Index in Sign Language: An interface requirement in search of features

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Abstract

The centrality of feature in syntax upholds the view that features or feature bundles drive the syntactic computations (Chomsky 1995); suggests that the syntactic projections are drawn identifying each head with a single feature (Kayne 1994), and eventually attaining the size of a morpheme, a word and a phrase (Starke 2009). Such feature based account introduces a sense that syntax is "language-free" (see Starke 2009 for details); cross-linguistic similarities and differences are rather due to the feature/s, and all linguistic phenomena and structures can be analysed syntactically which can be summarised as 'there are features, and none other enters into computation.'

This tenet seems to be promising in cross-linguistic, cross-modality studies specially in the study of various aspects of structure in sign language which have no parallel in spoken language which are generally dubbed as sign language universals. One such phenomenon is a type of pointing gesture in sign language that the signer uses to point to someone or something either manually and/or non-manually with the eye gaze or the body orientation. It is often labelled as INDEX, and is used to refer to an object, referents, spatial location, or events around the signer and the addressee in a common observable space. In sign language literature, such phenomena are generally ascribed to the modality differences that the sign language employ. Such ascriptions, however, paradoxically fail to provide account of phenomena arising from the same C-I system as the difference between sign and spoken language is the difference of the S-M system that impose different optimal conditions for convergence rather than the difference of the C-I system.

This paper aims to address that the 'modality differences' do not make sign language unique by virtue of its S-M system, rather the interface requirements of the S-M system creates the differences in terms of the feature, and INDEX refers to such feature(s). It aims to provide an account of the structure building feature(s) associated with various instances of INDEX in Indian Sign Language based on feature inventory sugggested by Wiltschko (2009), Nevins (2007), Harbour (2006), Déchaine and Wiltschko (2002, 2007), Ghomeshi, Paul and Wiltschko (2009), etc. among others.

This paper is divided into four broad sections. In section 2, the facts relating to INDEX in Indian Sign Language are described specifically showing the multiple syntactic functions of INDEX in the grammar of Indian Sign Language. A summary of the previous analyses of INDEX in

sign language literature is provided to highlight the inadequacies in the explanation of the phenomenon under discussion in section 3. In the following concluding section, based on feature inventory, the papers draws a feature inventory of INDEX in Indian Sign Language, and shows that it is associated with multiple features in congruity; and each instance of INDEX refers to the feature(s).

Key words: localisation, index, feature, value

1. Introduction

Syntactic research paved a way for growing 'syntactisation' of argument structure (Hale & Keyser 1993), discourse/information structure (Rizzi 1997; Haegeman 2010), pragmatics (Tenny 1987; Kidwai 2010), and of semantics. At the same time, it also led to the centrality of feature in syntax as Chomsky (1995) up holds the view that features or feature bundles drive the syntactic computations. Acknowledging the centrality and the gravity of the features in syntax, Kayne (1994) suggests that the syntactic projections are drawn identifying each head with a single feature.

Cartography as a research program, turned out to be a complement drawing detailed maps of syntactic configurations resulting a fine-grained structure. Further, it aims to study feature inventory of UG – the properties of human thought and belief system that are represented as grammatical features, and 'the structure and functioning of the cognitive systems at the interface with the syntactic module' (Cinque & Rizzi 2010: 63).

Such syntactic studies and aims prove to be a precedence for Nanosyntax, a novel approach to the architecture of grammar which assumes that 'syntax projects from single features and nothing else. Single features are merged together into the familiar binary branching trees, eventually attaining the size of a morpheme, a word and a phrase. Syntax doesn't build on morphemes, it builds morphemes' (see Starke 2009: 6 for details).

One of the novelties that Nanosyntax introduces is a sense that syntax is "language-free" (Starke: ibid.). In other words, cross-linguistic similarities and differences are rather the result of 'size' of spell out of the fine-grained structures i.e. features. Similarly, lexicalisation and grammaticalisation can be viewed as feature based operations. In the similar spirit, portmanteau, allomorphy and syncretism are de/composed along the features that constitute them.

As a natural outcome of such feature based approaches, all linguistic phenomena and structures can be analysed syntactically which can be summarised as 'there are features, and none other enters into computation.' This tenet seems to become a promising approach not only

in cross-linguistic but also in cross-modality studies specially in the study of various aspects of structure in sign language.

Sign language research has exhibited that there are phenomena which have correlate with spoken language. Such correlates are generally described and recast as spoken language equivalent, largely following a Test and Transfer approach (see Fischer 1978: 309; Vermeerbergen 2006: 172). However, there are also phenomena which have no parallel or correlate in spoken language. Such phenomena are generally dubbed as sign language universals; and are ascribed to the 'modality differences' that the sign language employ.

