



(RESEARCH ARTICLE)



# Aspects of Kenyan sign language (KSL) morphology

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## Abstract

Morphology examines forms of words and their relationship with other words in existence in a language. Generally, in linguistics, morphology studies how words are formed. However, in signed linguistics, morphology does not just study word formation per se (since SL uses signs) but rather how language makes use of smaller units that are important to construct larger meaningful units or signs. Accordingly, sign language morphology deals with how to put together sign components that are meaningful to construct complex signs. This paper sets out to examine the way that components of signs are put together in KSL to build complicated signs in reference to both sequential (derivation) and simultaneous (inflectional) morphology.

**Keywords:** Morphology; Morph and Morphemes; Kenyan sign language (KSL); Meaningful components of signs; Sequential morphology; Simultaneous morphology

## 1. Introduction

Morphology is a level of linguistics analysis that deals with units of meaning in language. To Nida [1] Morphology deals with how smaller meaningful units develop into larger meaningful units – words or signs. A sign or word can be reduced to its smallest meaningful unit – the morpheme. Morphology deals with the morpheme and how it is arranged (internal structure) in the whole word or sign formation process. The word/sign can be defined as the smallest independent unit of language since as a unit in language it is the only one that can be divided into distinct forms and can be moved around in sentences and it is also autonomous and meaningful. The word/sign is the only unit that can grammatically stand independently as a complete utterance. Morphologically it is thus the smallest independent unit of language.

It is important to note that both spoken and signed languages use symbols for communication in the form of words or signs as explained in table 1 below:

**Table 1** Concepts can be abstract/things /activities From Figure1 above, language symbols can manifest themselves in two forms.

| Kind of symbols | Written   | Spoken  | Signed  |
|-----------------|---|---|---|
|                 | Uses letters or a group of letters – Graphic symbols are used | Uses sound based symbols                                      | Uses visual based symbols                                     |
| FORM OF SYMBOLS | - Iconic they reflect what they represent in real life –      | - Iconic they reflect what they represent in real life – e.g. | Iconic signs- reflect what they represent in real life – e.g. |

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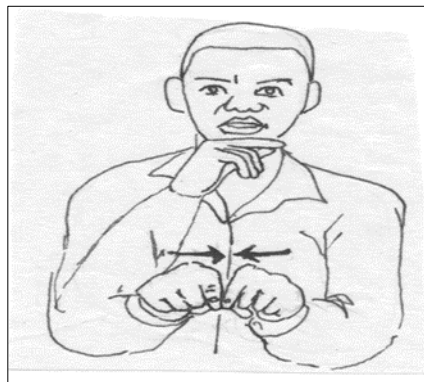
|  |  |  |   |
|--|--|--|---|
|  | <p>here they represent the shape of the mouth</p> <p>- Arbitrary - they are symbols - includes most symbols for sounds</p> | <p>onomatopoeic sounds. E.g. Clank, Pow! Thud! Bang! Squeak, hum</p> <p>- Arbitrary- they are symbols - no direct relationship between signifier and signified</p> | <p>MILK (milking), SMOKE (smoking_ in KSL</p> <p>- Arbitrary- they are symbols - no direct relationship between signifier and signified</p> |
|--|--|--|---|

- Audio or sound symbols, which give us words used in spoken languages. However, when words are written we get graphic symbols (letters or groups of letters) which represent the words in a visual way.
- Visual symbols used by people who are deaf called signs not words.

Symbols, whether spoken or signed, appear in both arbitrary and iconic forms. Arbitrary symbols are symbols that have no one to one relationship with what they represent in real life. Thus, when one does not have knowledge of the language in which such symbols are used, they are meaningless to them. For example, in French, one would only know that the word Couteau means knife if they speak French because the signifier - Couteau and the signified - the knife itself have no resemblance. In KSL, also most signs are arbitrary. For example the sign for BROTHER as exemplified in figure 2 (signed - MAN^SAME) below has no discernable relationship with concept of brother as we know it. A non-signer therefore will not understand what the sign represents. In componential terms, this sign represents the concept:

- [+ MALE (PERSON)]
- [+ SAME]

The feature [SAME] above, signals a genealogical sameness to signer or some other (previously identified or contextually understood) person.



**Figure 1 BROTHER**

In both spoken and signed languages however, a few words or signs are highly representative. In KSL, they are called iconic signs. Iconic signs refer to those that even a non-signer can discern the meaning of due to their pictorial nature and because such signs describe the concept, they refer to. For example, in English words such as: boom! Clank, Pow! Thud! Bang! Squeak, hum etc. are considered to sound like or look like what they represent or symbolize - these are onomatopoeic words and they are relatively few in language. In KSL as indicated earlier iconic signs, represent signs that even a non-signer can guess their meaning. For example, the sign SMOKE in figure 3.



**Figure 2 SMOKE**

Nonetheless, signs from different cultures of the deaf may be equally iconic but they would normally represent different properties of the referent. Thus, even iconic signs are conventional in this sense because they are based on the

established conventions of each deaf community. Consequently, signs from different countries may differ at the semantic level despite their physical sameness (or iconic nature). In this paper, iconic signs refer to those whose form and meaning resemble each other as compared to symbols that are normally arbitrary and the relationship between form and meaning is solely based on convention. This distinction between a symbol and an iconic sign is illustrated well in figure 3 below:



**Figure 3** FRIDAY

Figure 3 above is the sign for FRIDAY in KSL. However, it is also WASH (clothes) in KSL. A non-signer would easily assume that a signer is referring to washing clothes because the sign resembles the concept it refers to in the real world. However, if the speaker is referring to FRIDAY then the sign becomes an arbitrary symbol only understood by those that subscribe to the conventions of KSL. Signs are not pictures but abstract linguistic units with complex internal structures as the discussion of KSL morphology below will demonstrate.

