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Linguistic Eye and Artistic Eye-Their Origin and Evolution

Kurumi Saito [1]

[1] *Research Center for Advanced Science and Technology, The University of Tokyo, Tokyo, Japan*

*Corresponding Author Email: kurumi0917@gmail.com

ARTICLE INFO	ABSTRACT
	Eye has been said to fall into three types; EYE FOR SEEING (Looking at something), EYE FOR SHOWING (gazing and joint attention), and UNCONSCIOUS EMOTIONAL EYE. There are, however, the fourth and the fifth type; LINGUISTIC EYE in Japanese Sign language and ARTISTIC EYE in Indian classical dances. LINGUISTIC EYE and ARTISTIC EYE are probably the most sophisticated eyes. The purpose of this study is elucidating the relationship among these five types of eyes. LINGUISTIC EYE is closely related to EYE FOR SEEING. The complicated thing is, signers of Japanese Sign Language can have also UNCONSCIOU EMOTIONAL EYE beside LINGUISTIC EYE during signing. Eye of Indian classical dance is emotional eye, but it is not unconscious. This study also explores the process by which human eye evolved from EYE FOR SEEING to other types of eyes. **Keywords:** Eye for seeing, Indian classical dance, evolution of eye, sing language.

INTRODUCTION

Eye has been said to fall into three types; [T1] EYE FOR SEEING (Looking at something), [T2] EYE FOR SHOWING (gazing each other and joint attention), and [T3] UNCONSCIOUS EMOTIONAL EYE. [T1] has been studied by ophthalmologists and neurologists. [T2] can be called social eye or eye for communication which has been studied by psychologists or researchers of communication. It is widely known that eye gaze direction has the same function of arrow direction, hence it is utilized in joint attention. When human being express events, thoughts, or feelings, spoken language, hand movements, eye gaze/movement, and facial expressions are all mixed together. Eye in communication is used for sending some messages. It is not used for perceiving visual information. [T3] has been studied by mainly by neuropsychologists and researchers of engineering with eye-tracking technology. There are, however, the fourth and the fifth eye; [T4] LINGUISTIC EYE in Japanese Sign Language and [T5] ARTISTIC EYE in Indian classical dances. [T4] LINGUISTIC EYE and [T5] ARTISTIC EYE are rule-governed and the most sophisticated eyes. They are closely related to and perhaps originated from three types of eyes, [1],[2], and [3].

OBJECTIVES

The purpose of this study is elucidating the relationship among the five types of eyes, [1],[2],[3],[4], and [5]. This study also explores the process by which human eye evolved from EYE FOR SEEING to other types of eyes.

LITERATURE REVIEW

Three Types of Eyes:

Eyes of human beings and animals are organs for seeing. Eye for seeing has been studied focusing on mechanism of vision and visual impairment or vision problems. White sclera of humans is larger and whiter than that of other animals, which suggests that it evolved for communication.[1]

Gazing and joint attention are universal in human development, and they are very important for babies to acquire communicative ability. It starts with gazing between a baby and its caregiver (eg. parents). This eye contact between a baby and its caregiver is the first step of socio-emotional development as well as communication. It makes

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communication channel. The next step is "joint attention" in which a caregiver leads the baby's eye to the reference often with pointing. A baby and its caregiver look at the same reference together. It is the beginning of language activity. Language refers to something and the receiver and the sender share the same reference. Joint attention is the first step of language

acquisition.[2][3] There are, in terms of communication, a sender and a receiver in gazing and joint attention.

[T2] EYE FOR SHOWING can signal "I am looking at you" or "I am looking at something (to share the reference)". It is important for a baby to know that someone is looking at him/her or someone is looking at something. Thus, [T2] EYE FOR SHOWING is "eye for showing that the person is looking at something." In other words, [T2] EYE FOR SHOWING is "SHOWING EYE FOR SEEING".

[T3] UNCONSCIOUS EMOTIONAL EYE has been researched using eye-tracking technology and came to be measured precisely. [4][5][6][7] This type of eye seems to be directly connected with eye for looking at something.[8] For example, human beings, when disgusted, narrow eyes because they don't want to see what disgusts them. Other examples are; closing eyes in fear and squinting in doubt to look precisely. Charles Darwin already pointed this out; we widen our eyes in surprise and stare in confusion wanting to observe more closely, or close our eyes, when frightened, not wanting to see something frightening. Darwin hypothesized that human expressions of emotion originated from sensory function rather than social communication [8].