Such ascriptions, however, paradoxically fail to provide account of phenomena arising from the same C-I system as the difference between sign and spoken language is the difference of the S-M system that impose different optimal conditions for convergence rather than the difference of the C-I system. Secondly, such ascriptions do not provide an account of 'modality differences' in terms of optimal conditions that the S-M system impose, features that are grammaticalised by virtue of it, and the features that constitute such phenomenon. Consequently, the cross-linguistic and the cross- modality generalisations and differences are merely terminological or modality based rather than based on the features that consitute the phenomenon in question.

On the other hand, the appeal of feature based approach is, first and foremost, due to the fact that it is an impetus to overcome these shortcomings. With the advancement of feature based accounts, many traditional assumptions and analyses have been questioned and/or the phenomenon is studied afresh. Such advancement have not only drawn finer, precise details but also have chartered into features that theory of language, and theory of mind, are built upon.

In this paper, following the spirit of feature based approach, one such phenomenon in sign language which is often labelled as INDEX is reexplored (as a small initiative to a larger project). The paper aims to address that the interface requirements of the S-M system impose the differences in terms of the feature, and INDEX refers to such feature(s); and to provide an account of the structure building feature(s) associated with various instances of INDEX in Indian Sign Language (henceforth, ISL).

This paper is structured as follows: In section 2, the facts relating to INDEX in ISL are described showing the multiple syntactic functions of INDEX in the grammar of ISL. A brief summary of the previous analyses of INDEX is provided in section 3. The following section is on the composition of features expressed in INDEX in ISL, and shows that the multiple functions of INDEX is associated with multiple features in congruity; and each instance of INDEX refers to a

subset of features from the feature inventory of INDEX. Section 5 concludes.

2. Localisation and Index in ISL

In the sign language literature, an INDEX refers to a type of pointing gesture that the signer uses to point to someone or something either manually and/or non-manually with the eye gaze or the body orientation; and the act as indexing.[1] It is used to refer to an object, referents, spatial location, or events around the signer and the addressee in a common observable space, which I refer to as 'real reference frame.'

It is commonly observed in sign languages that a signer has an option to refer to a referent located in the real reference frame. The signer can choose to articulate the sign for the referent in its every instance; or the signer need not articulate a sign for the referent, rather indexing to the particular referent suffices to refer to the referent. However, in the absence of an appropriate referent in the real reference frame, the signer articulates the sign for the referent and assigns it a distinct, specific locus in the signer's signing area through indexing termed R(eferential) locus. I refer to such a reference frame as 'abstract reference frame' opposed to 'real reference frame,' and the unified one as 'linguistic reference frame.'

In the sign language literature, the articulation of the sign and the assignment of a particular R-locus to it is called localisation. Interestingly, localisation does not necessarily require INDEX. A sign can be localised by virtue of articulating it in the desired locus, without being followed by an INDEX. I shall recall these two types of localisation by descriptive labels - manual localisation and non-manual localisation, respectively.

In ISL, manual localisation involves the articulation of the [HANDSHAPE: G or B] above with or without eye gaze. It can be effected on either the ipsilateral or the contralateral side of the signer following a sign to be localised.[2] In non-manual localisation, the referent is either localised by the eye gaze, or by employing the strategy of role play (described below), in the discourse.

eg: IPSI
torso: IPSI
(1) R-A-M S-I-T-A IX $^{\text{LOC: CONTRA}}$ LIKE
Ram likes Sita.

1 It is also observed that index is also used for [HANDSHAPE: G] in which the index finger is used. There is a tendency, therefore, to discuss any sign formed with index finger under the rubric of index.

2 Zeshan (2003) mentions that it can either precede or follow a sign it localises. However, such instance is not observed in my corpus.

In (1), a signer localises RAM non-manually with an eye gaze at the ipsilateral side of the signer (for the notation system used in this paper see Notation Conventions). This is followed by manual localisation of SITA on the contralateral side. In the articulation of LIKE, the signer orients his/her body towards the ipsilateral side facing the R-locus associated with SITA. The subsequent INDEX to R-loci at the ipsilateral and the contralateral sides suffice to refer to RAM and SITA, respectively.

In ISL, however, not all nouns allow localisation: only [+animate], [+concrete], [+locative] nouns may be localised, and [+abstract], [+mass], and [+generic] nouns may not. It shows that there is semantic restriction regarding localisation. Interestingly, there may be intervening material between a noun and localisation like adjective that modifies the noun.

(2) BOOK RED IX $^{\text{LOC: IPSI}}$ OLD
A red book is old.

Despite such restrictions, one of the most striking functions is – once a referent is localised resulting an R-locus, an INDEX to the R-locus suffices to refer to the same referent unambiguously, even after many intervening signs in the discourse as shown in (3). This anaphoric function of INDEX has been stolen the limelight, and has led to analyse INDEX as pronoun in sign language literature.

