Nonlinguistic, Paralinguistic and Linguistic Eye - from Sensory Function to Communicative Function

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Abstract: *The purpose of this study is to elucidate the relationship among three types of eyes: [E1] Eye to See, [E2] Eye to Show (Social/Communicational Eye), and [E3] Eye as Emotional Expression, through their linguistic nature—whether it is (1) Nonlinguistic Eye, (2) Paralinguistic Eye, or (3) Linguistic Eye. I compared eye in Indian classical dance in Natyashastra and JSL (Japanese Sign Language), which has the most sophisticated rule-governed eye. I found phonemes and morphemes in Indian classical dance. Through analysis of these eyes, the universal direction which makes eye to be sophisticated from the act of seeing was clarified.*
Keywords: *Indian Classical Dance, Linguistic Eye, Paralinguistic Eye, Phonetic Language, Sign Language.*

1. INTRODUCTION

Human eye is generally classified into three categories: [E1] Eye to See (eye for looking at something), [E2] Eye to Show (Social/Communicational Eye), and [E3] Eye as Emotional Expression (unconscious facial expression). They are regarded as different kinds and have been studied in separate fields. There are medical (ophthalmological and neurological) studies on [E1]. [E2] starts with gazing at each other and eye for joint attention in infancy; therefore, it has been studied mainly in developmental psychology. [E3] has been studied in physiology and cognitive science. Eye of a facial expression is inseparable from the movement of the muscles around the eyes, such as the way the eyelids open.

Eye has not been studied as a linguistic element. However, in sign language(s), eye can be linguistic elements such as phoneme and morpheme, which has been proved by linguists and neuroscientists.[1]

On the other hand, Indian classical dance(s) such as Bharatanatyam and Mohiniyattam use the whole body, and there are detailed rules for how to use them, and those who know these rules can understand the story visually, just as if they were listening to the lines of plays and movies. In this respect, it is very similar to sign language.

The rules of Indian classical dances and dramas are described in an ancient Sanskrit encyclopedic treatise, Natyashastra (BC200-AD200). [2] Almost all rules in Natyashastra have been passed down to this day as they were in provably BC200, by dancers, actors, instrument players, and instructors of classical dances and dramas.

Eye in Indian classical dance is almost always used to express feelings. It seems at first glance that emotional expression doesn't fit into detailed rules. But in JSL (Japanese Sign Language), [E1] became discrete units of [E2] which are bound by strict rules.[3][4] The similar phenomenon possibly occurs in Indian classical dance. Charles Darwin assumed expressional eye originated from [E1].[5] His theory was, although the pros and cons have been debated to this day, recently being attested by psychologists such as D. H. Lee and A. K. Anderson (2017).[6] It is worth examining whether it applies to sign language and Indian classical dance.

2. MOTIVATION AND OBJECTIVE

For phonetic language speakers, eye has nothing to do with language, because the modality of phonetic language is not visual but auditory. [E1] can appear, regardless of linguistic communication, when the speaker is distracted by something and looks at it. Since facial expression has a different modality from phonetic language, [E3] appears freely while speaking, which may or may not relate to the content of utterance. Sometimes it affects the content, but it is not linked to linguistic elements.

[E2] can be an element of communication in that it plays a role in maintaining a channel between the speaker (the sender) and the listener (the receiver), which is not related to linguistic activity. It is noteworthy, however, when the utterance includes a demonstrative pronoun, pointing and gazing often accompany it as a paralinguistic element. In some cases, gazing is obligatory (e.g., "Look at that, over there." with pointing), which can be regarded as a prosodic element, or a suprasegmental phoneme; then it can be called linguistic eye.

In sign languages, however, [E2] often behaves as linguistic eye. In JSL, [E2] can be bound morphemes, free morphemes, and suprasegmental phonemes.[3][4] Eye of JSL is mostly rule-governed (hardly different between individual signers). In JSL, there is eye as morpheme meaning "see", which is directly related to [E1]. There are other kinds of morphemes, but they can often relate to [E1].[3][4]

Considering that it became clear in the 1990s that sign language, unlike gesture, is generated and understood in the language areas of the brain, it is necessary to reanalyze eye as a linguistic symbol depending on the modality of the linguistic system. Indian classical dance has a system very similar to sign language. It is therefore worth examining it, assuming that it is a language system. Eye in Indian classical dance is almost always used to express feelings, that is [E3]. Since it is used to convey something to the audience, it can be proved that [E3] can be converted to [E2], just as [E1] is converted to [E2] in JSL. Eye in Indian classical dance is bound by strict rules as seen in Natyashastra, which does not seem, at a glance, to fit with the act of expressing a variety of emotions; therefore, it is even more worth examining. Darwin's theory may apply to JSL and Indian classical dance. Analysis based on his theory may reveal the process by which gaze is sublimated into linguistic symbols. Then, a surprisingly close relationship between [E1], [E2], and [E3] will become clear.

