Nonverbal Communication and Affectivity: A Scale for Detecting Emotions Through Nonverbal Behavior

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Abstract Nonverbal communication (NVC) has direct implications on our relationships, emotions, interactions, and mental health and so does affectivity. However, affectivity as an aspect of NVC has not been explored. The present study figured out the relationship between NVC and affectivity by developing a measure to determine the factors comprising these variables. From the 26 items in the NVCA scale, 6 factors emerged and were divided equally between NVC and affectivity. Results clearly manifested a strong positive correlation between NVC and affectivity. The NVCA scale showed satisfactory reliability and validity. Thus, this study will help to develop interventions in the private and public domain to build healthier relationships, emotions, and interactions.

Abbreviations
NVC   Nonverbal communication
NVCA   Nonverbal communication and affectivity

Introduction

Renowned scholars have affirmed communication as social interaction through messages (Fiske, 1990). It is a process in which participants create and share information with one another to reach a mutual understanding (Rogers, 1997). Communication is an activity in which symbolic content is not merely transmitted from one source to another, but exchanged between human agents who interact within a shared situational and/or discursive context (Price, 1997). It is a process whereby people in groups, using the tools provided by their culture, create collective representations of reality (Trenholm, 1999), and there is a predictable relation between the message transmitted and the message received (Graber, 2003). These scholars articulate the social, cultural, behavioral, and cognitive characteristics of communication.

People spend most of their time in communicating their knowledge, thoughts and ideas to others. But, many of us fail to understand the role of nonverbal signs and codes in the process of communication. Nonverbal communication does not depend on words to express meanings. Nonverbal communication is usually understood as the process of communication through sending and receiving wordless messages. These messages may be communicated through gesture, body language, or posture; facial expression and eye contact; object communication such as clothing, hairstyles, or even architecture; symbols and infographics; prosodic features of speech such as intonation and stress, and other paralinguistic features of speech such as voice quality and speaking style, as well as emotion (Knapp & Hall, 2002). Nonverbal meanings can be easily communicated beyond the barriers. Communication researchers suggest that feelings and intentions can be transformed more effectively in nonverbal communication. A study by Albert Mehrabian (1972) provides some attractive information about the significance of verbal and nonverbal messages. Mehrabian ascertains that only 7% of messages have been exchanged by words; the remaining 93% of the messages are exchanged by nonverbal expressions.

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The field of nonverbal communication (NVC) has a long history involving many cue modalities, including face, voice, body, touch and interpersonal space; different levels of analysis, including normative, group and individual differences; and many substantive themes that cross from psychology into other disciplines.

NVC relies on facial expression, eye contacts, gestures and certain body movements (DePaulo et al., 2003; Mehrabian, 1972) that aid in identifying emotional states, attitudes and thoughts via the media such as touch, body motion, voice quality also known as paralanguage, and personal distance (proxemics) playing an important part in communication (Duncan Jr., 1969), which can facilitate either positive or negative emotions, relationships or impressions. NVC increases our expressivity, and people generally find it attractive and want to pay more attention to things that are expressive. This increases our chances of initiating interpersonal relationships. Nonverbal communication helps maintain relationships once they have moved beyond the initial stages by helping us communicate emotions and seek and provide social and emotional support. Since people with nonverbal communication competence are already more likely to have larger social support networks, it is likely that they will be able to spread their emotional communication, specifically related to negative emotions, in ways that do not burden others. Unfortunately, since people with less nonverbal skill are likely to have smaller social networks, they may end up targeting one or two people for their emotional communication, which could lead the other people to withdraw from the relationship. Nonverbal communication allows us to give and request emotional support, which is a key part of relational communication.

The tendency to display emotions, moods, or feelings with varying degrees (Ekman, 1992) is known as affectivity, which either is positive or negative (Watson & Clark, 1984). The word "affect" is related to the word emotions and means much the same thing when we are talking about body language.

