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Accuracy in Detecting Incongruence of Body Language

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Abstract:- Body language is the different body signals that we use to communicate one's feelings and emotions or reactions to what one is experiencing through gestures, postures, facial expressions to name a few. There has been a good amount of research covering body language with emotions and different parts of the body. Incongruency have been studied but not in terms of comfort and discomfort. Thus the present study was done to measure accuracy in detecting incongruence of body language. Thus participants were shown images of congruent comfort and discomfort images and incongruent images. As predicted participants had difficulty in detecting incongruency in body language. The obtained t values were found to be significant.

Keywords:- *Body Language; Incongruence; Congruence; Comfort and Discomfort.*

I. INTRODUCTION

The origin of nonverbal communication has been existing since Darwin whose book "The Expression of the Emotions in Man and Animals" focused on animals and human ability to communicate with each other without the usage of language and how these nonverbal signals have helped in their survival over time. Nonverbal communication have been defined as a means of transmitting information through facial expressions, gestures, haptics, kinesics, posture, body adornment (clothes, jewelry, hairstyle, tattoos, etc.) even the tone, timbre and volume of an individual's voice than spoken content. Nonverbal behaviour comprise 60 to 65% of all interpersonal communication [3].

Ekman and Friesen (1969) have divided nonverbal communication into five categories consisting of emblems signs or symbols when communication is done through gestures and not words, some of them are universal or some are culture specific; illustrators these are those movement or gestures which complement or reinforce the verbal communication; affect display the verbal and nonverbal display of emotions using facial expressions, gestures and body language; regulators are those which go along and regulate verbal content through various signals like nodding, eye contact or body orientation indicating whether you want to continue the conversation or want to leave; and adapters those movements which are done to pacify oneself thus touching face, fiddling with accessories, rubbing your neck are done when people are uncomfortable or are under stress.

Being a crucial part of human behaviour nonverbal communication is directly linked to the brain. There are numerous theories which discuss the relationship of brain and nonverbal communication. Apart from the fight and flight response of Autonomic Nervous System consisting of Sympathetic and Parasympathetic divisions of the brain. Another model as Brain and Robert (1988) consists of models like arousal-labeling, discrepancy-arousal and social cognition. According to Smith and Ellsworth (1985) the way an individual sees their environment and identify their emotional state and vice versa. [16]

Paul Mc Lean termed Tribune brain consisting of three types of brain namely reptilian, mammalian and neocortex. Reptilian or Brainstem and Cerebellum consisting of all the vital organs of the body like hunger, sleep, breathing, temperature etc. Mammalian or Limbic is the emotional (affective center) or survival that give signals manifested through various parts of body. Human brain (Neocortex) the new brain responsible for higher order conditioning of cognition and memory.

As it can be observed the Limbic system plays a far more significant role in nonverbal communication. The limbic system consists of the 3 Fs – Freeze, Flight, Fight forming the fight and flight response which is a part of the famous James Lange theory according to which for feeling an emotion one must first experience bodily responses like changes in body temperature, heartbeat, respiration to name a few.

According to William James emotion is one form of physical change of numerous physical changes while experiencing a stimuli reinforcing the fact that visceral brain play pivotal role in nonverbal communication. In a research by Nicole and James (2011) measured whether preschoolers of 3-5 years (N=144) were proficient in labeling videos of face only, body postures, voice and mixed. It was found that developmental progression in which preschoolers first recognize the visual components of emotion expressions

(facial and postural expressions) and only later come to recognize vocal expressions.[11]

Nonverbal communication have been bifurcated into first impressions, body language, nonverbal appeal and voice. Nonverbal appeal relates to those aspects about the individual which speak about them when they are not around like social media, their personal room or the way they arrange things, timeliness to name a few. Voice changes in the pitch, volume to create an emphasis or highlight what you are experiencing. First impressions which ae formed between 7 seconds to 2 minutes consisting of dressing, accessories, facial expressions, walking, etc. Body language are the different body signals that we used to communicate one's feelings and emotions or reactions to what one is experiencing though gestures, postures, facial expressions, etc.

There has good amount of research on nonverbal communication in diverse fields. In a study by Sandra et al., (2018) that charismatic appearance of Salesperson through their body language can in turn produce favorable attitudes toward them. [12] In an experiment by April and Kelly (2015) of perceived status and picture power using ERP it was found that women could use counter-stereotypical nonverbal displays (dominant poses) more flexibly than men. [2]

Similarly research on body language has led to lots of insights in the understanding of its functions. In a study by Hillel et al., (2012) showed incongruent faces and bodies either in positive or negative forms. The participants were shown victory or loss displays through incongruent face and body. It was found that perceived affect and mimicry of the faces shifted depending on the contextual body.[1]

Remy et al., (2013) showed coloured photographs of various objects in contextual scenes and measured object categorization of 97 participants (aged 20-91). Participants over 60 years object categorisation slowed which further deteriorated over 75 years of age. Thus visual processing of complex environments deteriorates with age.[13]

Incongruency have been explored but the current research focused only on two concepts namely comfort and discomfort. Comfort have been defined as a state of physical or psychological ease which is depicted through overall body right from facial expressions to gestures, postures overall. Whereas discomfort have been defined as uneasiness due to physical or psychological causes like boredom, anxiety, stress, aches and pains, etc. Congruent means the body language of the person is giving one particular single that is either comfort or discomfort. Whereas incongruency means the body language is 2 signals at the same time that is comfort and discomfort at the same time.