3. METHOD

I will examine and classify eye in JSL and eye in Indian classical dance in terms of their linguistic nature, and investigate whether [E1], [E2], and [E3] each can be elevated to linguistic symbols and whether [E1], [E2], and [E3] can be converted to each other.

To examine these, I use the example sentences in JSL and chapter VIII of Natyashastra. I will prove the existence of the elements equivalent to linguistic elements such as phoneme and morpheme in eye in Indian classical dance as sign linguists of the 1990s found phonemes and morphemes in sign language(s).

I will also show that eye of JSL and eye of Indian classical dance can be applied to Darwin's theory in order to grasp the true nature of eye and to clarify the relationship between the three types of eye.

Through this method, I will elucidate the process by which [E1] Eye to See can be converted to [E2] Eye to Show or [E3] Eye as Emotional Expression to [E2], and then prove that all kinds of eye possibly become [E2] for social activities, and further sophisticated to a communication system and finally to a linguistic system.

4. RESULT

For phonetic language speakers, eye is independent of language. Only the sentence including demonstrative pronouns and pointing obligatorily needs eye. If the speaker looks in a different direction from pointing, it is misleading or feels "ungrammatical". While speaking, all three types of eye appear with their original functions. However, there is no contradiction in saying that [E2] and [E3] originated from the act of seeing [E1] as Darwin insisted.

Signer's (sender's) eye is, unlike that of phonetic speaker, mostly a linguistic element. The sign sentence consists of body elements such as hand shape, hand movement, facial expression, nodding, and eye. Modality is different from phonetic languages. The elements which can be perceived visually can be parts of sign language.

According to researches using eye trackers, the receiver who is watching sign language is watching the sender's face, not hands.[7] While signing, [E1] is mostly converted to [E2] in JSL, and further can be linguistic eye. Eye of signer (sender) is mostly linguistic.

In Indian classical dance, eye expresses feelings. It is originally [E3] but not unconscious. It is eye for showing emotion to the audience, hence [E3] converted to [E2]. There are descriptions about the relationship between

[E1] and [E3] in Natyashastra, which are consistent with Darwinian theory which was written more than 1500 years later: eye expression originated from the act of seeing.

Linguistic nature of JSL has been proved since the 1990s in neuroscience. On the other hand, the linguistic nature of Indian classical dance has not been discussed. However, in Natyashastra, eye is already classified into the equivalent of phoneme and the equivalent of morpheme.[2] It is surprising, because eye of sign language(s) has not been classified clearly yet, although its linguistic nature was proved.

5. DISCUSSION

A. Eye of Phonetic Language Speakers

[E1] Eye to See of phonetic speakers can appear when the speaker is distracted by something around them and looks at it or when they observe the listeners' facial expressions to gauge how the listeners are feeling or to see if the listeners are paying attention to them. This kind of eye is independent from the meanings of linguistic articulation, hence non-linguistic eye. [E2] Eye to Show (Social/Communicational Eye) such as gazing during speaking is conventional and partly depends on culture. People with Asian culture tend to look at the receiver (listener) less frequently than people with Western culture.[6] For Japanese native speakers, averting eye from the listener (receiver) and looking at something not relating to the utterance is conventionally/culturally natural or even adequate. If the speaker keeps on gazing at the listener, it would feel aggressive.

Eye is independent from the content of utterance. It is mostly non-linguistic eye including eye gaze for keeping the relationship between the sender and receiver, which often appears at the beginning of the sentence, but can appear any time.

Eye for joint attention which co-occurs with demonstrative pronouns and pointing is paralinguistic or it is sometimes a prosodic phoneme, that is "suprasegmental phonemes". When the speaker asks "do you like this or that?" or "can you see that, over there?" with pointing, it is obligatory to see the reference. If the speaker fails, it is misleading or it feels ungrammatical.

When the speaker notifies that there is someone behind the listener(s) (receiver(s)), the speaker signals by eye, "I'm changing the subject because that person is watching" by eye. In such cases, eye is a gesture, hence a non-linguistic element.

[E3] Eye as Emotional Expression is sometimes related to the content of what the speaker articulates, but it is not necessarily linked to linguistic elements. Phonetic language speakers' emotional facial expressions including eye are nonlinguistic.