Morphology analyses the minimal components of words/signs that have meaning and cannot be broken down further – a morpheme. A morph represents a word/sign constituent that stands for a single morpheme in sound, writing or visual form. Nordquist [2]. It is the portion of a word that can be written, pronounced or signed. For instance, in English it can be an affix (a prefix or suffix). The word *unsuccessful* for example, is made up of three morphs—*un-*, *success*, *-full*—each of which represents one unit of meaning – a morpheme. The word has two affixes, both a prefix (*un*) and a suffix (*-full*) attached to a root word. Other examples of such words in English include *unsafely*, *deactivation*, *undoubtedly* etc.

In sign language sometimes, the distinction between a morpheme and phoneme is not clear. Nonetheless, a morpheme is a morphological construct while a phoneme is a phonological one. Phonology refers to the analysis of the physical composition of signs whose dissimilarity can lead to important differences among signs. Okombo et al [3]. KSL phonology involves sub lexical features that include hand shapes or hand forms (articulators), movement or motion (manner of articulation), location (place of articulation), and palm orientation (manner of articulation), moves and holds all of which constitute phonemes in KSL and can be used to distinguish meaning. For example in the signs **ME** and **YOU**, the orientation of the sign physically contrasts them leading to a difference in meaning. **ME** and **YOU** are thus phonemes in KSL. (cf. Mweri 2018)

In signed languages, a segment of a sign visually presented that constitutes one morpheme is a morph. A visual – manual morpheme is the smallest meaningful unit in Sign Language. Nordquist (ibid) views a morpheme as:

- A component of a word/sign that can manifest itself as an affix (suffix or prefix). Examples of Suffixes in KSL: FARM^PERSON- (Farmer) the sign PERSON acts as suffix (an agentive maker) used mostly to derive nouns from verbs. The verb FARM is used to derive the noun farmer by attaching the suffix PERSON to it. Most signs for professionals in KSL are bound morphemes since they add the agentive suffix PERSON. A morpheme can also manifest itself as a prefix for example in KSL; the sign BELIEVE and AGREE are signed as THINK^TRUE and THINK^YES in this case the sign THINK acts as a prefix added to the two root signs.
- If words or signs are broken into smaller and smaller units, they will eventually be rendered meaningless. Thus Morphemes can also be whole words (free morphs) e.g. in KSL the signs FARM, TEACH etc. cannot be forcibly separated into smaller meaningful units. A sign that exhibits only one unit of meaning is a morpheme. In this paper, a morph is taken as the visual representation of a morpheme.

In KSL, signs that are made up of just one morpheme (free morphemes) E.g. SUNDAY, CHILD etc. are morphologically simple and are called monomorphemic signs. Morphologically complex signs that have more than one morpheme (bound morphemes) are called polymorphemic signs. Spence and Woll [4]. Examples of 'polymorphemic' signs in KSL include BROTHER = (MAN^SAME), HUSBAND = (MAN^MARRY), etc. Research on Sign language Linguistics identified

two different morphology processes called derivational morphology and inflectional morphology, which we will discuss shortly.

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## 2. Material and methods

This research adopts an approach that is descriptive in which the data was collected using observation and also an inquiry approach (qualitative) method of analysis to explain how KSL puts together significant components in building complex signs. Data for this study was derived from a systematic analysis of video recordings of two types of discourses: planned and unplanned. The communicative situations that provided data for this study were; a video recording of a lecture and a church sermon given by people who are deaf and a recorded naturally occurring informal conversation among deaf native speakers.

### 2.1. Data collection

Data was obtained by video recordings and observation of participants. The researcher engaged two research assistants who are deaf and native users of KSL. The two research assistants are also experienced KSL researchers and have intensive experience in working with other people who are deaf and in teaching KSL to hearing people. They were in charge of most of the data recording. The video recording was for about 1 hour and 15 minutes. The researcher, who is a near native user of KSL was a non-participant observer. From the collected data, an analysis of how signs are formed in KSL was done.

### 2.2. Data analysis

The recorded video tapes were separately transcribed and the researcher sought to find out the different morphological process that manifested themselves from the collected data. The following sign formation strategies were identified as responsible for the formation of signs in KSL: Derivation (suffixation, prefixation, pluralization, numerals, compounding and borrowing) and inflection (Location, pronouns and verb morphology).

### 2.3. Theoretical underpinnings

Since this study uses a practical approach, it does not rely on a specific linguistic theory, but uses some aspects of different theories to account for the different aspects of KSL morphology. O'Grady et al [5], posit: human language makes use of different operations or processes that change a word structurally, by adding some elements to it or through internal change to express a new meaning or to mark a grammatical distinction. These are word/sign formation processes. We shall use elements of word formation process from Yule, O'Grady et al [6, 7] in accounting for the different sign formation processes identified in this research and the other aspects of Kenya sign language Morphology.

### 2.4. Literature review

Research on Sign Language (SL) Linguistics started intensely in 1960 with William C. Stokoe as the pioneer. Today SLs of the world have been studied extensively. Initial research tended towards structure or some sociolinguistic elements of the language. Research on African sign languages has also been conducted and largely follows the same pattern. For example Lutalo-Kiingi, S. and De Clerck G. A. M. [8]; Akach, P. [9]; Reagan, T. [10].Tcherneshoff N, K. [11]; Ramadan, D. [12] to name just but a few. A survey of most of these researches shows they were also on different aspects of SL ranging from documentation of the languages, SL in education of the deaf, sign language grammar etc. Scholarly works on KSL started emerging in the 1990s. The pioneering work on KSL structure was by Akach [13] on *"Sentence types in Kenyan Sign Language."* A lot more research has been done on KSL thereafter. For example Okombo [14-19], Mweri [20-27]; Omanga [28] to mention but a few have researched on various aspects of KSL linguistics. However, to the best of our knowledge nothing substantive has been done on KSL morphology. This study therefore sets out to research on aspects of KSL morphology. This will enable a better understanding of how KSL works, how it structures its signs and how these signs are segmented into different types of morphemes. This is important because it will give an insight into how KSL creates brand new signs and how it can create new signs from existing ones.