In the sections below, I present the researches of [T4] LINGUISTIC EYE and [T5] ARTISTIC EYE. The former is seldom known to researchers other than sign linguists. The latter has not been studied scientifically as "research on eye", although the dancers have been trained to become masters of using their eye.

Linguistic Eye in JSL (Japanese Sign Language) [T4]:

Eye in sign language is linguistic components. Eye used for marking of verb agreement and/or role shift is probably universal. It is found in many sign languages such as ASL (=American Sign Language) [9][10], DGS (*Deutschen Gebardensprache* = German Sign Language) [11] and JSL (Japanese Sign Language) [12][13]. Eye in sign languages can be bound morphemes or free morphemes, and it is rule-bound (hardly different between individual signers), which researchers other than sign linguists seldom know [9][11][14][15].

Eye in JSL (Japanese Sign Language) can be; free morpheme, bound morpheme, prosodic morpheme, and Para-linguistic marking [15]. In JSL, if a signer looks diagonally upwards, it refers to the third person (he or she). Also, JSL can assumes the place of each person the signer refers to in sentences or in discourses. In other words, it 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. If the place is fixed, the subject or object of the sentence is pointed by eye. Expressions followed by the first statement do not need the hand sign, /he/ nor /she/, because eye will do. The signer expresses "He" in "He said …" or "He does…" by direction of eye, that is, 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, or moves his/her eye along classifiers, the sentence implies that he/she actually experienced it. If the signer addresses the sentence without looking the manual signs and moves his/her eye to the recipient, that means the signer heard about that or he/she 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 recipient (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.

If eye which accompanies the hand sign refers to the subject or object of each sentence, and it is not ungrammatical but unnatural, even if the sender misses the eye, it is a prosodic morpheme.

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Para-linguistic marking is not obligatory, but effective, like pause and emphasis in phonetic (oral) language. One of "para-linguistic markings" is Eye Gaze as Setting-Switch Marking [15]. It is needed in JSL when the signer has to show that the time, place, and/or the subject of the statement changes. It appears also in Indian classical dances and Japanese traditional performing arts, *kodan*, *rakugo*, and *kyogen* as I will mention in the next section.

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 [T3]. It partly depends on culture. Asian people tend to look at the receiver (listener) less frequently [16]. However, eye in sign language is a grammatical component and the signer follow the grammatical rules. Therefore, how eye appears is predictable.

Artistic Eye in Indian Classical Dances [T5]:

Indian classical dances have strict regulations of hand shapes, hand movements, body movements and facial expressions including eye. They are very similar to sign language. According to a dancer the author interviewed, dancers can improvise expressions explaining incidents of modern society. Also, there appears Eye Gaze as Setting–Switch Marking as JSL. Dancers use it, as if they confirm the channel between them and the audiences. It is not gazing each other like [T2]. It appears even if there is no audience. There are a few schools (genres) in Indian classical dances, which put a stick with lamp on the ground as a symbol of God, and dancers gaze at it, instead of gazing at the audiences. Such artistic eye does not expect someone to gaze back, and the audiences are not expected to look at the same reference (God) either, hence it is not [T2] (eye gazing and joint attention). But it relates closely to [T2] or maybe it originated from [T2]. There is the same kind of eye in Japanese traditional performing arts such as *kodan*, *rakugo*, and *kyogen* [15]. It is needed when dancers or performers bring the audiences back to the real world, after they showed the fictional world where the audiences do not belong to. This kind of eye does not appear in movies and plays.

Natyashastra is the ancient Sanskrit encyclopedic treatise on the arts [17][18]. It is the oldest manuscript which explains the technique of Indian classical arts such as dances and dramas. It was written in verse probably between 200 BCE and 200 CE, though estimates vary between 500 BCE and 500 CE.   This is the oldest and largest document about Indian arts. The rules in *Natyashastra* are still followed in present-day performance of classical dances such as *Kathakali, Mohiniyattam,* and *Bharatanatyam*.

Natyashastra explains the movements of both major and minor limbs in Indian dances. The major limbs of the body including the head, hands, chest, sides, waist, and feet are in *Angas*, while the minor limbs of the body including the eyes, eyebrows, nose, lower lip, and chin are in *Upangas*. The movements of these limbs are used to express incidents, emotions, states, and suggestions. The proper use of these limbs can help dancers perform with more aesthetic sense and less risk of injury [17]. There are 36 eyes (*drsti*) in *Natyashastra*, in *Upangas*; with other face expressions; eight "Glances to express the Sentiments", eight "Glances to express Dominant States", and 20 "Glances to express Transitory State".