(3) ANCIENT-PAST KING IX$^{\text{LOC:IPSI}}$ .IX$^{\text{IPSI}}$ FEM-BORN THREE HAVE. ^{3}OLD
Once upon a time, there was a king. He has three daughters. (He was) old.

Another phenomenon which has barely received any attention in literature is associated with localisation and index. It is related to the dynamicity inherent to both reference frames, where referents may change discourse space-time. Consider the example from Indian Sign Language (Sinha 2003, 2008) in (4), concentrating on how the referent MONKEY is treated.

(4) a. MONKEY IX$^{\text{LOC: IPSI}}$ BIG
A monkey is big.

b. TREE $^{\text{LOC: CONTRA}}$ $_{\text{IPSI}}$ CLIMB $_{\text{CONTRA}}$
(The monkey) climbs a tree.

c. IX $^{\text{CONTRA}}$ APPLE=EAT
The monkey eats an apple (on the tree).

3 A sign glossed as HAVE basically marks non-inherent possessions, and also shows thespatial location of a Figure and a Ground.

In (4a), MONKEY is manually localised at the ipsilateral side of the signer at the [LOCATION: v1-h-l], thereby identifying the frame to the abstract reference one. TREE is articulated at the contralateral side of the signer at the [LOCATION: v2-h- h1-l] showing an instance of non-manual locaisation. In (4b), CLIMB has a path movement that has the onset R-locus associated with the MONKEY and the offset is at the top facet of the contralateral R-locus associated with the TREE, respectively. The sign MONKEY is not signed nor indexed (as it is a discourse topic); the onset of the path movement suffices to refer to the MONKEY. The path movement shows that the MONKEY has climbed the TREE, and is at the top fact of the TREE. In (4c), MONKEY is not indexed where it is localised i.e. the ipsilateral R-locus, but at the top facet of the TREE at the contralateral side of the signer at [LOCATION: v2-h1-l].

The above example (4) indicates that even in the abstract reference frame – and just as in the real reference frame – R-loci decay as events/situations unfold, and cease to be linguistically significant. This is exactly as would have been in the so-called real reference frame for an identical sentence, except that instead of signing MONKEY in (4a), the speaker would have merely pointed to the real-time referent MONKEY. In other words, with the anaphoric reference the spatio-temporal dimension of the referents are traced in the linguistic reference frame.[4]

In an instance of non-manual localisation, the narrator often plays the role of the characters in turn and narrates the event from the character's perspective as direct speech. This is either carried out by the signer orienting his/her body towards the character's R-locus or by taking the perspective of the agent or experiencer of the event. In the sign language literature, this phenomenon is known as role play. This can be illustrated by considering a popular story of a person pretending to be deaf, a police officer and sign language.

(a) (b)

Fig. 1: Role play

In Fig. 1(a), the signer plays the role of a pretended deaf person, who is driving a car; hence sitting. In Fig. 1(b), the signer's role is of a standing police officer, who stops the car for speeding. The role play shows various spatial dimension that the referents actually occupy in the discursive

4 I am keeping aside, in this paper, another function of INDEX which is used to express time relative to the time of speech act in association with the spatial location with reference to the signer's body used as a time line.

context. Moreover, a careful observation shows that the role play yokes together varying frames of reference, besides the expected relative frame of reference, intrinsic and absolute frames of reference.

Sinha (2003, 2006 and 2008) argue that the index to the R-locus traces the movement of the referent in the spatio-temporal dimension of the linguistic reference frame, indicating where the referent is at that point of discourse. This distinguishes it from pronominal forms in spoken language – if it were a pronoun, the signer would have indexed to a unique assigned R-locus in the partitioned space. In their analysis, an index to the R-locus in the partitioned signing space is not a pronoun, but an R-Expression, thereby involving reference of the *Chandan* type rather than the *he* type. He argues that every instance of index (in the linguistic reference frame) is a noun (i.e. an R-expression), and that there does not exist a syntactic realisation of person other than the pragmatic/discourse roles. In this regard, the binding facts support the argument that an index is a noun rather than a pronoun. Consider (5),

(5) RAM IX $^{\text{LOC: IPSI}}$ IX $^{\text{IPSI}}$ LIKE.
Ram_i likes him_i. (lit. Ram_i likes Ram_i)

In the grammatical example (5), the R-locus associated with the ipsilateral localised referent refers to the same referent i.e. Ram. If the index were indeed a pronominal, then Principle B of the Binding Theory is violated. However, the example is grammatical, suggesting that Principle B does not apply at all. Principle C, that prohibits co-reference to hold between R-expressions, holds in a modified form in ISL by which c-commanded R-Expression are treated like epithets in spoken language as shown below in (6).