B. Eye of JSL Signers

Eye in sign language(s) is a linguistic component. Eye for verb agreement and role shift is probably universal. It is found in many sign languages such as ASL (American Sign Language), DGS (Deutschen Gebärdensprache, or German Sign Language), and JSL. [8][9][10] Eye in sign languages can be bound morphemes or free morphemes, and it is rule-bound (hardly different between individual signers).[8][9]

Eye in JSL can be: free morpheme, bound morpheme, prosodic morpheme, and para-linguistic marking.[3][4] In JSL, if the signer looks diagonally upwards, it refers to the third person (he or she). JSL signer can assume the place of each person the signer refers to in sentences or in discourses. In other words, the signer can create an imaginary place, in front of a signer's chest, where each person (subject or object in a sentence) takes his/her position, as if each character stands on the small stage in front of the signer. Once the place is fixed, the subject or object of the sentence is pointed by eye. It does not necessarily need hand signs such as /he/ or /she/. The signer expresses "He" in "He said …" or "He does…" by looking at the assumed place. In this case, the eye is a free morpheme.

If the signer looks at a manual sign and traces its movement by eye, the sentence implies that the signer actually experienced it. If the signer addresses the sentence without looking at the manual signs and looks at the receiver, that means the signer has only heard about it or simply knows it. It is a bound morpheme, because it does not appear on its own. Also, the sequence of hand signs, /TURN RIGHT//POST

OFFICE//BE/, means "turn right, then there is post office", if the signer gazes at the receiver (listener), while it means "when I turn right, I found post office", if the signer looks at the assumed place of post office. This is another example of bound morphemes.

In the case that it is not ungrammatical but unnatural, if the sender misses the eye, it is paralinguistic morpheme. Para-linguistic marking is not obligatory, but effective, like pause, slow tempo, and loud voice in phonetic language. Eye of phonetic language speakers is different from signers' eye. Their eye is irregular and unpredictable, except for eye with pointing. Their eye is often showing emotion unconsciously [E3]. However, eye in sign language is often a linguistic component and the signer follows the linguistic rules. Therefore, how eye appears is predictable.

[E1] Eye to See of signers, in principle, does not look at something around them, because eye gaze, eye movement, and eye expressions including squinting or widening the eyes are a very important part of grammar (phonology, morphology, and syntax). It is rude for signers, both senders and receivers, to avert eye or to look around, just as phonetic language speakers cover the ears.

As to [E2] Eye to Show of signers, gazing and eye for joint attention are always used during signing. However, they are not only social or communicational but also linguistic elements. There is gazing to set the conversation, fixing sender-receiver relation. This is gaze for communication, just as gazing of phonetic language. Gazing is used as subject-verb agreement, establishing location for subject or object or indicating adverbial (place, time), hence syntactic. Eye often appears with demonstrative pronoun which is mostly pointing. Pointing in JSL is used as demonstrative pronoun or as adverb meaning "there" or "at that time". Although eye for joint attention of non-signers (phonetic language speakers) always looks at the reference, signers' eye can be in a different direction from the reference, as seen in an example of /TURN RIGHT//POST OFFICE//BE/ implying that the signer knows where the post office is. If the signer looks in the same direction as the pointing, it means that the signer found the post office. Thus, this eye is a bound morpheme. Yes/No question and WH question are differentiated by eye: the former is wide opening eye and the latter is squinting. These are suprasegmental phonemes.

Finally, [E3] Eye as Emotional Expression of signer is often conscious being adverbial and adjectival. This kind of eye is linguistic.

C. Eye in Indian Classical Dance

Indian classical dance has precise rules about hand, head, eye, and body, very similar to those in JSL. Natyashastra prescribes eight eye movements, nine eyelids, and seven eyebrows which form 36 eyes expressing 36 states of mind.[2][11]

I will use linguistic terms for elements of Indian classical dance, because most of the definitions of language by linguists apply: being arbitrary and rule-governed, having discrete units, and cultural transmission. Only duality of patterning seems lacking in Indian classical dance. People may doubt that it has duality of patterning by which senders can create and produce an infinite number of new sentences. However, the dancer I interviewed improvised modern events by dancing. It might be worth experimenting to see to what extent it is creative and productive. It was certainly born and succeeded for traditional pieces of dance and drama; therefore, Natyashastra does not assume the rule is used for daily conversation. But that does not mean that no one can use the system in daily conversation.

The equivalent of morphemes in Indian classical dance are Mudra. Mudra can be both free morpheme and bound morpheme. A single mudra can appear in various positions, moved in different directions, and combined with other body movements, facial expressions, and eye. The handshape itself is the constant, the "noun" of the sentence, but if the movement is added it can be "verb" and "adjective."

In terms of eye, there are both morpheme and phoneme. In chapter VIII of Natyashastra, there are 36 drsti (eye expressions): eight "Glances to express the Sentiments," eight "Glances to express Dominant States," and 20 "Glances to express Transitory State." Each of them has a name and meaning, such as Kanta (pleasing), Bhayanaka (terrible), and Hasya (smiling). Since they have meaning, they are the equivalent of morpheme. These morphemes are combined with other morphemes such as Mudra, foot step, and body posture.