### 2.5. Aspects of KSL morphology

According to Aronoff et al [29], SL morphology is classified as sequential or simultaneous. Sequential morphology deals with signs comprised of two free morphemes or a bound morpheme and a free morpheme – polymorphemic signs. Sequential morphology creates new units in language and therefore it is derivational. Simultaneous morphology on the other hand adds grammatical information to already existing units. This information may be on number, tense, agreement or case etc. it is therefore inflectional. This dichotomy gives us derivational and inflectional morphology that we will discuss below.

2.5.1. Derivational Morphology

Morphemes are used in the creation of new signs. This can be done by addition of a derivational affixes to a base. This process creates both monomorphemic and polymorphemic signs. In derivational morphology, morphemes appear sequentially after each other. Derivational morphology creates new units in a language thus; it is the morphology of lexeme formation.

Yule, O’Grady et al [30, 31] view derivation as a word formation process that involves addition of affixes or derivational morphemes. Affixes are by their nature bound morphemes. In sign morphology, signs formed through the process of affixation are part of sequential morphology that attaches affixes to roots or core words. Derivational affixes are used to create a new sign from a root signs thus occasioning change of the grammatical categories. Thus, derivation derives from other parts of speech new words or signs. For example in English, we can derive:

- **Nouns from verbs:** E.g., fail – failure; teach – teacher.
- **Nouns from adjectives** E.g., true – truth; absent – absence.
- **Verbs from nouns** E.g., apology – apologizes; class – classify.
- **Verbs from adjectives** E.g., real – realize; soft – soften.
- **Adjectives from nouns** E.g., friend – friendly; music- musical etc.

In the above examples, the derivational morphemes added to the root or core words change the meaning or grammatical category of the affected word.

Suffixation in KSL

Regular verb – noun and noun – verb derivations in KSL is done through the process of suffixation as exemplified below:

1

| <b>V+ PERSON( SUFFIX)</b> | <b>N</b> |
|---------------------------|----------|
| COOK+ PERSON              | CHEF     |
| FARM+PERSON               | FARMER   |
| TEACH+ PERSON             | TEACHER  |
| LECTURE+ PERSON           | LECTURER |

Examples one above uses a regular noun formation pattern of foming nouns from verbs in KSL. The sign PERSON is a suffix (an agentive marker) in KSL, which derives nouns from verbs. In KSL, suffixation can also be exemplified by noun + verb derivation pattern – in this process, free morphemes are added to other forms to produce new signs. This process changes the segmental structure of the original element while at the same time retaining parts of the form that includes the hand shape, location and orientation.

Some derived nouns in KSL can be formed by noun + verb or noun + adjective for example:

2

| <b>N+V</b>   | <b>N</b> |
|--------------|----------|
| MAN +MARRY   | HUSBAND  |
| WOMAN+ MARRY | WIFE     |

| <b>N+ADJ</b> | <b>N</b>    |
|--------------|-------------|
| MAN +OLD     | GRANDFATHER |
| WOMAN+OLD    | GRANDMOTHER |

In example 2 above MARRY and OLD are suffixes.

Other examples of suffixation in KSL include the use of negative morphemes in the process of negation. KSL uses the signs NOTHING, ZERO and NO as negative markers. These negative morphemes are always attached to different core signs to negate them. For example in GO NOTHING/ZERO/NO (do not Go); EAT NOTHING /ZERO/NO (do not eat) we have the Verb+ negative morpheme structure; SISTER NOTHING/ZERO/NO (not a sister); MOUNTAIN NOTHING/ZERO/NO (not a mountain) giving us a noun + negative morpheme structure.

Prefixation

In KSL, we can also derive Adjectives from verbs by using the prefix POSSIBLE.

3

| V          | ADJ            | KSL                 |
|------------|----------------|---------------------|
| Do         | doable         | POSSIBLE DO         |
| Work       | workable       | POSSIBLE WORK       |
| Understand | understandable | POSSIBLE UNDERSTAND |
| Eat        | edible         | POSSIBLE EAT        |

The sign **POSSIBLE** is a prefix since it can be attached to several root signs to make meaning. KSL sometimes it is used post verbally however going by the preferred KSL structure of SOV; it seems that the preverbal usage above is the regular use. The use of **POSSIBLE** after the verb has all the marking of influence from the English language structure. THINK is also a prefix in KSL. The sign BELIVE is signed as THINK TRUE (verb prefix+ adjective = Verb), THINK YES (verb prefix + noun= Verb) for AGREE (Fig 5 below). BELIEVE and AGREE are examples of what Aronoff et al [32] call sense prefixes. Other example of such prefixes in KSL includes HEAR, SEE etc. Examples



Figure 4 THINK- TRUE=(I) BELIEVE      THINK-YES= (I) AGREE

Sense prefixes as exemplified above and HEAR below emanate from signs that indicate the sense organ used in their perception. BELIEVE, AGREE and HEAR (Fig 6 below) when signed, delete the subject pronoun I given that it is entailed in the sign THINK or HEAR.