(6) $[\text{John}]_i$ hired a secretary that hates $[\text{the idiot}]_i$.

Reflexives also do not exist in ISL as a word class,[5] although an emphatic reflexive, in which an index with the [MOVEMENT: pronate] at the R-locus of the referent, does exist. This is shown and transcribed as EMP in Figure 2 and (7), respectively.

5 See Richa (2003).

Fig. 2: EMP

rb---------- bf----------rb------ bf----------

(7) FEM- S-I-T-A IX $^{LOC:IPSI}$ ROOM IX$^{LOC:\ FRONT}$ $_{IPSI}$COME$_{FRONT.}$ IX^{IPSI} SHOE POLISH EMP^{IPSI}
Sita came to the room. She polished shoes herself.

In (7), EMP functions to emphasise the referent associated with it. As the index is an R-expression, it seems that EMP is also an R-expression, albeit with an emphatic function. In ISL, reciprocity is articulated with single hand[6] or double hand, with a repeated alternating movement of the [HANDSHAPE: V] which is is shown and transcribed as RECP in Figure 3 and (8), respectively.

Fig. 3: Reciprocal

(8) RAM S-I-T-A TALK RECP
Ram and Sita talk to each other.

In ISL, there is no morphological realisation of any Case rather INDEX is used invariably. In genitive construction, compounding is employed as a strategy, where an index followed by a possessum is grammatically valid genitive construction. It is, however, observed that [HANDSHAPE: tA] is often used for genitive/possessive opposed to INDEX, and to make distinction between the two forms. It is important to note that the [HANDSHAPE: tA] is a loanword from English and ASL in which the handshape is used for fingerspelling 'S.' Similarly, an emphatic form, not a reflexive, in which INDEX followed by an upward movement is also found (Zeshan 2003: 179).

To summarise, localisation functions to create an ego-centric representation of a spatio-temporal situation. It creates a scene in which discourse non-participants are in certain spatio-temporal relations with each other, making a resemblance to the real reference frame. In both the real and the abstract reference frames, discourse relevant referents are treated alike as there is no fundamental syntactic distinction between referents that have been introduced by the signer.

On the other hand, Indexing and localisation, although similar in articulatory terms, are different. In a discursive context, an INDEX to a referent in the real reference frame is equivalent

6 Reciprocity (single handed) differs from the dual conjunction in orientation and positional (post-verbal) occurrence.

to the articulation of the sign in its every instance. INDEX, thus, stands in lieu of the sign for the particular referent and the communicative intent of indexing would be of generic reference rather than a specific reference to an entity located in the real reference frame. Further, INDEX to the R-locus unambiguously refers to the same referent associated with the R-locus even after many intervening signs. This shows that localisation does not signify an act of reference, whereas INDEX does, and the latter encodes deixis too. To sum up, the index is an R-expression; the word class pronoun and anaphor does not exist in ISL, and that Principle C holds in a modified way in ISL.

3. Previous analyses

Prior to the exploration of the previous analyses, as an aside, it is important to acknowledge that the S-M system that sign language is predisposed to makes use of space for various phenomena. To illustrate an example, the spatial location with reference to the signer's body (front and back) is used as a time line to express time relative to the time of speech act. This shows that in sign language abstract temporal reference are converted into spatial expresssion (see Senior (1988: 285), Bhattarcharya and Gourshyam (2010)).[7] In addition, the mental representation of space is not based on its perception of space, but rather its conception, which Tversky et al. (to appear) argue, is constructed out of the referents in space. In ISL, the signer conceptualises space from his/her own perspective generating an ego-centric perspective (often referred to as the *origo*). The binary relations between the Figure and the Ground are also expressed by the spatial displacement of these referents akin to what an adposition does (Sinha 2010). Such heightened use of space in sign language shows the blending of the temporal and the spatial dimensions in the lingusitic reference frame which leads to acknowledge that linguistic reference frame is not void of spatio-temporal dynamicity. Consequently, the linguistic items in this dynamic linguistic reference frame, too, are sensitive to it. In addition, localisation also establishes spatio-temporal coordinate of the referent localised in the linguistic reference frame, as resumed for expressing binary relations between the referents. This implies that location provides deictic information vis-á-vis the signer.

In sign language literature, the phenomena of localisation and INDEX are, often, regarded as one. Under such conceptualisation, index is regarded as a 'homophonous sign' with a wide array of functions. Hence, paradoxically, localisation is one of the functions of index rather than a phenomenon distinct from INDEX. As a consequence of such analysis, localisation has barely

7 Although INDEX and its spatial location together makes a sign for temporal reference,the detailed analysis of the phenomenon deserves a separate paper on its own. Hence, the issue not discussed in this paper. .

received any distinct linguistic analysis, whereas INDEX has received a fair amount of attention as an equivalent of spoken language categories.