In Indian classical dances, there is Eye Gaze as Setting–Switch Marking as I mentioned. Although such an eye is not in *Natyashastra*, it may be a key to elucidate linguistic and artistic eye.

There is no previous research which studies eye in Indian classical dances comparing with or contrasting to the three types of human eyes.

METHODS

It is certain that the author(s) of *Natyashastra* and the successors including leaders, mentors, and dancers/actors have been recognizing, interpreting and utilizing the human eye. Therefore, they had made the strict rules before *Natyashastra*. On the other hand, eye in JSL is less artificial. Sign language emerges as a natural language. Each component or element such as hands, body direction, and eye has developed all together as a whole language. No one has had intention of "regularizing" it, as no linguistic rules are artificially or intentionally stipulated.

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I analyzed 36 eyes in *Natyashastra* which have been maintained to this day. I compared and contrasted them with LINGUISTIC EYE of JSL [T4]. I also clarified the difference and relationship between (1) "Glances to express the Sentiments", (2) "Glances to express Dominant States", and (3) "Glances to express Transitory States".

I found the similarities and differences between linguistic/artistic eye ([T4] [T5]) and each of [T1], [T2] and [T3]. I clarified also the similarities and differences between [T4] and [T5].

The criteria of analysis are their role and/or function, their position in the overall structure of the systems (JSL and Indian classical dances), and their meaning and/or reference. I first assumed, for convenience, that Indian classical dances would have a linguistic structure like sign language and looked for its linguistic elements. I explored whether the eye of Indian classical dances could be free morphemes, bound morphemes, prosodic morphemes, and para-linguistic elements. I focused on linguistic nature such as flexibility and creativity.

RESULTS AND DISCUSSION

The following is results (findings) and discussions on five kinds of eyes.

Similarity and Difference between Linguistic Eye and Artistic Eye:

JSL and Indian classical dances both have precise and complicated rules. Hands, body and facial expression including eye are elements of expression and how to use the elements are regulated by detailed rules.

There is Eye Gaze as Setting–Switch Marking in sign language and Japanese traditional performing arts. This is not gazing each other as seen in a baby and its caregiver [T2], but a rule-governed marking. It automatically appears when setting (subject of the sentence, time, place) changes. This has similar function as punctuation in writing. Indian classical dances also have Eye Gaze as Setting–Switch Marking. However, [T4] and [T5] should not be put in the same category as will be discussed below.

The following is eye in Indian classical dances, as seen in *Natyashastra*. In *Natyashastra* "Thirty-six Glances (*drsti*)" fall into three categories. It is rather difficult to understand the difference among these three categories. (English translation in the following is by Muni [12].)

(1) Glances to express the Sentiments

Kanta (pleasing), *Bhayanaka* (terrible), *Hasya* (smiling), *Karuna* (pathetic), *Adbhuta* (of wonder), *Raudri* (cruel), *Vira* (heroic), *Bibhatsa* (odious)

(2) Glances to express Dominant States

Snigdhā (loving), *Hṛṣṭā* (joyful), *Dīnā* (pitiable), *Kruddhā*, (angry), *Dṛptā* (haughty), *Bhayānvita* (awestricken), *Jugupsitā* (disgusting), *Vismitā* (astonished)

(3) Glances to express Transitory States

Śūnyā (vacant), *Malinā* (pale), *Śrāntā* (tired), *Lajjānvitā* (bashful), *Glānā* (lazy), *Śaṅkitā* (apprehensive), *Viṣaṇṇā* (dejected), *Mukulā* (no translation, explained as "the eyeballs are open in happiness"), *Kuñcitā* (contracted), *Abhitaptā* (distressed), *Jihmā* (crooked), *Lalitā* (amorous), *Vitarkitā* (conjecturing), *Ardhamukulā* (no translation, explained as "the eyeballs are half-blown and slightly mobile"), *Vibhrāntā* (confused), *Viplutā* (disturbed), *Ākekarā* (half-shut), *Vikośā* (full-blown), *Trastā* (frightened), *Madirā* (intoxicated)

After these 36 eye expressions with detailed explanations, the ways to move eye physically follow.

The above (1) – (3) look complicated and redundant, but the three are not a categorization of emotions; (1) means audiences' emotions when they see a performance, (2) static, and/or permanent emotion, and (3) transitory emotions. Here are the extractions of the similar emotions from (1), (2) and (3) (translated by Muni [12]).

(1)- 51. *Bībhatsā*: 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 close to each other, is called *Bībhatsā* (odious).

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(2)-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.

(3)-77. *Viplutā*: The Glance in which the eyelids [first] tremble and then become motionless and the eyeballs are [again] disturbed, is called *Viplutā* (disturbed).

