# Background to the Research Problem

Face speaks more than a thousand words. Proverb that holds many truths yet may not be as universal as once thought. The problem arises when those words are not clearly communicated to the other person correctly.In a recent study reported by BBC, entitled “*Cultural Confusions Show Facial Expressions Are Not Universal”* , Rachael Jack and her colleagues[[1]](#footnote-1) had discovered in their experiment which was testing Western Caucasians and East Asians that facial expressions were not accurately read and is therefore, not so universal. [[2]](#footnote-2) Jack (2009) study is casting doubt on the claim of universal facial expressions.  In this study, a cross cultural perspective concerning facial expression recognition will be conducted in Saudi Arabia. Before this can be achieved, a deeper understanding of Arabic culture and language must be reviewed as well as the historical theories and accounts concerning facial expressions, brief look at tools used in the experiment and methodology to be used for data collection.

### Arab Context of Language and Culture

Zaharna (1995) study examined the uniqueness of the Arabic language and culture compared to American language and culture. This study provided the framework for which Arabic language is defined in order to bring a conscious awareness of the cultural differences that exist. The differences shape the perception of the culture. The framework is based on the following factors[[3]](#footnote-3):

1. context:

a. low focuses on meaning in the message, explicitness of the message, details within the message, and the responsibility for the comprehension lies upon the speaker

b. high focuses on the meaning in context, implicitness, details in the context, and the responsibility for the comprehension lied upon the listener

2. directness

a. direct: simple, straight to the point, clear, objective and void of emotions

b. indirect: exaggerated, ambiguous, subjective, uses emotions

3. activity: doing versus being

a. doing stresses the actions that connect words and deeds.

b. being or becoming stresses the relationship within the social context for social effect

4. organization and orientation:

a. linear: mono thematic, stress on organization and object oriented

b. non linear: multi- thematic, stress on people or event oriented, and organization is not stressed

5. type of society.

a. literate society: written word is valued, single experience, factual accuracy is stressed, logic, coherent, and analytical. The speaker and audience is detached.

b. Aural/ oral society: spoken word is valued, group experience, imagery and sound is stressed, emotional resonance, and intuitive reasoning. The speaker and audience is linked.

The study classified American language and culture as low context, direct, doing focus, linear, and literate society. In comparison, Arabic language and culture is high context, indirect, focus on becoming, non linear, and aural/oral society.

Information concerning the background of the language is important because of the influences language and culture had on perceptions. This issue is related to the cultural decoding ability that is discussed in the literature review.

### Historical Theories Concerning Facial Expressions:

For the purpose of this study, it is essential for a brief background historical account over concerning some theories concerning nonverbal communication particularly to those of facial expression be discussed. Charles Darwin in his book, *The Expression of the Emotions in Man and Animals* (1872), introduced the idea of universal facial expressions which were explained as emotions and their expressions were tools of evolution designed by nature to all people and things regardless of race or ethnicity and expressed in the same way. In modern times, Paul Ekman and Carroll Izard conducted the first of many studies focusing on the universality studies based on the same ideas of Darwin. The findings of these studies[[4]](#footnote-4) identified the existence of six universal expressions – anger, disgust, fear, happiness, sadness, and surprise (Matsumoto, 2005).

History is filled with theories to explain the function and purpose of facial expressions. Hager and Ekman (1983) study discussed how facial expressions function as social signals, signal to the self about one's own emotional state. This theory started with William James (1884) who promoted the idea that the feelings of emotions arise from the perception of characteristic bodily changes. Tomkins (1962, 1982) elaborate more on this theory suggesting that there are nine fundamental affects and affect auxiliaries, each having a characteristic and innate facial, vocal, and physiological expression (Hager and Ekman ,1983).

Schachter and Singer (1962) publicized one of the first cognitive social theories of emotion in a widely cited experiment. In their theory, the important determinants of the quality of emotional feelings are affiliated with cognition about physiological arousal. Arousal that has no apparent explanation creates a need to label the feeling it produces in emotional terms. Situational and social cues provide a basis for determining the appropriateness of the category of emotion, and this decision underlies the qualitative differences in emotional feelings. The theory was limited as it did not explain the factors the elicit arousal of emotions (Hager and Ekman , 1983).

Mandler (1975) also emphasized autonomic arousal and cognitive interpretation as the important factors in determining the feelings of emotion and considered it a part of “human vanity”. Mandler discussed the role of facial expression being biologically tied to certain events or situations which, in turn, have a high probability of eliciting particular cognitions about emotion. Also, expressions may generate automatic cognitions which contribute to the interpretative process and depend on the cognitive interpretation to influence emotional feelings (Hager and Ekman, 1983).