Figure 5(I) HEAR

The sign HEAR can be used with other signs to derive different meanings. For instance: HEAR NOTHING (I cannot hear); HEAR FINISH (I have heard); HEAR CAN (I can hear).The sign SAME in KSL can also be used as a prefix that derives adjectives from nouns. E.g. SAME GIRL (girlish), SAME CHILD (childish).



**Figure 6 SAME**

In KSL, irregular derivation of nouns from verbs can be exemplified by:

4

| V     | N         |
|-------|-----------|
| FLY   | AEROPLANE |
| DRIVE | CAR       |

The verbs **FLY and DRIVE**, in 4 above are used to derive the noun **AEROPLANE and CAR** respectively. This is an example of an irregular verb – noun derivation pattern in KSL. Conversely, in Example 5 below aspect verbs are derived from nouns.

5

| N   | V       |
|-----|---------|
| CAR | DRIVING |
| EAT | EATING  |

### Pluralization

Another noun derivation process in KSL involves pluralization through reduplication. Reduplication is the doubling or the restatement of a sign or an action to create a noun e.g. BOOK Figure 8 below is signed with double palm brought together in front of the signer and opened once. When the opening motion is reduplicated, we get the sign BOOKS. **PALM CLOSED+OPEN ONCE = BOOK. PALM CLOSED +REDUPLICATION = BOOKS.** During the formation of the plural noun **BOOKS**, nothing is added to the morpheme BOOK but rather it is just repeated to create a plural noun.



**Figure 7 BOOK**

More examples of reduplicated noun plurals include CHILD^CHILD= CHILDEN; PERSON^PERSON= PEOPLE. Reduplication does not change the grammatical category of the sign however, it changes its meaning to plural. Pluralization can also be achieved through use of definite or indefinite quantifiers. These quantifiers are normally suffixed to the noun to form plurals. Examples PERSON^MANY= PEOPLE; CAR A LOT= MANY CARS. MANY and A LOT are suffixes that indicate indefinite quantity. For definite quantity number is used for example PERSON 3; CAR 10.

### Numerals

In KSL, some numerals are morphemes that occur as part of other morphemes (bound morphemes) because they must coalesce with other morphemes to bring meaning for example those from 6-19. They work with KSL articulatory

properties such as hand forms, location, orientation and non-manual signs that involve movements and holds to make meaning. For example:

6.
  - ME NINETEEN
    - ✓ I was born
    - ✓ **EIGHTY EIGHT** BORN FINISH//
    - ✓ in1988.
  - **FIRST** LANGUAGE MINE KSL//
    - ✓ My first language is KSL.
  - PAST/**NUMBER ONE** WE VISIT POLICE//
    - ✓ First we visited the police.

The numerals used to indicate years in 6 above, **NINETEEN EIGHTY-EIGHT**, **FIRST** and **NUMBER ONE** on their own would not have any meaning. However, when used in combination with other morphemes they meaningfully enumerate certain activities. Each bound morphemes in the above examples include segmental features of hold, movement, location and orientation. For example in **FIRST LANGUAGE** , the sign has two meaningful morphemes. The hand form used to produce the numeral sign **FIRST** specifies the noun **LANGUAGE** in terms of its number. In, **NUMBER ONE** the numeral specifies when the police were visited in terms of position.

In the above examples, the numerals **NINETEEN EIGHTY-EIGHT**, **FIRST** and **ONE**, are all bound morphemes because they cannot stand autonomously. These numerals function to specify the number of the various nouns that appear in the sentences. When used together with other morpheme they produce meaning.

### Compounding

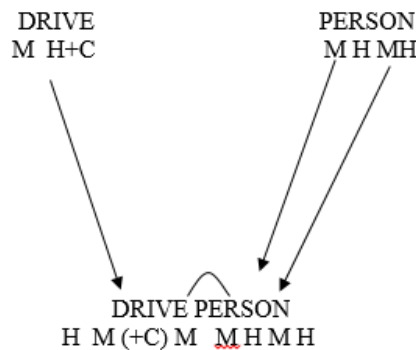
Sequential morphology also deals with signs that consist of two free morphemes or a bound morpheme and a free morpheme – polymorphemic signs. This is the process of compounding. In KSL, compound signs are formed when two or more completely distinct signs are brought together to form a new sign.

O’Grady [33], say that compounding happens as a result of combining some lexical categories such as nouns, adjectives, verbs or prepositions to create new forms. During the formation of new signs, a morphological rule called the first contact rule may be used to delete certain holds. The first contact rule indicates that if we bring two signs together for purposes of forming compound signs, then the first sign will have a contact hold (+C) in it, and that hold stays. If the contact hold is absent in the first sign, but appears in sign two (+C) that contact hold will also be retained – Valli and Lucas [34]. For example:

The sign DRIVER signed from DRIVE^PERSON is structured as follows:

- DRIVE: M H (+C) M
- PERSON: MHMH.

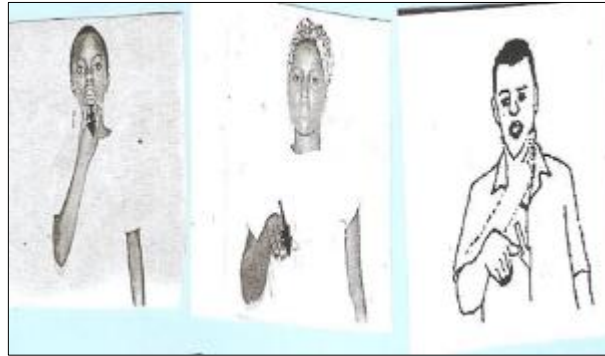
The amalgamation of the two signs gives us the following structure:



The change from: MH (+C) M MHMH →H M (+C) M H MH is the outcome of the application of the first contact rule mentioned above. DRIVE ^PERSON (DRIVER) is an example of a compound sign made of or a bound morpheme (PERSON) and a free morpheme (DRIVE). PERSON is used as a suffix that is equivalent to the English – er.