Thus the current study wanted to explore whether participants can accurately detect in-congruency in body language through congruent and incongruent images depicting comfort and discomfort. So the hypothesis is to study whether participants can detect body language accurately when shown images of comfort and discomfort of congruence and incongruence.

II. METHOD

The total number of participants who participated in the study was 35 (15 Females and 20 Males). The average age of participants was 30.25714 (Range- 18-62). The average age of Females been 27.4 (Range- 17-40) and average age of Males been 32.4 (Range- 18-62). The participants were working professionals of diverse fields.

A. Apparatus and Stimuli

Participants were shown 10 images of which one was dummy used for familiarising the participants with the nature of the experiment. 9 images were used. 5 images were of females and 4 of males. 6 were comfort images (3 for comfort, 3 discomfort) and 3 were incongruent presented in a totally randomised order. The images used were randomly taken from the internet. The images were shown using PowerPoint 2016. The size of the images were uniform for all 10 images. The congruent comfort images were1, 3, 8 and congruent discomfort images were 2, 5, 7 and incongruent images were 4, 6, 9.

The exposure time of each image was 5 seconds. The participants had to answer whether the person in the image was comfortable, uncomfortable or can't say. The responses were then evaluated and scored accordingly.

B. Design

A Repeated measures design with one independent variable and two levels congruent and incongruent. The dependent variable was correct responses. (Correct recognition of congruency and incongruency) The following controls were considered. The size of the images was constant. All the images were shown for five seconds. Equal number of images were used.

The images were displayed on the screen to a group of participants at the same time. After they sat comfortably they were shown images one and the other. So they had to see and image and answer in 5 seconds on the sheet of a paper that was provided to each participant. The same procedure remained for all participants and they were debriefed at the end.

III. RESULTS

TABLE I. TESTS OF NORMALITY

Shapiro-Wilk normality test	**W = 0.91553**	**p-value = 0.08132**

TABLE II. MEAN AND STANDARD DEVIATION

Male		**Female**
Mean	***5.85***	***5.266667***
Standard Deviation	1.460894	1.387015

TABLE III. MEAN AND STANDARD DEVIATION OF CONGRUENCY AND INCONGRUENCY

	Congruent Comfort	**Congruent Discomfort**	**Incongruent**
Mean	***2.514286***	***1.685714***	***1.4***
Standard Deviation	0.658493	0.963188	0.847141

The present study was conducted to test the accuracy in detecting incongruence of body language. The hypothesis been to study whether participants can detect body language accurately when shown images of comfort and discomfort of congruence and incongruence, do participants commit more errors while incongruence images are shown as against congruence. As it was a repeated measures design of one IV with two levels as there were two groups involved, the appropriate inferential statistics was t test.

To test whether the data was normally distributed a normality test was done of Shapiro-Wilk normality test as seen in Table I. The results were non-significant meaning the data is normally distributed. Mean and Standard Deviations of gender is depicted in Table II and Mean and Standard Deviation of Congruency and Incongruency is depicted in Table III. The obtained t value of Male and Female on the accuracy in detecting incongruence of body language was found to be $t_{(14)} = 3.389$, p-value = 0.004408, which was found to be significant.

The obtained t value of Congruent comfort and Incongruency $t_{(34)} = 5.8252$, p-value = 1.452e-06 was highly significant. However the obtained t value of Congruent discomfort and Incongruency $t_{(34)} = 1.2028$, p-value = 0.2374 ns was found to be insignificant. As an ancillary observation within the comfort group t test was computed of Congruent comfort and discomfort $t_{(34)} = 5.136$, p-value = 1.144e-05 was also highly significant.

IV. DISCUSSION

The current study showed that participants have difficulty in recognising incongruent body language when it comes to comfort images as compared to incongruent images. The obtained results are similar to that of Hillel et al., (2012) who has incongruency of victory displays. Some of the limitations of the study were few images were used, so the number could have been more.[1] Also reaction time (RT) of the participants was not measured and thus images were easier or difficult to answer was not known. Future research could be done to include more images and also measure RT.

V. CONCLUSION

The present study was perfectly inline with the hypothesis that participants committed more errors and have difficulty in recognising incongruency in body language.

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