Bem's (1972) self-perception theory also links emotional feelings to inferences based on behavioral cues which can be the individual’s own facial behaviors that cues about emotion[[5]](#footnote-5) depending on the abilities of the verbal community to learn and to make the discriminations. Bem's theory is limited as it does not explain why the same connections between particular facial expressions and emotions are found universally across widely differing cultures (Hager and Ekman, 1983).

Other issues that were importantly discussed in other studies were: Hager and Ekman (1983) discussed two substantive issues concerning the relationship between facial expression and emotional feelings: (1) distinctive expressions correspond to different feelings, and (2) intensities of expressions and feelings correlate. In another study, Riggio (2006)[[6]](#footnote-6) has identified three general domains of nonverbal skills and abilities: (1) nonverbal decoding skill, (2) nonverbal encoding skill, and (3) skill in regulating nonverbal communication

# Literature review

### Cultural Impact on Decoding:

Culture influences the encoding and decoding process of communication in both verbal and nonverbal behaviors. Culture influences the individual’s interpretation of other people’s action or behavior (Matsumoto and Yoo, 2005). Ekman’s cross- culture experiments videotaped the reactions of the respondents (Japanese and Caucasians). Their reactions were coded to identify facial muscle configurations associated with six emotions – anger, disgust, fear, happiness, sadness, and surprise; all corresponded to the facial expressions portrayed in the stimuli used in their judgment studies. Several other studies such as Rosenberg and Ekman, 1995 suggested that other expressions were also universal and that highlighting the context of the emotional connotation which the respondent can connect the emotion with the situation that it is used even though the label for the emotions cannot be expressed in terms (Matsumoto, 2005).

Faces interact with the perception of emotional expressions and are more directly involved in the individual’s interpretation of the facial movement. Hess, Adams, and Kleck (2009) study researched the interaction of facial expressions and appearances. The study mentioned two important reasons for the different interpretation of facial expressions amongst individuals. One reason is the beliefs held about the individual can lead one to different conclusions about the underlying emotional state. The second reason is the interaction between facial features and expressions may result in pattern matching errors. Another study by Cunningham and Wallraven (2009) study discussed the impact of facial expressions and recognitions in experimental setting that compares the performance of dynamic facial expressions to that of static expressions. The study found that the dynamic expressions were more easily and accurately recognized. Thus there are aspects such as knowledge of the subject, context, facial features interaction with expression, and culture that can be a source of error in decoding and interpreting of facial expressions.

Elfenbein and Ambady (2003) study focused on the ability to communicate emotion across cultural differences and recognizing emotions. This study discussed two theories about cultural decoding. First theory is the neurocultural theory of emotion. This theory is based on Tomkins and McCarter (1964) study that viewed emotional expression as a “dialect” of the “more universal grammar of emotion”[[7]](#footnote-7). This theory connects a one to one relationship between the emotional expressions with that of the facial expression that is displayed- facial affect program. This program is believed to be the same in all cultures and goes on to state the emotions are expressed in the same manner (in a non social setting). In a more public setting the individuals are believed to use display rules as “management techniques”[[8]](#footnote-8) for emotions. Cultural differences are viewed from two different processes (display rules and decoding rule) in which emotional expression and perception emerge. Hager and Ekman (1983) study discusses the central concept of display rules which is defined as informal, nonverbal etiquette about socially acceptable ways to use and control expressions. Previous researchers had probably confused these culture specific modifications of emotional behaviors with the universals of expression. "Neurocultural" theorists explain how culture as well as biological influences could contribute to the meaning and use of facial expressions.

Contrary to this theory is another theory, dialect theory which directly links the cultural differences with the rise in the expression and perception of emotion. Critics of the neurocultural theory such as Matsumoto argued that despite the encoding of emotions, there are slight cultural differences of decoding emotions that is seen in emotional expressions. These differences in style of expression have a purpose or meaning in a culture; therefore, harmony of the culture depends on the display and decoding rules ability to act as conscious management techniques. Taking this into consideration, the dialect theory views that two different sources of cultural differences in perceiving emotion—the specific affect program and decoding rules (Elfenbein and Ambady ,2003).

To explain the cultural differences in the way people express emotions is defined by the “cultural display rules”. Ekman and Friesen used this term in relations to the cultural differences that people in a given culture show emotions in their facial expressions. The display rules are connected with emotion regulation. These rules are believed to be learned from early childhood and are used to help people to control, manage and modify ones emotional experiences and expressions (Matsumoto, 2005). Individuals then use cultural decoding rules based on their upbringing and experience to judge the emotions of others. The intensity rating of emotions differs from culture to culture and data suggests these decoding rules are culturally learned rules on perception.