In KSL, some compounds are formed using two free morphemes example: PARENT, is a compound sign of FATHER^MOTHER signed through either the elimination of some internal movements or repetition of movements. The sign FATHER when being produced, there is reduplication of the sign while in producing the sign MOTHER, the open palm facing down on the breast moves up and down twice. However, when PARENT is signed, there is no reduplication in FATHER or the up and down movement of the open palm for MOTHER; both are eliminated due to the application of the simple sequence rule as exemplified below:



**Figure 8** FATHER^MOTHER =PARENTS

Examples of other signs whose production eliminates some internal movements or repetitions of movements in KSL include HUSBAND and WIFE. HUSBAND is produced with the C hand form making a double movement on the chin for MAN followed by the sign MARRY which is produced when the last fingers of both hands are entangled in front of the signer. However, for HUSBAND which is signed as a combination of MAN^MARRY, the internal movement (double movement) or the reduplication in MAN is eliminated as illustrated below:



**Figure 9** MAN^MARRY =HUSBAND

Similarly, WIFE –signed as WOMAN^MARRY, WOMAN is signed with an open palm hand shape facing down placed on the breast with up and down movement twice followed by MARRY signed with the last fingers of both hands coming together in front of the signer. However, when signing WIFE, the up and down movement of WOMAN is eliminated. In both cases we end up with a single movement for MAN (for HUSBAND) and WOMAN (for WIFE) followed by the sign MARRY.



**Figure 10** WOMAN+MARRY= WIFE

Others compound signs produced in KSL include BOY^SAME (BROTHER), GIRL SAME (SISTER), DREAM^BAD (NIGHTMARE), POPULAR (NAME^BIG) PUPPY (DOG^SMALL) etc.

## Borrowing

Borrowing is a word formation process where words in one language are acquired for use in another language or are taken to fit into the vocabulary of another language. Languages come into contact for various reasons sometimes occasioning borrowing. When grammatical morphemes (inflection, derivation, and function words) are transferred from one language to another due to language contact we talk of Morphological borrowing is. Nordquist [35]. Lexical borrowing, involves transforming lexical item from one language for use in another language resulting in loanwords.

According to Pakhurst and Parkhurst [36], the existence of two languages side by side can lead to mixing of systems resulting in either direct or indirect borrowing. Direct borrowing (includes, cultural, core and therapeutic borrowing), while indirect borrowing (includes loan shifts and loan blends (Hybrids), Sarah et al [37]. Cultural borrowing happens by necessity when a culture borrows to fill a vocabulary gap that exists in its language for objects new to the culture. Kiswahili for instance borrowed words for certain new objects introduced into the culture, televisheni for television, baisikeli for bicycle, komputa for computer etc. Core borrowing is about a culture supplementing its lexical entries by borrowing words that already have equivalents in their language. For instance, Kiswahili borrowing from English the word as motokaa (motorcar), komputa (computer) and televisheni (television) while the word gari, tarakilishi and runinga respectively are in existence.

Therapeutic borrowing is based on social norms for example if a word becomes a taboo word in one culture then the culture may be forced to borrow a word from another culture to replace it. Indirect borrowing can be exemplified by loan shifts where a culture borrows a phonological form but gives it a different meaning and by loan blends or hybrids where a blend of parts of a borrowed word and a native word joined to form a new word made of parts from different languages. E.g., the English word monolingual comprises of the Greek prefix mono and a Latin root lingual.

Languages can also borrow for historical reasons like colonialism; for social reasons such as; Religious, social status and prestige, educational, Lingua franca etc.; due to advancement of science and Technology. Normally, the dominant language (source language) will affect the minority (target language) than vice versa.

## Borrowing in KSL

Pakhurst and Parkhurst [38] assert that because sign languages coexist with spoken languages they are bound to borrow aspects of the spoken languages in various levels. However, signed languages are also most likely to borrow from other signed languages. Coulmas [39] argues, while it would be foolish to deny that a language sometimes borrows from several other languages at the same time, its main source will be that language which is mostly accessible to the speech community. For borrowing to take place, contact between the donor and recipient languages must be established. Globally, world languages can influence each other from a far distance as long as there is contact through communication with others, especially by speaking or writing to them regularly.

In sign language –spoken language contact, borrowing takes place despite the inherent differences between the two languages occasioned by use of distinct symbol systems –visual based and audio or sound based symbol system respectively. Virginia and McKee as quoted in Omangi [40] lists three factors that influence this type of contact (paraphrased below):

- Using spoken languages in the education of learners who are deaf. The use of English as a medium of instruction in schools for the deaf guarantees contact between KSL and English.
- The use of interpreters in service centers. Kenyan interpreters mainly interpret from KSL into English or vice versa.
- Where KSL lacks a sign for an equivalent word in English, a sign may be invented following the lines of the spoken word.

## Lexical borrowing

The contact between English and KSL produces contact signs. At the morphological level, most borrowings from KSL – English contact are lexical borrowings. Lexical borrowing in KSL from aspects of spoken language includes:

- Loan signs
- Loan translations or calque
- Initialization
- Mouthing
- Hybridization

### Loan signs

In KSL, loan signs are found mostly in finger spelled words that have been used in the language overtime and have ceased to be associated with finger spelling. Examples in KSL include **OK** and **IF**. Originally, they would be finger spelled as **O-K, I-F**, but they lost the finger spelling hyphen and they are now part of signs used in KSL.

