THE ROLE OF GENDER IN INTERPRETING SUBTLETIES OF FACIAL EXPRESSIONS

VATSA S.[1] AND LATA P.[2]

[1]Electrical and Electronics Engineering Student, BITS, Pilani, Rajasthan, India.
[2]Department of Languages, BITS, Pilani, Rajasthan, India.
*Corresponding Author: Email-

Abstract- Recent research on Facial Expressions (by Matsumoto, Wallbott and Scherer in 1989) has revealed that facial expressions are both culture specific and universal. However, this paper aims at explaining the difference in how men and women interpret and relate to the seven universal facial expressions of anger, sadness, happiness, fear, disgust, contempt and surprise. To understand whether both the sexes read emotions the same way, a survey was conducted amongst 200 boys and 200 girls (in the age group of 18-21) at the Birla Institute of Technology and Science (BITS), Pilani in India. The respondents were asked to write down an emotion (from a list of emotions) that they thought corresponded most to the facial expression that was shown. The analysis performed on the data obtained and the results arrived at in this paper provide evidence in support of the hypothesis that there is a correlation between particular facial muscular patterns and the way these are interpreted by both the sexes.
Keywords- Facial expressions, non-verbal, happiness, sadness, surprise, fear, anger, disgust, contempt.

Introduction

Dr. Albert Mehrabian [1] is a prominent psychologist who works at the University of California at Los Angeles. He has studied body language and paralinguistics extensively and proposed a 7-38-55 rule. In his opinion, our perception/liking of a person depends on the words he/she speaks (7%), his tone and inflections (38%) and non-verbal cues (55%). Hence, nonverbal cues (such as standing, sitting, smiling, frowning, raising a finger or averting the eyes) influence the audience and their perception about the message. These cues reflect confidence, competence, truthfulness and reliability. A proper understanding and interpretation of these cues help people avoid misunderstandings in their day-to-day affairs. Recognition of the importance of nonverbal messages and the support they lend to verbal communication generally helps the communicators exchange the information successfully. It becomes all the more important in multicultural work environments. Scientific research on nonverbal communication and behaviour began with the 1872 publication of Charles Darwin's The Expression of the Emotions in Man and Animals. Here he discussed his hypothesis of the universality of facial expressions (for a limited set of emotions). These signals are often so subtle that we are not consciously aware of them. These facial expressions which constitute an important part of non-verbal cues play a pivotal role in the communication environment. During face-to-face meetings, men and women constantly give signals about their personality, feelings, behavior, preferences and attitudes. While nonverbal communication and behavior can vary dramatically between cultures, the facial expressions for happiness, sadness, anger and fear among others are considered to be similar throughout the world. Interpreting facial expressions helps them decode the appropriate meaning of a spoken message. For example, making direct eye contact typically increases credibility. As another example, if a woman makes a negative remark but smiles while doing so, she may be cracking a joke. Both men and women need to be conscious of the messages their facial expressions add to the conversation. The combination of facial and body messages with verbal language help individuals decipher truth and lies.

For instance, on his way to the first televised presidential debates in 1961, Richard Nixon refused make-up for his on-stage appearance. Sweating profusely, he stood behind the lectern favouring his injured leg - his body leaning to one side in a crooked manner. These factors, along with his pain-filled face, made him appear dishonest to his television audience. According to the poll of the radio audience (who only heard him speak), Nixon won the debate by a landslide. But, in the poll of television viewers, Nixon lost by a huge margin. At the end, John Kennedy won the presidency. Had Nixon known the significance of body language, he might have paid more attention to the negative image he was projecting.

Research suggests that women are more skilled at both sending and interpreting facial expression than men. Over the last 75 years, there has been much debate on the topic of whether facial expressions are universal in their understanding or culture specific. As mentioned earlier, it was Darwin who first acknowledged [2] the concept of universality. His evidence for the same was the answers that he obtained to 16 questions he sent to Englishmen living in eight parts of the world: Africa, America, Australia, Borneo, China, India, Malaysia and New Zealand. That, even by today's standards, is an extremely diverse sample set. They wrote that they saw the same expressions of emotion in these foreign lands as they had known in England, leading Darwin to say:

It follows, from the information thus acquired, that the same state of mind is expressed throughout the world with remarkable uniformity . . .