(Underlines added by the author of the present article.)

The sentence (1)-51 includes "the eyeballs are disturbed in disgust", which suggests the rules of eye are made based on the facial expressions of everyday people. (2)-59 is very similar to (1)-51. The difference may be that (2)-59 is the static "states" of the emotions described in (1)-51. Interestingly, it mentions that people close eyes when disgusted, because they want to "turn away from the object coming in view". This is what Charles Darwin and some modern researchers such as Lee and Anderson assume [8].

(3)-77, expresses human instant reaction. The state, "the eyeballs are [again] disturbed" becomes eventually (1)-51 and (2)-59. Next example is as follows.

(1)-45. *Bhayānakā*: The Glance in which the eyelids are drawn up and fixed, and the eyeballs are gleaming and turning up is called *Bhayānakā* (terrible). It indicates a great fear and is used in the Terrible Sentiment.

(3)-80. *Trastā*: The Glance in which the eyelids are drawn up in fear, the eyeballs are trembling and the middle of

the eye is full-blown due to panic, is called *Trastā* (frightened).

The word "trembling" describes the way in which eye momentary reacts. The question is, if it is possible to make eyeballs tremble. The answer is in the training video, "Kathakali eye movements" by Yotam Jacobson [19] and Kathakali Dance "Kathakali Eye Exercise", by Nadaeye. [20] It is possible after long time practices.

The important point is that eyes in (1), (2), and (3) are all about emotions, feelings, or states of mind. They do not have arrow-like function. Each of them is an independent semantic symbol. There is no eye behaving as bound morphemes as seen in JSL. Eyes in *Natyashastra* are independent elements and accompanied, in principle, by the other signs such as hand shape and hand movement. There is an exceptional case in which only eye movement (right to left, left to right) is shown without other signs, for example, in overture to attract audiences' attention. Since eye in Indian classical dances has meanings of emotions, the explanations statements are often written with the description of eyelids and eyebrows.

The fact that eye of JSL signer is linguistic element does not mean the signers have no emotional facial expressions. On the contrary, emotional facial expressions such as squinting or opening eyelids like in Indian classical dances do appear, but they are not rule-governed. Facial expression of the signers has been discussed for a long time, because it is different from that of hearing people. But in appearance, linguistic facial expression and emotional facial expression are all mixed together, which makes research difficult. At present, research is ongoing into extracting linguistic facial expressions including eye gaze and eye movement, but their relationship to emotional facial expressions is extremely complex and no conclusion has been reached.

Unlike eye in JSL, eye in Indian classical dances is not used as functional morpheme. Functional morpheme has grammatical function but it does not have lexical meanings. Most of eyes in JSL have arrow-like function, like eye in joint attention [T2]. The list of eyes in *Natyashastra* is a kind of "lexicon", where each eye has meanings which refer to emotion.

The most striking difference between [T4] and [T5] is as follows. Eye in JSL can be linguistics elements. The signer shows his/her eye to the recipient like he/she shows the hand signs. The eye works in combination with other elements, such as hands, feet and body movement. They may also express unconsciously emotional eye.

It is difficult for the sender to show emotional eye [T3] while showing linguistic eye. On the other hands, each of eye in Indian classical dances has a meaning which refers to human emotions. Each of hand(s) in Indian classical dances has also the meanings similar to nouns and verbs of phonetic language. That does not mean, however, eye is adjective.

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It cannot modify a noun. It is noteworthy that each part of the body expresses semantically different category. For example, eye expresses emotions while hand(s) express(es) action and situation. Each of them has independently its meaning.

In terms of flexibility, eye in JSL [T4] and eye in Indian classical dances [T5] are opposites. All the elements in Indian classical dances are fixed by strict rules. Linguistic elements such as bound morpheme can be combinded each other, while elements of Indian classical dances cannot.

In terms of creativity, eye in JSL is more creative than Indian classical dances. Indian classical dances are able to express variety of things because there are tremendous number of semantic symbols using hands, feet, eyes and other facial expressions. However, the regulation is rigid and original performance and creativity are not allowed. Every symbol in Indian classical dances has a detailed definition, making it difficult to create new symbols. Because JSL is a natural language, it has rules for connecting phonemes and morphemes and it has some elements which do not have fixed meanings, therefore it can create nearly infinite number of expressions, like phonetic languages such as English and Japanese.

Relationship of T4 and T5 with the Three Types [T1], [T2], and [T3]:

Eye in Indian classical dances expresses emotions. But it is not the same as [T3], because eye in Indian classical dances is not "unconscious" but intentional. Dancers have been strictly trained to follow the regulations.