Interaction with others is not merely the use of words. Sometimes, it involves continuous giving and receiving of wordless signals, which are exchanged via NVC and manifested through affectivity. There is a vast array of channels for NVC exchange that are similar to the mode of manifestation of affectivity. However, only a few commonly seen to be used by many Indians are:

1. Facial Expressions: According to Ekman and Friesen (1975), facial expressions are one of the most commonly used forms of NVC.
2. Eye Contact: Greenbaum and Rosenfeld (1978), Kloth et al. (2011), and Weiten et al. (2009) have shown that eye contact can heighten interpersonal emotions and lead to a greater sense of intimacy.
3. Touch: Jones and Yarbrough (1985) argue that touch is crucial in human relationships, as it plays a part in giving encouragement, expressing tenderness, showing emotional support, and many other things.
4. Gestures/Bodily Postures: According to Argyle (1972), gestures and bodily postures are also common forms of NVC.

Mayer and Gaschke (1998) identify two elements of positive and negative dimensions of affectivity: the direct experience of the mood and meta-mood, which consists of thoughts and feelings about the moods. Even when the verbal message is neutral, we can reveal our hidden affective states, be it positive or negative, through the channels of NVC. Nonverbal emotional expressiveness is influenced by affectivity, as there exist individual differences in terms of expression, which is a likely element of social influence in vis-à-vis interaction (Friedman et al., 1980).

Watson et al. (1999) propose that these are bio-behavioral systems that have an evolutionary basis. Negative affect has evolved to withdraw or inhibit the organism from a behavior that might lead to undesirable consequences (Watson & Clark, 1984), while positive affect has evolved to lead the organism towards more rewarding results (Watson, 2002). Watson (1988) concludes that negative affect and positive affect consistently occur across various time periods, descriptors, and response formats in both within- and between-subjects analyses. According to Davidson (1992), the difference in affective styles is also due to the neurological basis.

Considering the similarities in certain aspects of NVC in terms of affectivity, it is essential to measure them on factors which are representative of major channels that speaks of individual's positive and negative behavioral and mental outcomes arising from NVC and affectivity. Hence, in this research, the investigators have tried to study the relationship between NVC and affectivity and measure different levels of these variables in Indians in order to determine how affectivity can be an aspect of NVC.

The literature review sheds light on the fact that NVC and its implications have been studied extensively in all spheres, but mostly in terms of how they can contribute to negative aspects such as developing stereotypes, deteriorating mental state, inducing fear, etc. However, its benefits in clinical and daily setups have also been studied, along with its contribution to attraction. Yet, there is a deficiency of research specifying how NVC links with affectivity. Moreover, there exists no tool to measure these variables. Therefore, this study aims to find out the relationship between NVC and affectivity by developing a tool to determine the major factors of these variables and measure their levels. The *expected outcomes* include adding knowledge in the untouched area of NVC and affectivity, developing interventions in public and

private domains, and facilitating positive NVC and affectivity among people to build strong and healthier relationships.

Method

Participants

Sample collected using *purposive sampling*. The survey was completed by 200 participants with consent. Overall the participants were 129 males and 71 females with the mean age 34.93. The sample had participants counting 51 in the 18- to 21-year age group, 104 were in the 22- to 25-year age group, 20 were in the 26- to 29-year age group, and 25 were 30 years and above. Among the sample, 115 were post-graduates and above, 16 were semi-literate and 69 were undergraduates.