Otto Klineberg (in the year 1940) tended to the view that emotions were culture specific. According to him, facial behaviour becomes associated with the culture; he took an example of how facial expressions in China differ from those in the west. He studied how people entering a village wore a fierce look rather than a smile as follows:

Not only may joy be expressed without a smile, but in addition the smile may be used in a variety of situations in a manner quite different from what appears to be its original significance. Even in our own society, we know that a smile may mean contempt, incredulity, affection, and serve also as part of a purely social greeting devoid of emotional significance.

In 1970, Ray Birdwhistell postulated that body language and facial expressions (which he collectively termed as kinesics) can best be viewed as another language. He maintained the following view:

When I first became interested in studying body motion I was confident that it would be possible to isolate a series of expressions, postures and movements that are very denotative of primary emotional states... As research proceeded, and even before the development of kinesics, it became clear that this search for universals was culture-bound... There are probably no universal symbols of emotional state. ... We can expect them [emotional expressions] to be learned and patterned according to the particular structures of particular societies. (Chapter 16, Handbook of Cognition and Emotion)

Ekman, Friesen and Sorenson [3] are proponents of the theory of universality of expressions which means all cultures interpret facial expressions in nearly the same manner; but not exactly aligning with the evolutionary theory of emotions proposed by Darwin. Cultural differences would be seen when reacting to some stimuli which, through habit, become established elicitors of particular emotions.

The Seven Universal Facial Expressions

The fundamental emotions of happiness, sadness, surprise, fear, anger, disgust and contempt are universal in nature and free from religious and social barriers. Paul Ekman conducted a study in which he showed photographs of a man making these basic expressions to various cultures across the globe. His research revealed that these 7 micro expressions were perceived the same way by all races - for instance, a picture of happiness was termed 'happiness' by all regardless of their upbringing, religion or caste.

In this light, it is important to have some understanding of these expressions and the subtle facial features that come into play when a person expresses a particular emotion.

The sentiment of happiness is usually accompanied by a genuine smile - which can be distinguished from a fake one by the 'crow's feet wrinkles' that appear around the eyes in the case of an honest smile. The first person to define some of the differences was the nineteenth-century French neurologist Guillaume Duchenne. His work showed that a genuine smile not only stimulated an upward movement of the mouth muscle (the zygomatic major muscle), but also caused a movement in the muscle around the eyes (the orbicularis oculi). The activation of the orbicularis oculi muscle resulted in wrinkling around the eyes and an upward pulling of the cheeks. In contrast, non-emotional or "fake" smiles result in movement of the zygomatic major, but not the orbicularis oculi. To honour his observations, genuine smiles are often referred to as Duchenne smiles.

Putting on a false smile is easy - on the other hand, it is tougher to fake sadness. The eyelids droop naturally, eyes become hazy and lose focus and the lips acquire a slight downward turn. In genuine sadness, the chin plays no role - in fact, excessive movement of the chin muscles may indicate that the person is faking that particular expression.

Surprise is a brief emotional state experienced at the occurrence of an unexpected yet significant event. A very powerful or long lasting expression of surprise may be considered shock. Surprise is expressed on the face by raised, curved eyebrows, widened eyes and an open mouth (a dropped jaw such that the lips are parted and mouth free of tension). Genuine surprise is spontaneous and lasts a fraction of a second - this is why a person faking surprise can be caught easily as he/she tends to exaggerate the time taken in the hope that he/she will not get caught. Surprise is almost always followed by a look of fear, joy or utter confusion.

Fear is a negative emotion that arises due to a threat perceived by the individual. Fear is the ability to recognize danger and do one of two things -either flee (Flight) or stand one's ground and face it head on (Fight). An increase in adrenaline usually accompanies fear and it is worth noting that fear almost always relates to future events, such as worsening of a situation, or continuation of a situation that is unacceptable. Fear could also be an instant reaction to something happening at the time.

When one feels cheated, he/she may have a tendency to correct that wrong by retaliation. Anger is a strong emotional response to provocation and gives rise to an increased heart rate, high blood pressure and an invariable rise in adrenaline. The face becomes flushed, and the brow muscles move inward and downward, fixing a hard stare on the target. The nostrils flare and the jaw tends toward clenching. The lips are tensed and narrow; the arms are raised and one tends to adopt a squared-off stance - this muscle

tension provides a sense of strength and assurance.

Disgust is an emotion that is typically associated with things that are revolting (could be anything ranging from inedible rotting food to gory scenes). Unlike the other negative emotions, disgust is accompanied by a decreased heart-rate. Since people know that disgust is a primary, or visceral, emotion (with characteristic gestures and expressions), they may imitate it. Disgust has been noted to feature strongly in the public sphere in relation to issues and debates, among other things, regardinganatomy, sex and bioethics.