### Loan translations or calque

If a sign comprises a word taken from English and is translated word for to be used as a sign, it is a loan translation or calque. Omangi [41] identifies the following as some examples of loan translation in KSL:

**Table 2** Examples of Loan translations in KSL

| Word in English | KSL loan translation | KSL SIGN     |
|-----------------|----------------------|--------------|
| Blind fold      | BLIND + TIE          | BLINDTIE     |
| Careless        | CARE +NOTHING        | CARE NOTHING |
| Ear ache        | EAR + PAIN           | EARPAIN      |

### Initialization

Initialization is the process of using finger spelled letters from the KSL manual- alphabet to represent a certain idea however, the initial letter eventually ends up being used as a sign. When a KSL signer finger spells a letter that represents the first letter of a word in English or Kiswahili and uses it as a hand shape for a sign, that sign is an initialized sign and is considered borrowed.

Example in KSL:

**Table 3** Examples of initialized signs in KSL

| LETTER | SIGN                     | STATUS                         |
|--------|--------------------------|--------------------------------|
| F      | FAMILY/ FAITH            | BORROWED FROM INITIAL LETTER F |
| B      | BUSY                     | BORROWED FROM INITIAL LETTER B |
| W      | WITNESS/WILL/WORRY/WORLD | BORROWED FROM INITIAL LETTER W |
| C      | COUNTRY                  | BORROWED FROM INITIAL LETTER C |

Initialized signs in KSL are exceptional though the corpus of such signs is growing despite the fact that their overuse is not encouraged and is mostly frowned upon by the Deaf Community.

Borrowing assists languages develop their corpus i.e. its lexicon, its grammatical system and the semantics of the items that are found in it. Through borrowing, all natural languages acquire new items. Okombo [42]

### Mouthing

Woll (1990) as quoted in Jefwa [43] indicate that signers use mouthing patterns due to their exposure to a spoken language. Engelhardt [44] calls this phenomena cross modal code- mixing because it is specific to sign language.

Users of KSL always verbalize (mouth) some signs to match with words in English due to the high intensity contact between KSL and English in the schools for the deaf. Conversely, Kiswahili the national language has but limited contact with KSL since it is not taught to deaf learners. A sign that uses an English mouth pattern matching is considered a borrowing especially if when the sign is not accompanied by that particular mouthing it is rendered meaningless. The following are examples of English mouthed signs in KSL that fall in this category: WHO/GO/WHAT/WHY and HOW.

Though the contact between KSL and Kiswahili is characterized by low intensity, there a few Kiswahili mouthed signs in KSL which have over the years entered KSL and are used with existing signs in the language. Examples include:

**Table 4** Examples of Kiswahili mouth signs (Adopted from Jefwa G. J. (2009) with alterations)

| KISWAHILI MOUTHED SIGN | ENGLISH GLOSS       |
|------------------------|---------------------|
| BADO                   | Not yet             |
| SAFARI                 | Journey             |
| POA                    | Fine                |
| SHAURI YAKO            | That's your problem |

The lexical items in Kiswahili that are used in KSL above are produced only with Kiswahili mouthing but they are not Kiswahili signs i.e. they are KSL signs with KSL meaning and function but they are only mouthed in Kiswahili. The corpus for Kiswahili mouthed signs is minimal. Such Kiswahili words used to mouth KSL signs are also examples of code switching from KSL to Kiswahili or code mixing – a sign of contact between the two languages albeit minimal.

#### Hybridization

According to Asghar, [45] frequent code-mixing results in a process of language hybridization where sometimes the grammatical structure of one language may be made applicable to the lexicon of another. When two or more languages mix frequently, a new mixed-hybrid variation of language is born. This new variety may share the characteristics of both languages but also has its own independent grammar and lexicon. Thus, the elements in a hybrid word are from more than one language. In KSL, hybridization manifests itself through code mixing or code switching and finger spelling.

- Code mixing and code switching

Auer [46] considers code switching and code mixing or language alternation as similar since both are a product of the juxtapositioning of two languages in discourse intra-sententially. Conversely, Bokamba [47], views code switching as occurring inter-sententially and involves words, phrases and sentences from two different languages being inserted or mixed within the same speech act and across sentence boundaries. Code mixing on the other hand is an intra-sentential event involving affixes, words, phrases, and clauses being inserted or mixed from two distinct grammatical languages. This paper views the phenomena of code mixing as the mixing of languages at the word level. For example if a person who is deaf uses KSL but also uses a Kiswahili mouthed sign he/she is code mixing aspects of KSL and those of Kiswahili a spoken language and is deemed to have switched from one language to another at the word level.

- Finger spelled Signs

In KSL, Fingers spelling involves representing the letters of the English alphabet (A-Z) manually on the fingers. Finger spelling uses articulatory properties that include hand shapes, location and orientation to produce finger spelled signs according to Liddle and Johnson in Valli and Lucas [48]. During finger spelling a signer produces segmental structures that also consist of holds, which are produced in a sequence. These holds that are produced sequentially also add movement as they transit between hold to hold as illustrated below:

**HMHM H MHMH**

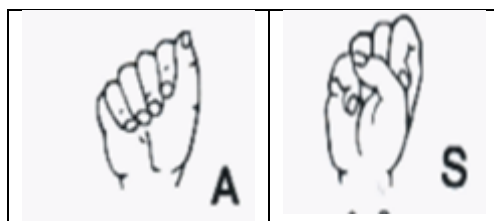
#JEFWA

The example above is the finger spelling of the name J-E-F-W-A. When signers produce holds, movements are naturally added between the holds. Every segmental structure in finger spelling is different and can be viewed as free morphemes. In finger spelling, sometimes some of the letters being finger spelled may be deleted. For example in finger spelling the name

W – A – S – H – I – N – G – T – O – N,

The **A** between **W** and **S** can be deleted because the two letters are signed almost the same thus occasioning the elimination of A to get W –S –H –I – N – G – T –O – N.

