54	325
		11.1%	11.1%	6.2%	26.5%	16.3%	12.3%	16.6%	100.0%
Indian	Indian	85	39	41	98	77	71	59	470
		18.1%	8.3%	8.7%	20.9%	16.4%	15.1%	12.6%	100.0%
Total		301	259	171	709	478	353	404	2675
		11.3%	9.7%	6.4%	26.5%	17.9%	13.2%	15.1%	100.0%

In overall observation Table 5 reflects the highest correct recognition scores percentage for happy facial expressions (26.5%) followed by sad (17.9%) and surprise (15.1%) expressions, respectively. However, people from all the three cultural groups could recognize correctly the Disgust (9.7%) and Fear (6.4%) emotional expressions in a limited amount. Whereas Anger (11.3%) and shame (13.2%) facial expression were comparatively in the middle range of correct recognition. In this manner the Happy, Sad, Surprise emotional expressions were correctly recognized in majority in comparison to the Disgust, Fear and Anger emotional face expressions.

Furthermore, Happy (29.1%) and sad (23.1%) Chinese facial expressions were highly recognized by Chinese participants in comparison to the fear (2.2%), disgust (10.4%) and anger (6.6%) facial expressions. Thus, in case of Chinese participants in-group benefits were more visible for happy and sad emotions. Whereas, Happy (26.5%), surprise (16.6%) and sad (16.3%) types of emotions again showed in-group advantage by Nigerian participants and rest of the emotion types were with poor percentage of recognition. Interestingly in case of Indian participants, anger (18.1%) emotion was observed to follow the happy (20.9%) emotion recognition with maximum in-group advantage. Fear (8.7%) and disgust (8.3%) were poorly recognized by Indian participants.

### **Conclusions, Limitations and Implications**

To raise the important aspects of study and summarize the thoughts as well as to guide the future researches it is essential to summarize the research report with conclusions. The conclusions of current research on in-group advantage in recognition of facial emotional expressions across cross cultural societies. In today's ever changing world when globalization, urbanization and migration of population are more common, cross cultural studies are more relevant. The findings of the current research exhibited the in-group advantage in correct recognition of facial emotional expressions by the individuals of different societies. Desired recognition of facial emotional expressions helps the person in communication and behavior towards others.

Interestingly, Nigerians and Indians were found to detect correct facial emotional expressions of Nigerian and Indian faces respectively with higher percentage rather than faces different from their own culture. The facial expressions on Chinese faces were too poor to recognize correctly even by the Chinese participants. The reason behind the poor facial expression was noticed the flat facial structure. Also the mixture of facial features and movements on the face during expressions were not clear to recognize correctly. The findings are helpful in the development of insight on humans' tendency towards recognizing the facial emotional expressions. Humans have the advantage of more accuracy and less time to identify their own cultural group emotions in comparison to the facial emotions of cultures other than their own group. Therefore, in their personal and professional life they are suggested to judge and regulate their behaviour accordingly. In recent times, there are manager are from different cultures and the employees are from other groups, similar in the industries, like aviation, tourism, medical, education, there are relationships among individuals from various cultural groups. Thus, the above findings provide significant insight to improve the behaviour towards better performance.

### **Limitations**

The current study was conducted with limited time options and could not explore more dimensions related to emotional facial expressions. Only seven emotional expressions of three cultural communities were analyzed because of availability of these communities.

## Implications for Future Research

More useful future cross cultural research may be taken up in the area of emotions and more particularly, facial expressions. Facial expressions with a larger range of emotions can be studied for their correct recognition and behavior accordingly. More communities across various cultures in the world can be taken as subject to study the facial expressions. The research can be extended at higher levels to study the larger population on accurate and speedy facial emotional recognitions.

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