Contempt is the expression that the layman has the most difficulty understanding and interpreting correctly. It is an intensely negative emotion regarding a person or group of people considered inferior, base, or worthless. Contempt is often brought about by a combination of anger and disgust. Ekman and Friesen found that the facial expression that universally signals contempt is a tightening and slight rising of the lip corner, primarily on one side of the face. They noted that contempt is the only emotion expressed asymmetrically. It was Darwin who first recognized the facial expression for this emotion. He gave a detailed description of the facial expressions that occur when contempt is being portrayed - the nose may be slightly turned up, which apparently follows from the turning up of the upper lip; or the movement may be abbreviated into a mere wrinkling of the nose.

In this paper an attempt has been made to explore a different path within this science viz., the influence that one's gender has on how he/she reads these seven universal facial expressions. As a suitable control, the members of the sample population represented here belong to the same culture and country.

Methodology

A survey was conducted amongst boys and girls (aged 18-21) in the Birla Institute of Technology and Science, Pilani. The survey contained the following:

- A set of the 7 universal facial expressions deemed to be culture independent by the proponents of the universality theory (see *Introduction*)

- A legend with 11 words that describe a range of emotions.

The one page survey sheet (given in appendix A) was distributed amongst 200 boys and 200 girls. Each one of them was told to fill out what they *felt* was the most suitable word to describe a particular expression; there was no time limit so the respondents were under no stress while judging the expressions.

Choosing a set of expressions

The man featured in the pictures used for the survey is Tim Roth, an English actor and director who plays the protagonist in the popular television series Lie To Me *, a show based on lie detection through the observationof facial and micro-facial expressions. The expressions are subtle enough to not be dead giveaways; neither are they ambiguous. The intensity of the expressions is similar to those featured in the cross-cultural research conducted by Ekman, Sorenson and Friesen ** in 1969 - the main difference is that, in this case, all expressions are made by the same individual.

Patterns and observed trends

On compiling the results to observe the number of people who had correctly interpreted a particular expression, the results were tabulated as shown below.

Table 1- Number Who Correctly Identified

EMOTION	BOYS (OUT OF 200)	GIRLS (OUT OF 200)	TOTAL (400)
Anger	111	146	257
Sadness	73	105	178
Happiness	160	168	328
Fear	110	178	288
Disgust	119	144	264
Contempt	32	48	80
Surprise	97	63	160

Girls are superior to boys when it comes to identifying facial expressions particularly sadness, fear and anger. Exceptions to the above occurred when it came to interpreting surprise - boys proved better than girls (97 out of 200 boys correctly identified surprise while only 63 out of the 200 girls got it correct).

89% of the girls correctly identified fear as compared to 55% for the boys. As girls are able to relate to and recognise fear, this probably points to the existing social conditions prevalent in India - both in the family and in society at large. Genetically speaking, women learn to recognise fear in their young infants and make an effort to tune into their emotions. This trait has subconsciously developed over generations and is now firmly a part of a woman's emotional makeup.

The same figures were converted to percentages to illustrate the results in a more compact manner as seen in figure I. Clearly, women score over men in nearly all the categories of emotions.

*Lie To Me premiered in America on 21 January 2009 and continues to run successfully after 3 seasons. The series won the 37th People's Choice Award '2011 Favourite TV Crime Drama'.

** Ekman, Sorenson and Friesen showed six photographs portraying the fundamental emotions (excluding contempt) and asked the observers to select one emotion from a set of 10 emotions. There was a large degree of agreement among citizens of the 21 countries in which the survey was conducted.
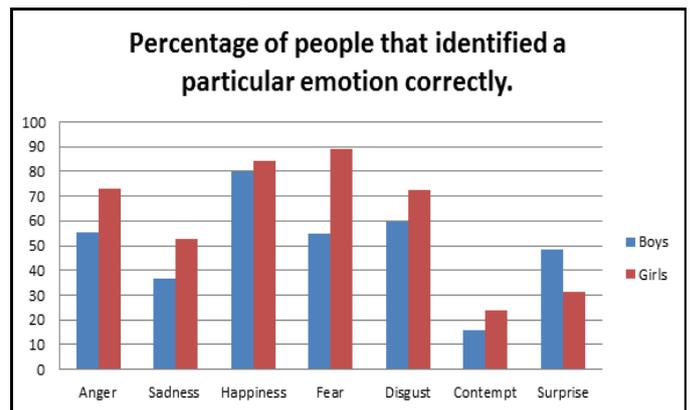