Example of A and S below:



**Figure 11** A and S hand forms

Finger spelling is highly symbolic in nature since the relationship between finger spelling and their referent is an arbitrary one. Signers get to know how to associate what is finger spelled and what it meant by convention. Finger spelling is a borrowed concept from spoken language. The following are some of the instances that a signer may use finger spelling:

- On first introduction with a person who is deaf.
- When inquiring about the sign of a word that one may have forgotten.
- On introducing a word that may lack a sign equivalent.

In a situation where certain linguistic elements have no equivalents in KSL, they can be expressed by switching from SL into spoken language using finger spelling. Okombo et al [49] view finger spelling as a cardinal linkage tool that connects the deaf co-culture in any given country to its larger national culture.... In KSL, finger spelling is used to represent places, people, actions, feelings and so on, especially those whose signs are either not known (by the signer) or are not yet developed. (P34-5).

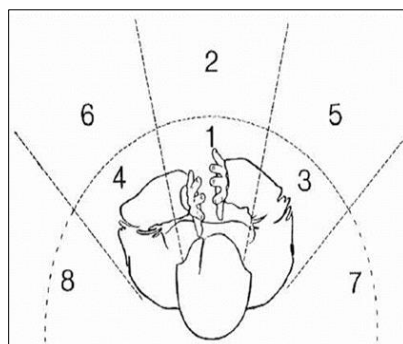
### 2.5.2. Inflectional morphology

Inflectional morphology is concerned with changes made to existing words/signs by adding grammatical information such as number, tense, agreement, and case or in KSL the use of space or location formation, verb aspect, classifiers and numerical incorporation to already existing units

#### Location

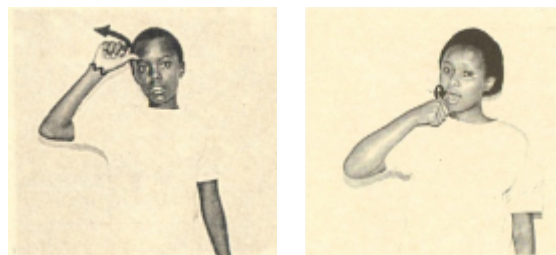
Location in KSL refers to where the hand forms contacts a certain part of the body (place of articulation). It may also comprise of signs that are made in the signing space without any contact between a hand form and parts of the body e.g. signs made at the neutral space in front of the signer (zero location). Signs in KSL can be produced at different locations on the signers body e.g. on the head, chest, waist, on the face, on the different sides of the face – upper face, mid face, lower face etc.

KSL uses location in the signing space for referential function. Thus morphological location is deictic (indexic) i.e. it is used to point in the signing space at the place that has been referred to before (the locus).



**Figure 12** Sign language signing space. (Adopted from Rissanen -2009)

According to Liddle, Valli and Lucas [50, 51], the particular place or location where signs are produced incorporates the structure of the sign. The location on its own has no autonomous meaning since if it changes, it also occasions change in the meaning of the sign. For example, signs for CLEVER and NICE are produced using an A hand form with thumb protruding on the forehead (location) and cheek (location) respectively. A change in morphological location also occasions change in meaning.



**Figure 13** CLEVER

NICE

Location in Kenyan sign language morphology also fulfills diverse functions. For instance, use of demonstratives or pointing signs to indicate where an entity is located in the signing space. They refer to objects in a deictic way – by using the index finger to point at a targeted or specific place also called the location fixing function of a locus. Examples:

**Table 5** Demonstratives or Pointing signs in KSL

| Type of pronoun | Examples                                  |
|-----------------|---|
| Demonstrative   | <b>THIS, THAT, THERE, HERE THESE, NOW</b> |

**THERE** and **HERE**, have articulatory roles as deictic signs pointing with the finger in space to the particular place where a noun is placed. **NOW** refers at a particular time. Thus, the above demonstratives are used as noun locatives in a particular locus. **THIS** and **THESE** can point to a particular locus where a noun is placed, or point in space thus they carry referential information. They are also used with nouns to enable the signer to co-reference the same noun by pointing the referent locus.

Demonstratives in KSL therefore refer to already mentioned nouns (referents) and provide co-referential reference, which brings texture to the text or what Hasan [31] refers to as cohesive harmony assisting texts make sense. The demonstrative pronouns above (apart from **NOW**) show how proximal the signer and “listener” are to the object being talked about; they show the position of the object by pointing at where it was placed.

#### Pronouns

Pronouns are words that are connected to things, persons or places that have already been identified. In KSL, they are deictic in nature. Examples:

**Table 6** Personal pronouns in KSL

| Type of pronoun   | Examples                            |
|-------------------|-------------------------------------|
| Personal Pronouns | <b>I, YOU, HIM ME, WE, US, THEY</b> |

In KSL personal pronouns are formed when signers place objects, things or persons in the signing space so that they can refer back to them deictically. Pronouns become distinguishable using different spatial areas e.g. if the sign **MAN** is placed at a particular place in the signing space, one only needs to refer back to the same by pointing at where **MAN** was placed, the sign changes from **MAN** to the pronoun **HE**. **YOU** is produced with the index finger hand form pointing at the listener (second person locus) while **ME** is signed using the index finger hand form pointing at the signer (first person locus). When we change the orientation of the sign the meaning also changes.

#### Verbs

Sign language inflectional morphology also manifests itself in verb agreement and verb aspect. Verbs in KSL can be inflectional because they carry grammatical information, such as number, tense, agreement or case. There are three major categories of verbs: plain verbs, indicating verbs (directional verbs, reciprocal verbs, locative verbs), and depicting verbs (classifier predicates) in sign language linguistics.