In sign language literature, an index to the locus of the signer and the addressee are analysed as first and second person, respectively, and an index to the actual referent and/or to the R-loci is analysed as third person. It is in this trifurcated division of linguistic reference frame, an index is analysed as a pronoun. With the passage of time, there evolved a consensus among the researchers that an index is a pronoun in ASL, and in sign language.

Zeshan (2003) has adopted the similar line of conceptualisation regarding localisation and index in ISL – a dominant view that abounds in descriptive literature. She maintains that index, in essence, is a multifunctional sign realised by pointing at various locations. In one of its function, she (2003: 165) writes, "the index is also used to localize a referent in sign space, that is, to indicate a point with which the referent is to be associated in the following text." In other functions, when index is used for deictic function and anaphorically, it is considered to be equivalent to demonstratives and pronouns in other languages, respectively.[8]

Mühlhäusler & Harré (1990: 278), Ahlgren (1990) and McBurney (2002) are among some of the authors that contest the claim that indexing has a pronominal function. In fact, Ahlgren (1990) argues that Swedish Sign Language indexes are essentially demonstratives. McBurney (2002: 365) argues that in sign language "the coding of participant roles is accomplished not through abstract categories of person, but rather through gestural deixis." Pfau and Steinbach (2006, 2011; also see Pfau 2011) propose the grammaticalization of pointing gesture to locative, locative marker, demonstrative pronoun, personal pronoun, relative pronoun, agreement marker and agreement auxiliary.

Within the generative framework, localisation, index and possessive sign in ASL are usually associated with the head of the determiner phrase (Bahan 1996, MacLaughlin 1997). For ASL, it is argued that pre-nominal localisation is a definite determiner (ibid.) while post- nominal is analysed differently. MacLaughlin (1997) claims that it may be used in definite or indefinite contexts while Bahan (1996) regard it as adverbial. Neidle et al. (2000: 31) claim that 'spatial locations constitute an overt instantiation of Φ features (specifically, person features).' Schlenker (2011), further, shows the pronominal uses of indexing in ASL can be found in the temporal and modal domains. Schlenker et al. (2012:3) claims that "sign language loci are simultaneously variables and pictorial representations: their values are provided by assignment functions, but the interpretation function is constrained to preserve some geometric properties of signs – hence

8 I am keeping one of the functions as an auxiliary out of the discussion in the paper. The phenomenon is analysed as a tag question (see Sinha 2008).

an iconic component." In other words, loci are both formal variables (see Lillo-Martin and Klima 1990, Neidle et al. 2000, Sandler and Lillo-Martin 2006) and simplified representations (see Liddell 2003) of what they denote.

As a matter of fact, there is a school of thought that contests the claim that index is indeed a pronoun analogous to spoken language. Friedman (1975), the first to argue that person reference in ASL is accomplished through the use of indexing, maintains that there is no equivalent of pronoun in the ASL lexicon. Although Mühlhäusler & Harré (1990: 278) agrees to pronominal function citing Sherman (1989) sums up the claims and counter claims, "a matter of great differences in opinion." Lillo-Martin & Klima (1990) although agrees that there is only one pronoun listed in the lexicon, argues for a referential index , which is overtly realised in sign language due to a specific effect of the modality, in contrast with those of spoken language.

With respect to ISL, Sinha (2003, 2006) argue that an INDEX to the R-locus is a R-Expression rather than pronominal form analogous to spoken language citing the above example (6) (see Gourshyam 2005 for aguments in favour of pronominal analysis). Recall that – index is tracking the movement of the referent in the spatio-temporal dimension wherever the referent is at that point of discourse. This shows that the index to the R-locus or the physically present referent in the partitioned signing space is not an invariant pronominal form as in spoken language. Had it been, the signer would have been indexing to the same assigned locus in the partitioned space.

Acknowledging the fact that there is a distinction between localisation and Index, Sinha (2008) uses the ideas of Heim (1982) in distinguishing localisation and index. Heim (1982) argues that indefinite descriptions are referential. On the basis of their semantics, she argues that an indefinite is used to introduce a new entity into the discourse (Novelty Condition), while a definite or a pronoun is used to refer to old/familiar entities (Familiarity Condition). Sinha (2008) argues that localisation is governed by the Novelty Condition, but indexing is in service of the Familiarity Condition. Thus, localisation signals indefiniteness in ISL, while indexing yields definite descriptions in ISL. This entails that a noun introduced into a discourse without localisation is indefinite while the subsequent articulation of the same in the discourse is definite. To sum up, localisation and index serve to indicate in/definiteness of the referent in ISL.