Fig. 1-

80% of the population failed to identify contempt; the survey results reflect that this emotion was interpreted as arrogance/satisfaction (see Table II below). This is mainly because it appears as a subtle micro expression* on the face (that lasts for less than a second) even though it is an intense negative emotion on the inside which people consciously make an effort to suppress. The result is a supercilious and haughty expression that could pass off as arrogance (to one with a negative mindset) or satisfaction (to one with

a positive outlook). A crucial point to be noted is that the number of girls who read contempt as arrogance nearly

A microexpression is a brief and involuntary facial expression shown according to emotions experienced. They usually occur in high-stakes situations, where people have something to lose or gain. Sometimes they last for less than 1/4th of a second.

doubles the number of boys. This fact points to prevalent social environment once again - girls grow up wary and cautious, always on the lookout for danger. On the other hand, boys recognised contempt more as satisfaction and less as arrogance because the element of negativity is not a part of their intrinsic nature.

Table 2- Number (and%) of People Who Identified Contempt As

EMOTION	BOYS	GIRLS	TOTAL
Arrogance	48 (24%)	88 (44%)	136 (34%)
Satisfaction	88 (44%)	64 (32%)	152 (38%)

From Apartcontempt, the two expressions that were misinterpreted to a large extent were surprise and sadness. Surprise was read as shock by 58% of the population (refer to Table III below). By definition, shock is the emotional/physical reaction to an unexpected and usually unpleasant event (so, it is a negative response) whereas surprise is just a reaction to an unexpected event. Thus, if a person looks perturbed (along with an expression of surprise), then that is classified as shock.

Table 3- Number of People Who Interpreted

EMOTION	BOYS	GIRLS	TOTAL
Surprise as Shock	104	128	232

Sadness appeared as a neutral expression to 45.75% of the population (observe Table IV given below). It is characterized by drooping upper eyelids, a slight downward curve of the mouth and a lost and out-of-focus look in the eyes. These are extremely subtle features and are thus easily misread. This expression is not aggressive and one needs to look a bit deeper to correctly identify this expression. The hectic pace of modern day life has ensured that a majority of the population only have time to skim the surface of what they perceive.

Table 4- Number of People Who Interpreted

EMOTIONS	BOYS	GIRLS	TOTAL
Sadness as Neutral	97	86	183

5 (out of 400) correctly identified all expressions. These people are probably Truth Wizards * in the art of reading faces without any formal training (this could be an exaggeration as there is a chance that they guessed an expression on an intuitive level). Ideally, they constitute less than 1% of the population and have the innate ability to correctly notice micro expressions. The science behind their extraordinary ability to perceive emotions is not yet fully understood and is currently put down to gut feeling/intuition.

68% of the respondents got between 2 to 4 correct out of 7. This is shown in the pie chart below (figure II) and indicates that the average person is not too adept at reading facial expressions. Increased use of e-mails, SMSs and social networking websites (written communication) and telephones, mobiles and call confer-

encing (oral communication) has resulted in people communicating less face-to-face - this could be a contributing factor to the low success rate.
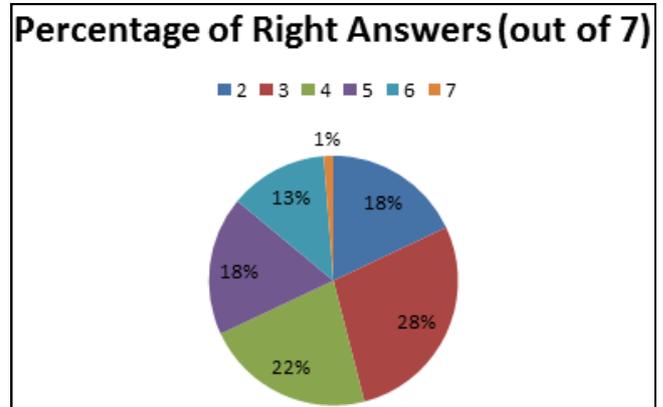

Fig. 2-

Identifying Micro-Facial Expressions

Conclusion

The results of the paper conclusively prove that women (belonging to a particular culture) read most expressions better than men (belonging to the same culture). This is probably why women make better Montessori school teachers as compared to men - they are able to relate and understand a child's unspoken wish just by observing his/her facial expressions. As children grow up, they are able to express themselves; therefore, at the university level, the difference between a male and female professor is absent.

The paper does not conclude that women are always better than men - it is just that men will need to work harder to understand facial expressions as compared to women to whom it seems to come far more naturally.

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