Eye in JSL is, on the other hand, closely related to EYE FOR SEEING [T1]. When it has semantic implication, it often expresses "the subject (or object) SEEs something". But it is often used as functional morpheme, which has no semantic implication.

Both EYEs are EYE FOR SHOWING, because the senders send eye to recipient(s). In this respect, both are categorized as [T2]. However, eye of [T2] cannot be semantic symbols nor functional morphemes. It might as well be said that [T2] can be sophisticated to be LINGUISTIC EYE and ARTISTIC EYE.

If Charles Darwin's assumption is right, [T3] originated from [T1]. [T2] can be said in the same way. It is plausible that [T2] is for showing what the person is looking at. Then [T4] and [T5] are originated from [T1] in the end. However, the question is, (i)whether it is possible to explain the reason why eye goes upward (or downward), when we are thinking something, (ii) whether eye can be really "trembling" when we are frightened like in (3)-80 above. Some highly technical eyes such as keeping on trembling pupils or keeping on rotating pupils need years of training. Human beings do not utilize such eye movement for "seeing". Even if eye of JSL and Indian classical dances originated from EYE FOR SEEING, unique rules must have evolved within each system, and probably they have been sophisticated further and they have developed detailed symbols for themselves.

CONCLUSION

There are [T1] EYE FOR SEEING (Looking at something), [T2] EYE FOR SHOWING (gazing each other and joint attention), and [T3] UNCONSCIOUS EMOTIONAL EYE. In addition, there are [T4] LINGUISTIC EYE in JSL and [T5] ARTISTIC EYE in Indian classical dances. [T4] and [T5] are rule-governed eyes. These two types are probably the most sophisticated EYE FOR SHOWING [T2]. But each of them has distinctive characteristics. Eye in JSL can be bound morphemes or free morphemes, while eye in Indian classical dances [T5] cannot.

The most striking difference between [T4] and [T5] is, that sign language is natural language having the same characteristics as phonetic language in terms of structure which consists of phonemes and morphemes, hence it is creative and flexible. On the other hand, Indian classical dances have an artificial and technical systems. The rules are rigid like lists of lexicons. The 36 eyes are bound by the precise ways to express and their meanings are fixed. Therefore, eye use in Indian classical dances is not as flexible and creative as that in sign language.

Eye in *Natyashastra* is psychological or emotional eye, which can be regarded as [T3]. It is noteworthy that the author of *Natyashastra* defined "*Jugupsita* (eye of disgusting)" as "the eyeballs are covered (by eye lids) and are turning away from the object coming in view". This means psychological/emotional eyes [T3] originated from EYE FOR

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SEEING. The reason why disgusting face expression has narrowed eye is, that they do not want to SEE that. Thus, as Charles Darwin hypothesized, our expression originated from sensory function rather than social communication.

Indian classical dances kept everyday people's emotional facial expression, but probably exaggerated and evolved into many symbols.

To sum up;

1. [T1] EYE FOR SEEING evolved to [T2] EYE FOR SHOWING, then further it became sophisticated to [T4] rule-governed LINGUISTIC EYE in JSL and [T5] rule-governed ARTISTIC EYE in Indian classical dances. ([1]→[T2]→ [T4] and [T1]→[T2]→[T5]).

2. There is eye very similar to and related to [T2] other than eye gaze and joint attention; Eye Gaze as Setting-Switch Marking. Partly because of this, [T4] and [T5], as well as Japanese traditional performing arts, appear similar.

3. [T3] UNCONSCIOUS EMOTIONAL EYE probably originated from [T1] EYE FOR SEEING, then it became further sophisticated to [T5] rule-governed ARTISTIC EYE in Indian classical dances. ([T1]→[T3]→[T5])

4. Eye in Indian classical dances are fixed rigidly, while eye in JSL is flexible and creative.

Further researches are needed as follows. It has not yet been proved enough that emotional eye originated from [T1] EYE FOR SEEING as Chales Darwin hypothesized. Therefore, further research is necessary. Also, linguistic eye in sign language is mixed together with emotional eye in signers' expressions, therefore more precise observation and analysis are necessary in order to clarify the difference between emotional eye of speakers of phonetic language and that of signers and in order to clarify how linguistic eye and emotional eye of signers appear during signing. Finally, although Indian classical dances cannot be regarded as language, it has certainly rule-governed system. Further research is needed to explore if there is other examples of the same system as Indian classical dances and if there is other kind of communication systems which might have eye other than five types.

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