Inclusion criteria

- Participants should be 18 years and above,
- Willing to give consent,
- Should be literate or at least semi-literate,
- Indian participants

Exclusion criteria

- Individuals who do not give consent for the survey
- Individuals who are with cognitive or serious neuropsychological disorders preventing them from providing a valid consent

Development of Tool

Writing Items

The first phase of the instrument development involved item generation and a review of the scale items by expert scholars. During the first phase of the instrument development, the researchers generated 31 items for the NVCA measure scale. These items included 26 Likert-type questions from the *Nonverbal Immediacy Scale-Observer Report (NIS-O)* by Richmond et al. (2003). The wording of the items was refined to condense meaning and simplify language, and Likert's scale response format was applied, ranging from "Never-1" to "Always-5." The remaining five questions included two additional Likert-type questions ("*He closes his eyes while talking to people*" and "*He scratches his body parts when talking*") and three open-ended questions ("*What nonverbal cues do you use to show interest in someone?*", "*What nonverbal cues do you use to show disinterest in someone?*" and "*What nonverbal cues do you find difficult to interpret?*").

However, after the psychometric analysis, the researchers eliminated these five questions and only kept the 26 items from the NIS-O in the final scale. Lastly, Higher total scores on the NVCA scale indicate greater perceived NVCA.

Psychometric Analysis

A newly constructed scale should be developed by using well-defined and rigorous methodology and psychometric analysis (Rattray & Jones, 2007). Factor analysis is run to investigate the multidimensional structure of the scale by discovering items loading under common factors that all together will gauge an underlying theoretical concept or parameter. This type of analysis helps in data reduction and gives the closest structure of the tool that matches its measure with the least stuff and therefore supports construct validity (Ferguson & Cox, 1993; Hair et al., 1995; Oppenheim, 1998). A principal component extraction with Varimax orthogonal rotation was performed for the 31 items. This analysis was run to explore the interrelationship between the components.

In the sample, the eigen values of the first few factors derived from the 31 items were calculated. When the factors were rotated to a Varimax solution, every item had its primary loading on the factor defined by the other items of its scale, and all primary loadings exceeded 35 (Table 1). Factor analyses of the 31 items produced a six-factor structure. Finally, 26 items were selected which represents the six factors. The numbers of items representing to the 6 factors are as: Disengaged proximity (item nos.: 24, 23, 26), Poetic rhythm (item nos.: 19,12,14), Traditional gestures (item nos.: 1, 20, 13), Obstructive Cues (item nos.: 11, 3, 15, 7, 8, 9, 18, 4, 5), Confidence reflecting cues (item nos.: 17, 22, 6, 25) and Engaged proximity (item nos.: 16, 10, 21, 2). The first 3 factors provide composite score for NVC and later three for affectivity. The resulting six factors' scores were inter-correlated with each other. The minimum score was NVCA is 26, and the maximum score was 130, with a Cronbach's Alpha of 0.81.

Reliability

Internal consistency and stability of scores refers to the reliability of the measure. Cronbach's alpha of all 26 items was found to be 0.81. The reliability coefficient reported exceeds the prescribed significance level. Thus, the preliminary form of the present measure is a reliable instrument for measuring NVCA among Indians.

Table 1 Factor loading with composite scores of 200 Indians

S. no.	Item no.	Item	Factor loading
Factor 1: Obstructive nonverbal communication			
1	11	His voice is monotonous or dull when he talks to people	.787
2	03	He uses a monotone or dull voice while taking to people	.737
3	15	He has a bland facial expression when he talks to people	.655
4	.07	He frowns while talking to people	.628
5	08	He avoids eye contact while talking to people	.612
6	09	He has a tense body position while talking to people	.611
7	18	He is stiff when he talks to people	.608
8	04	He looks over or away from others while talking to them	.535
9	.05	He moves away from others when they touch him while they are talking	.372
Factor 2: Confidence reflecting nonverbal communication			
1	17	He looks directly at people while talking to them	.818
2	22	He maintains eye contact with people while he talks to them	.791
3	06	He has a relaxed body position when he talks to people	.683
4	25	He smiles when he talks to people	.445
Factor 3: Engaged proximity			
1	16	He moves closer to people when he talks to them	.730
2	10	He sits close or stand close to people while talking with them	.723
3	21	He leans toward people when he talks to them	.601
4	02	He touches others on the shoulder or arm while talking to them	.534
Factor 4: Disengaged proximity			
1	24	He leans away from people when he talks to them	.735
2	23	He tries not to sits close or stands close to people while talks with them	.720
3	26	He avoid touching people when he talks to them	.690
Factor 5: Poetic rhythm			
1	19	He has a lot of vocal variety when he talks to people	.807
2	12	He uses a variety of vocal expression when he talks to people	.780
3	14	He is animated when he talks to people	.505
Factor 6: Traditional gestures			
1	01	He uses his hands and arms to gesture while talking to people	.777
2	20	He avoids gesturing while talking to people	− .644
3	13	He gestures when he talks to people	.603