These morphemes consist of three kinds of phonemes: Drishti (eye movements), Puta (eyelids), and Bhru (eyebrows). They are the smallest units having no meanings, hence phonemes:

- 8 Drishti (Eye movements): Sama (level), Saci (side-long), Anuvrtta (inspecting), Alokita (casual), Viokita (looking around), Pralokita (carefully looking), Ullokita (looking up), Avalokita (looking down);
- 9 Puta (eyelids): Unmesa (opening), Nimesa (closing), Prasrta (expanding), Kuncita (contracted), Sama (level), Vivartita (raising up), Sphurita (throbbing), Pihita (resting), Vitadita (driven);
- 7 Bhru (eyebrows): Utksepa (raising), Patana (lowering), Bhrukuti (knitting), Cantura (clever), Kuncita (contracted), Recita (moving), Sahaja (natural).[2]

They all represent physical movements or shapes, but have no symbolic meanings (no references), although the English translations do not seem consistent. For example, Saci is "the eye balls are covered by eye lashes" "to looking through the corner of the eyes." Phoneme should not include other phoneme such as eye lashes and the aim "to looking...." Also Anuvrtta, "glance which carefully observes any form", is not a mere physical movement. However, recent videos for training describe Saci as "looking through the corner of the eyes" and Anuvrtta as "moving eyes up and down rapidly." Alokita also changed from "suddenly seeing any object" in Natyashastra to recent "rolling eyeballs in a circular pattern." They became more consistent, more phoneme-like explanations. This shows that Drishti phonemes have been perceived, to this day, more firmly as the equivalent of phoneme.[12][13]

Thus, eye expressions in Indian classical dance are morphemes which consist of phonemes. These function all through the performance. Eye can be regarded as linguistic elements which are all shown to the audience, that is [E2] Eye to Show. On the other hand, the meanings of eye morphemes are all about emotions.

There are stories and dramas in Indian classical dance and a dancer acts as someone in the story. Therefore, the dancer sometimes looks at the assumed position of someone else or something. In such cases, they are not expressing morphemes (and phonemes). This kind of eye is [E1] Eye to See, but fictitious [E1], or [E1] of impersonation. Sometimes dancers look at the audience, when setting changes, which is also [E1]. In both cases, eye is [E1] converted to [E2].

The most noteworthy point is that eye as morphemes all have emotional meanings. (In the following examples the underlines have been added by the author of this article.)

51. Bibhatsa; The Glance in which the cornets of the eyes are nearly covered by eyelids, the eyeballs are disturbed in disgust and the eyelashes are still and closed to each other, is called Bibhatsa (odious)

59. Jugupsitā: The Glance in which eyelids are contracted but not joined together, and the eyeballs are covered and are turning away from the object coming in view (lit. the place in view) is called Jugupsitā (disgusting); it is used in disgust.[2]

The underlined parts suggest the rules of eye are made based on the facial expressions of everyday people, which is closely related to the act of seeing.

Charles Darwin insisted in *The Expression of the Emotions in Man and Animals* that human eye movements and facial expressions evolved from animal behavior.[5] For example, he explained the expressions of surprise and fear as follows. When we are surprised, our eyes open wide as an instinct to let in more light and quickly assess our surroundings. The contraction of eyebrow muscles has the effect of widening our field of vision. Such eye movement was originally survival behavior and has become established as signs of emotion.

Darwin also explained that squinting when concentrating is for blocking out unnecessary light and seeing objects more clearly. This is similar to, according to him, the behavior of animals pursuing certain prey. Darwin concluded that facial expressions are not simply cultural conventions but have a biological basis, hence universal to a large extent.[5]

6. CONCLUSION

It became clear that there exist nonlinguistic eye, paralinguistic eye, and linguistic eye. I proved, through analysis of eye accompanying phonetic Japanese, eye of JSL signers, and eye in Indian classical dance, that there is a universal direction in which eye is sophisticated, and there is a universal mechanism which makes

us perceive eye as discrete units such as phoneme and morpheme which makes eye to be symbols of a rule-governed system for communication, that is language. To prove that Indian classical dance is "language," further research is necessary. But surprisingly Natyashastra distinguishes these two kinds of eye, the equivalent of phoneme and the equivalent of morpheme, which has not yet succeeded for eye of sign language(s).

Three kinds of eyes are universally and naturally related as Darwin insisted. Being converted to each other, three kinds of eye are sophisticated to be elements of a complicated communication system and finally become elements of language.

Acknowledgement

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