Further, the index also encodes deixis as well in ISL, in a way parallel to languages like Hindi, where there is no definite article, and demonstratives may be used to mark familiarity – in which the deictic reading is inherent but in each and every instance of it.

The above discussion points that localisation and index serve to indicate in/definiteness of

the referent in ISL. They also provide deictic information with respect to the signer, anaphoric, number and honorific information. In addition to it, they are also target of the onset and the offset of the verb's path movement.[9] Such accounts of localization and index provide syntactic and semantic explanations in terms of categories analogous to spoken language as evidently shown in analyses in this section. In the sign language literature, it has been argued that the heads of determiner phrase are usually associated with localisation, index, deictic and possessive signs. Paradoxically, such accounts, too, seem to make rather a sweeping account about the phenomenon; pragmatically, enough to over look, or even to obliterate a fundamental question: what is the structure building feature expressed on a phenomenon to which we ascribe a categorical label? As well as how similar and different is the feature composition of the similar category in another language?

To sum up in the words of Schlenker (2011:9), "...it would be an overstatement to claim that all the features of sign language pronouns are analogous to those of their spoken language counterparts." With this statement, he sets a research agenda, presumably directed towards decomposition of D.

4. Composition of INDEX: anatomy of space

As evident from the earlier section, localisation and index in ISL signal indefiniteness and definiteness, respectively. In addition, they provide deictic information with respect to the signer, number and honorific information as well as serves for anaphoric function. Syntactically speaking, it has been argued that they occupy the head of determiner phrase. In this paper, we assume that D is not a monolithic element but composed of features; and these features vary within and across languages cross-linguistically as well as on cross-modality basis. The purpose of this section is to determine the composition of features expressed in D (henceforth d-features) in terms of their content from ISL data.

The form of the index varies with respect to number in ISL. An interesting phenomenon regarding INDEX is marking plurality over a discursively relevant referents in the linguistic reference frame. A solitary INDEX with [HANDSHAPE: G/B] to a referent has semantics of singular. In other words, such instance of INDEX includes singleton. In contrast, successive INDEX to referents includes as many those referents as INDEX refers to. On account of such instance of marking singularity as well as plurality, INDEX with [HANDSHAPE: G/B] is labelled as transnumeral (Zeshan 2003b). It is also observed that to mark two of the referents, howsoever displaced in the linguistic reference frame, the signer makes eye gaze to the referents and a

9 I am keeping this issue aside in this paper as it deserves a separate exploration.

suppletive [HANDSHAPE: V] is used to include the two. Such suppletive form is labelled as dual. Another articulatory strategy to include more than two referents is to articulate a semi/circular horizontal arc sweeping the referents. This articulatory strategy labelled as ARC is an instance of plural INDEX. The difference between transnumeral plural and ARC is that the former is specific and the latter is not. The similar applies to transnumeral dual and dual. A schematic diagram is provided below for clarity.

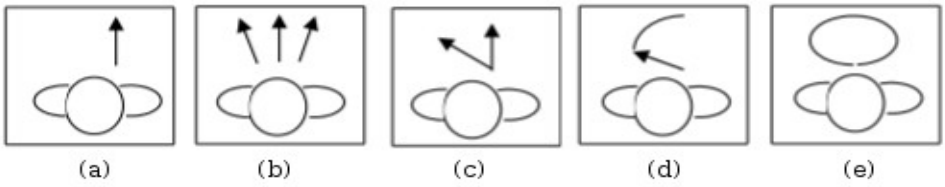

Fig. 4: Number marking in ISL

Figure 4(a) shows the index to the addressee. Figure 4(b) and 4(c) are an instance of transnumeral plural and dual, respectively. Figure 4(d) has an ARC showing the inclusion of all the referents along with the sweep of the ARC. In Figure 4(e), all the referents in the discourse including the signer is included.

This establishes that number is among the d-features, and it is manifested with distinct values. Following Harbour (2007) and Nevins (2006), the number feature in ISL is devised as [±singular] and [±augmented] where, [+singular, -augmented] is singular; [-singular, -augmented] is dual, and [-singular, +augmented] is plural.

In ISL, gender differences are encoded for animate humans. The animate usually has FACE, if the signs (abbreviated in text as MASC. and FEM.) are not articulated. MASC. and FEM[10] are articulated with the [HANDSHAPE: G] at the [LOCATION: PHILTRAL COLUMN] and [LOCATION: NOSE GROVE], respectively. They are obligatorily used for non-discourse participants and may be localised. Bare Index is also used for animate human masculine, and also for neuter.

(9) FEM-IX $^{\text{LOC: IPSI}}$ PAST CRY^{+++}
She cried yesterday. (lit. A woman cried yesterday).