Factorial Validity

The validity of a test is defined by its factor loadings, and these are given by the correlation of the test with each factor. The factorial construct validity of NVCA reveals high loadings of each item ranging from 0.372 to 0.81 (Table 1).

Procedure

Prior to administration of the measure, the investigators contacted the participants for obtaining consent/permission of data collection. The study was conducted on different age groups of Indians having varied qualification levels—using NVCA along with a semi-structured demographics proforma. The data were collected from February 6, 2021 to March 17, 2021 for which the investigators utilized Google Forms to develop the survey; it was then disseminated through various online platforms. Considering the ethical code while dealing with the participants, consent was taken online before proceeding to answer questions on the survey, confidentiality was maintained and any apprehensions that occurred were resolved.

Data Screening

The data had no missing values. However, two responses were excluded from the analysis as "YES" was not selected in the consent section. Therefore, the data for study consisted of a total of 200 participants.

Results

NVCA was employed on a representative sample of 100 Indian origin participants to ensure objectivity. Inter-correlation and image matrices were examined; thereby, 5 items having multicollinearity and singularity were removed, and the final version of the scale comprised 26 items with 5-point Likert-type responses, viz., Never, Seldom, Sometimes, Very Often and Always. The final scale with 26 items was administered online to a representative sample of 200 Indians. It can be inferred as the higher the score higher is the higher the NVC and affectivity and vice versa. The internal consistency reliability of the NVCA measure scale was 0.81 (Cronbach's alpha). The factorial validity was examined by using exploratory factor analysis (EFA) with principal component analysis (PCA) as extraction and Varimax as rotation methods.

Six factors emerged in analysis and were labeled as:

1. **Disengaged proximity:** is the factor of NVC which interacts by *disengagement*, *detachment* and *noninvolvement in the interaction*.
2. **Poetic rhythm**: is the NVC factor which refers to producing *variations in tone of voice* and *vocal expression during an interaction*.
3. **Traditional gestures**: is the factor of NVC denoting the extent to which *a person employs the use of gestures during an interaction*
4. **Obstructive Cues**: is the factor of affectivity which exhibits *hesitation* or *lack of interest* on part of the individual that hinders or obstructs the interaction or communication between individuals
5. **Confidence reflecting cues:** is that factor of affectivity which expresses *confidence* and puts individuals *at ease during an interaction*; and
6. **Engaged proximity**: is the factor of affectivity which is reflected by *expression of engagement*, *engrossment* and *involvement in the interaction*, where the first three come under the NVC dimension and the latter three in the affectivity dimension.

The percent variance explained by six factors varied from 15.522 to 7.000%, and cumulative percent of variance explained 58.878%.

Profile is an arrangement of test scores (expressed in comparable units of measure, such as percentile scores), which indicates the relative standing of an individual on various psychological/attitudinal measures. The technique was used to drive on-spot inference about nonverbal communication and affectivity among participants.

Norms were developed for nonverbal communication and affectivity based on the whole sample and classified in seven equal units based on percentile scores. Table 2 shows the range, level and their interpretation.

Standard (Z score) scores were calculated as estimates of norms by using descriptive statistics (mode) based on the whole sample and classified in seven equal units using percentile scores. Table 2 shows the range, level and their interpretation.