Matsumoto and Yoo (2005) study discussed the three psychological processed involved in decoding. One process is the fact that cultural rules of appropriate encoding in communication (both verbal and non verbal) are learned (perception of signals and messages) and reinforced by society (parents, friends, schools, organizations, and institutions). The decoding cultural rules are developed as a set of expectations and decoding rules that are associated with emotions and valued judgments in a society. This forms a filter in which the individual perception is viewed. The study goes on to state that as an individual becomes more acculturated into society, the more filters are added. These filters become part of the individuals’ psychological composition and affects how the individual interprets situations and behaviors. To better understand the difficulty of the study in this field, previous methodologies will be discussed and reviewed.

### Reviews on Methodology

Birnbaum (2004) study discussed the implications of Birnbaum (2004) using the Web for data collecting and stated three important advantages of the web research.

a. large samples can be collected making statistical tests more accurate and models more appropriate.

b. Wider variety of participants to give a better representation of the population

c. Recruitment of special types of participants would be obtained easier whereas before it was difficult to find among students.

The recruitment method for the participants can be obtained either by a passive model in which the participants go and apply to be participants or announce the study via email and ask a particular group or online panel to participate. The online panel is preselected on some basis (e.g., for representative distributions of gender, age, education level, etc.) but may not effectively reflect the general population.

Another advantage for the participation on the internet is that it is cost efficient because there is no need for a lab assistant to clarify or explain the task or instructions which helps to eliminate some of the sources of biasness in most studies. However, the drawback to this is that the instructions and wording of the questions must be carefully selected and clearly stated without influencing or biasing the population. For example, some input devices used for registering responses can influence the participants. Birnbaum (2004) study suggested that some of these devices should be avoided such as:

1. Check box should not be used because it allows only two responses: yes or no (Birnbaum 2001a).

2. The over complication of the pull-down selection that requires the user must click on the device to see a list of alternative answers.

3. Numerical answers should not be limited to the text box size.

As another advantage for web research is the standardization of the test that allows other scientist to repeat the exact experiment. However, close attention must be paid to the dropout rates of the test subjects and the test must have an ability to discourage and eliminate multiple submissions by finding ways to filter out these submissions.

Research tool for the study is important especially when doing a cross cultural perspective on facial expression recognition. Ekman and Friesen's Facial Action Coding System (FACS) (1976, 1978) measures all visible facial movements. Ideally, FACS would differentiate every change in muscular action, but it is limited to what a user can reliably discriminate when movements are inspected repeatedly, in stopped and slowed motion. FACS can be applied to any reasonably detailed visual record of facial behavior.

Yin and Wang (2006) study established a Three Dimensional (3D) facial expression database for facial behavior research. This database uses the FACS which aids in facial analysis and recognition. 3D facial expressions aids in a higher accuracy of identifying wide range of facial expressions. The database is composed of 100 subjects (56% female, 44% male), ranging age from 18 years to 70 years old, with a variety of ethnic/racial ancestries, including White, Black, East-Asian, Middle-east Asian, Indian, and Hispanic Latino. Participants in face scans include undergraduates, graduates and faculty from our institute’s departments of Psychology, Arts, and Engineering (Computer Science, Electrical Engineering, System Science, and Mechanical Engineering). Each subject performed seven expressions in front of the 3D face scanner. With the exception of the *neutral* expression, each of the six prototypic expressions (*happiness, disgust, fear, angry, surprise* and *sadness*) includes four levels of intensity. [[9]](#footnote-9)

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2. <http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8199951.stm> [↑](#footnote-ref-2)
3. Context (Hall, 1976), directness (Levine, 1985), activity of focus (Kluckhohn & Strodtbeck, 1961) and orientation/organization (Dodd, 1982) [↑](#footnote-ref-3)
4. Ekman, 1972, 1973; Ekman & Friesen, 1971; Ekman, Sorenson, & Friesen, 1969; Izard, 1971 [↑](#footnote-ref-4)
5. Laird, 1974 [↑](#footnote-ref-5)
6. Nonverbal Skills and Abilities (Riggio 2006) pg 79 -95 [↑](#footnote-ref-6)
7. Tomkins & McCarter, 1964 p 127 [↑](#footnote-ref-7)
8. Term used by Ekman, 1972 p 225 [↑](#footnote-ref-8)
9. http://www.elsevier.com/ [↑](#footnote-ref-9)