(10) MASC- IX $^{\text{LOC: IPSI}}$ DELHI IX $^{\text{LOC: CONTRA}}$ $_{\text{IPSI}}$ GO $_{\text{CONTRA}}$
He came to Delhi. (lit. A man came to Delhi).

(11) X $^{\text{LOC: IPSI}}$ DELHI IX $^{\text{LOC: CONTRA}}$ $_{\text{IPSI}}$ GO $_{\text{CONTRA}}$

10 Thanks to Sibaji Panda (p.c.) for this observation. I continue to use English pronouns as glosses for these items, purely for ease of exposition.

He came to Delhi. (lit. A man came to Delhi).

(12) IX^{IPSI} GOOD
The book is good.

On the basis of these examples, it is appropriate to conclude that ISL encodes animacy and gender differences. Note that ISL display difference in terms of animacy; and Harley & Ritter (2002) had independently argued that animacy is a form of gender. Following Harley's (2008) two-feature system for distinguishing gender, ISL gender can be stated as [±feminine] and [±neuter], where [+feminine, - neuter] is FEM; [-feminine, - neuter] is MASC; and [-feminine, +neuter] is neuter. In turn, this feature system captures the difference of animacy with [±neuter].

In ISL, it is also observed that [HANDSHAPE: B] in lieu of [HANDSHAPE: G] is also used by the signers for INDEX as well as ARC. It is mostly used for a human referent since to point with [HANDSHAPE: G] is considered unmannerly in the Indian socio-cultural setting. [HANDSHAPE: B], therefore, can be best understood as a marker of honorificity. Consequently, the manual INDEX [HANDSHAPE: B] and [HANDSHAPE: G] can be divided into honorific and non-honorific, respectively. Adger and Harbour (2008) appropriate honorification within the ambit of φ-features. Based on ISL data, the honorific distinction can motivate to build feature distinction based on [± honorific].

We also observe that honorific distinction is maintained in singular and dual masculine and feminine whereas the same distinction is not distinguished morphologically in dual. In fact, the distinction is neutralised.

TABLE 1: HANDSHAPES ASSOCIATED WITH NUMBER, GENDER AND HONORIFICITY

	[+SINGULAR, −AUGMENTED]		[−SINGULAR, −AUGMENTED]		[−SINGULAR, +AUGMENTED]	
	[-HON]	[+HON]	[-HON]	[+HON]	[-HON]	[+HON]
[+FEMININE, -NEUTER]	G	B	V	V	ARC	B
[-FEMININE, -NEUTER]	G	B	V	V	ARC	B
[-FEMININE, +NEUTER]	G		V		ARC	

A sign can be localised by virtue of articulating it in the desired locus. An interesting contrast is observed in localisation of place names. The place name in which the signer is situated at the moment of signing is localised differently from the place name in which the signer is not, as shown in Fig. 1 below.

(13) rb----------
YEAR=TWO FUT R-A-M IX $^{LOC:IPSI}$ BOMBAY IX $^{LOC:DOWN}$ DELHI IX $^{LOC:UP}$ $_{DOWN}$GO $_{UP}$
Ram will go to Delhi from Bombay after two years.

(14) IX SELF DELHI IX LOC: DOWN J-O-B FRONT GETSELF
I got a job in Delhi.

Fig. 5: Localisation of place

In Fig. 5(a) and 5(b), the localisation of the sign BOMBAY and DELHI, respectively is shown from (13). In the former, the signer is in Bombay, so the sign is localised close to the signer; in the latter, localisation shows the spatio-temporal distance between the signer and the place localised i.e. Delhi. Contrast this with Fig. 5(c) from (14) , the signer's spatio-temporal situation i.e. Delhi is localised closed to the signer unlike in (13).This shows that space is viewed from the perspective of the signer which creates an ego-centric view (often referred to as the *origo*), and the referents are in relation to the signer. The sign in 5(a) and 5(c) is used for location of the utterance and 5(b) is used for location that is not the location of the utterance. This shows that ISL encodes a contrast in terms of visibility with [-visible] and [+visible] values.

Now, let us now turn our attention to one other use of index in ISL that is exclusive to the real reference frame in which the referent is [+visible]. It is found that in the presence of many referents of the same kind, such as "many books," it is observed that the articulation of the sign BOOK with an index serves the function of uniqueness.

(15) a. BOOK IX GOOD
b. IX BOOK GOOD
This/that book is good.

In such cases, as the descriptive content alone is not enough to determine a unique referent and an index must be articulated; here, indexing has the function of a demonstrative. In such a function of INDEX, it can either precede or follow the noun sign. In (15), shown above, the index has an overt deictic reading necessarily. However, it is not the case that each and every instance of

an index in ISL has necessarily deictic as well, apart from its referential reading. This contrasts with (16), shown below, where the deictic reading of (IX^{IPSI} i.e. Ram) is inherent but implicit.