Conclusion

NVC and affectivity hold a strong positive correlation, and individual differences contribute to different levels of these variables that can be measured using NVCA.

Implications

The study will help the institution's grievances committee to understand issues related to NVC. It will aid interaction in social setups like family, peers, co-workers, etc. Further, inappropriate or negative NVC eventually disturbs our cognition resulting in social or personal dysfunction, so these findings will help to develop a sense for positive and negative NVC as it directly linked to affectivity to avoid such disturbances. The NVCA can be used by organizations for recruitment of good personnel. The inputs from this research may aid artificial intelligence for cloning humans.

Table 2 Norms and interpretation of the NVC and affectivity scores

S. no.	Level	Label	Range of NVC scores	Range of affectivity scores
1	A	Extremely low	13 to 20	26 to 36
2	B	Low	20.01 to 24	36.01 to 39.4286
3	C	Below average	24.01 to 26	39.4287 to 42
4	D	Average	26.01 to 27	42.01 to 45
5	E	Above average	27.01 to 29.5714	45.01 to 47
6	F	High	29.5715 to 32	47.01 to 53.28
7	G	Extremely high	32 through highest	53.28 through highest

Suggestions for Future Research

The norms for the NVCA scale should be developed on larger more representative samples. The convergent and discriminant validities should be estimated for the scale. India is a unique subcontinent as it is home to different races, castes, religions, languages and cultures. Therefore, any study representing some part of this diversity will not give us the complete insight into the Indian culture owing to its limitations in terms of collecting sample from the length and breadth of India. This study can be extended further by including samples from different ethnicities and regions to know how NVC and affectivity are influenced by cultural and regional differences.

Availability of data and materials The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Code availability (software application or custom code) Not applicable.

Declarations

Conflict of interest The authors declare that they have no conflict of interests.

Ethics approval Not applicable.

Consent to participate Consent was taken on the online survey form.

Consent for publication All authors have given consent for the publication.

NVCA

Instructions: *Against each statement written below five options are given. These options are representing to the five response categories,* viz., Never-1, Seldom-2, Sometimes-3, Very Often-4 and Always-5. *You are requested to put a tick mark (√) on any one of the five alternative response categories, which represents your feeling truly.*

S. no	Items	Never 1	Seldom 2	Sometimes 3	Very often 4	Always 5
1	He uses his hands and arms to gesture while talking to people					
2	He touches others on the shoulder or arm while talking to them					
3	He uses a monotone or dull voice while taking to people					
4	He looks over or away from others while talking to them					
5	He moves away from others when they touch him while they are talking					
6	He has a relaxed body position when he talks to people					

S. no	Items	Never 1	Seldom 2	Some-times 3	Very often 4	Always 5	S. no	Items	Never 1	Seldom 2	Some-times 3	Very often 4	Always 5
7	He frowns while talking to people						14	He is animated when he talks to people					
8	He avoids eye contact while talking to people						15	He has a bland facial expression when he talks to people					
9	He has a tense body position while talking to people						16	He moves closer to people when he talks to them					
10	He sits close or stands close to people while talking with them						17	He looks directly at people while talking to them					
11	His voice is monotonous or dull when he talks to people						18	He is stiff when he talks to people					
12	He uses a variety of vocal expression when he talks to people						19	He has a lot of vocal variety when he talks to people					
13	He gestures when he talks to people						20	He avoids gesturing while talking to people					
							21	He leans toward people when he talks to them					

S. no	Items	Never 1	Seldom 2	Some-times 3	Very often 4	Always 5
22	He maintains eye contact with people while he talks to them					
23	He tries not to sits close or stands close to people while talks with them					
24	He leans away from people when he talks to them					
25	He smiles when he talks to people					
26	He avoid touching people when he talks to them					

Name: ……………………………………………………………
…………………………

Age: ………………….   **Education:** ……………….
Gender: Male/female

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