(16) IX^{IPSI} FEM-S-I-T-A IX $^{LOC: CONTRA}$ LIKE
Ram likes Sita.

In addition to visibilty, indexing in ISL has the function of a demonstrative which can either precede or follow the noun sign. The deictic nature of demonstrative encode information about the location of the referent with respect to the utterance location thatis visible. Since there are no defined loci in space to distinguish proximate, medial and distal but a continnum, the relative difference is constructed out of the referents in space (Tversky et al. to appear). For the ease of exposition, the relevant values associated with [+visible] are [±proximate] and [±distal].

Zeshan (ms.) observes that signs localized in the upper space in ISL involves entities that are invested with some degree of authority such as the government, the police and schools. Similar observation is expressed by Schlenker et al. (2012) for ASL and LSF, and maintains that this distinction of high or low position of a locus in signing space has a direct semantic reflex, akin to the semantic contribution of gender features of pronouns. They (ibid: 9) "posit an iconic analysis that establishes a mapping between the height of the loci in signing space and the position of their denotata in the (real or metaphorical) world of the context."

In spoken languages like in Burmese, Thai and Japanese, it is found that there are distinct forms in the pronominal system to indicate status, intimacy, and non-restraint, closely linked with other factors like politeness or respect, and also assertiveness which are directly connected with speech roles - the speech role of 'being an honoured addressee' as distinct from that of 'being an addressee of the same or lower status' (Bhatt 2004:112).

In sign language, the high and the low loci which are associated with reference to the signer can be understood as the spatial representation of the speech roles as observed in the spoken languages. Under this conceptualisation, the high and the low loci can be introduced in terms of feature speech role with [±status] values.

We now turn to localisation and indexing. Sinha (2008) makes distinction between localisation and index, and uses the ideas of Heim (1982) in distinguishing localisation and index. Sinha (2008) argues that localisation is governed by the Novelty Condition, but indexing is in service of the Familiarity Condition. Thus, localisation signals indefiniteness in ISL, while indexing yields definite descriptions in ISL. This entails that a noun introduced into a discourse without localisation is indefinite while the subsequent articulation of the same in the discourse is

definite. To sum up, localisation and index serve to indicate in/definiteness of the referent in ISL.

In order to postulate feature familiarty and novelty, it is imperative to follow cross linguistic data. Although traditional descriptions claim the definiteness and the indefiniteness are associated with determiner, a large cross-linguistic study shows that the determiner may not encode definiteness i.e. the same determiner can be used for novel referent as well as familiar referent. In Squamish, Malagasy, and Skwxwú7mesh among other languages (see Ghomeshi et al. 2009), all determiners can be used in novel or familiar contexts, regardless of whether they are deictic or non-deictic. Hence, the D-link features like familiarty and novelty (see Aboh 2003) do not suffice to determine the feature composition. The Skwxwú7mesh data provide us with evidence for three-way distinction: definite, indefinite and non-definite. In Skwxwú7mesh, non-definites can be used in both novel and familiar cases, but behave much like definites in familiar contexts. Acknowledging the cross linguistic variations, the d-feature definiteness can be valued as [±definite] and [±indefinite].

To sum up the discussion so far, phenomenon of localisation and index in ISL signal d-feature definiteness, and also provide additional deictic information with respect to the signer, gender, number and honorific information, status as well as serves for anaphoric function. In other words, the d-features are number: [±singular] and [±augmented]; gender: [±feminine] and [±neuter]; honorificity: [± honorific]; visibility: [-visible] and [+visible], and further [+visible]: [±proximate] and [±distal]; speech role: [±status]; and definiteness: [±definite] and [±indefinite]. We have also identified values associated with these features based on a wider cross-linguistic generalisations. Further, in the decomposition of D, these features with their values are organised in an arbitrary hierarchical order; and the features along with their values constitute each instance of INDEX.

5. Conclusion and Challenges

This paper aims to address that the 'modality differences' do not make sign language unique by virtue of its S-M system, rather the interface requirements of the S-M system creates the differences in terms of the feature, and INDEX refers to such feature(s). It aims to provide an account of the structure building feature(s) associated with various instances of INDEX in Indian Sign Language based on feature inventory sugggested by Wiltschko (2009), Nevins (2007), Harbour (2006), Déchaine and Wiltschko (2002, 2007), Ghomeshi, Paul and Wiltschko (2009), etc. among others. However, such cursory analysis initiates several questions among them these two in particular:

1. Unification of various other functions noticed in the ISL data viz. anaphoric function, emphatic function and "verb agreement" into a single analysis in a more rigorous manner.
2. To ascertain the feature inventory.
3. The features valued for ISL are universal across languages or are specific to the modality facts.

References and Acknowledgements to follow.