## Plain Verbs

Plain verbs do not show any inflection for person or number thus when used, the signer indicates the subject and object of the verb devoid of any inflection. For example, the verb LOVE (Figure 14 below) does not require inflection. The signer would only need to show the subject and object. In signing ME YOU LOVE (I love you) and YOU ME LOVE (You love me) the verb does not change and is signed the same.



Figure 14 LOVE

THINK, KNOW, UNDERSTAND, EAT, HAPPY etc. are also examples of plain verbs.

## Indicating Verbs

Indicating verbs can be modulated through inflections to show the direction an object is moving to or from in a sentence. They include directional verbs, reciprocal verbs, and locative verbs. For example, ASK, GIVE etc. change based on either the subject doing the action, or where the action is taking place.

The verb **FLY** is signed depending on where one is flying to or from. For instance, it is signed in the direction of the signer if one is flying in while it will be signed away from the signer if flying out. **ASK** is signed away or toward the signer depending on whether he/she is asking or is being asked. **LOOK, GIVE, TEACH** etc. fall under this category. They are directional or agreement verbs. These verb indicates where the object is moving by its direction and movement. Verbs that indicate particulars about the subject and object in a sentence agree with the subject and object – subject-object agreement. Spence and Woll [52] state that directional or agreement verbs incorporate information about the person doing the action, number of the subject and object and whom it affects by changing the movement and orientation of the verb. Padden [53] says that verbs that show agreement characterize, convey and encrypt the syntactic role of the arguments in a sentence, including their person and numbers features – indicated by the hands direction and movement and palm orientation.

Agreement verbs possess a subject agreement marker – as its starting point then followed by a verb stem – linear movement and then an object agreement marker.

For the verb **GIVE** in the example below:

- **NOWMAN HIMSELF THINK DEAF**
  - The man thought the deaf person was
  - **CLEVER/ AGAIN MEANING**
  - clever which meant he had
  - **WORK GIVE**
  - to give him a job

The commencement of the verb **GIVE** is the sign **MAN** the subject agreement marker and represents a point in the space where signing is done and is used to refer to the subject normally proximal to the signer. The verb stem is made up of movement and the sign **DEAF** marks the object agreement in the sentence. This sentence is summarized as **MAN- DEAF- WORK- GIVE**. The place used to refer to the object **DEAF**, which is also a place near the signer, is the finishing point. The verb **SEE** conveys information about person who is the object. **SEE** is signed using the Index finger hand shape starting from below the eye. The end point for the verb **SEE** is at places in the signing space that is used to refer to both the subject and object. **SEE** exemplifies agreement verb that changes the orientation of the index finger to differentiate for example between SEEING ME and SEEING YOU.

**THINK** and **HEAR** are also examples of agreement verbs. The verb **THINK** is signed in such a way that there is no separate sign between the subject and the verb. Thus, the sentence **ME THINK** (I think) is signed as **THINK** since

information about subject is incorporated in how the verb is oriented. Conversely, in signing **YOU THINK** (you think) there will be a distinction between the subject **YOU** and the verb **THINK**. **HEAR** also switches orientation from subject to the object for the aim of agreement. The sign **HEAR** can be oriented towards the signer or towards the listener. **ME HEAR** (I hear) is signed with no separation of signs between **ME** and **HEAR** thus for **ME HEAR** one can sign **HEAR**. The verbs above contain information about agreement features for person and number of subject and object. The agreement is shown through the change direction of movement.

**THINK** is classified as verbs of mental functions or action the same as **REMEMBER**, **BELIEVE** and **KNOW** all articulated or located at the temple. This location at the temple indicates the where the emotions of the experiencer argument are located. Verbs of mental actions are normally located where the mental activity of the experience takes place, which happens to be at various points on the temple.

**SEE** and **LOOK** in contrast are verbs of perception and their place of articulation is at the sight organs – the eyes the location of the activity of the experiencer. Verbs like **SAY** and **TELL** have the mouth as their location or place of articulation. The mouth is where on the body of the experiencer the action emanates.

The verbs discussed above are agreement verbs of the regular forms. These verbs according to Sandler et al [54] can move away from the body when the subject agreement is the source possessor or towards the body when the subject argument is the goal possessor e.g. in **GIVE**. Where the subject is 1<sup>st</sup> person **I** and object 2<sup>nd</sup> person **YOU**, the active hand will move from the body towards the addressee or listener. The same also happens for verbs such as **SEE** and **LOOK** which are verbs of perception located at concerned sense organ. The eye is thus a representation of the activity of the experiencer.

However, sometimes **LOOK** can also be used to mean searching for something. Used this way it is produced using a V-hand-shape bent slightly and takes an outwards orientation denoting looking or searching. **ASK** has its orientation determined by whether its reference is the 1<sup>st</sup>, 2<sup>nd</sup> or 3<sup>rd</sup> person. In reference to 1<sup>st</sup> person, its orientation will be towards the signer. When it is used to refer to 2<sup>nd</sup> and 3<sup>rd</sup> person, the palm orientation is outwards away from the signer and towards the listener.

#### Reciprocal and locative verbs

Reciprocal verbs indicate reciprocating or simultaneous action of the subject and the object. They are used for example in situations where two people are asking each other question, are asking and being asked simultaneously. E.g. **ASK EACH OTHER** or giving each other something e.g. **GIVE ME**, **GIVE YOU**, **GIVE HIM/HER/IT** or looking at each other etc.

Locative verbs on the other hand are another form of indicating verbs, which shows direction or location. The meaning of a locative verb is contained in its location or direction. The action could be oriented away from the signer or toward the signer.

#### Depicting verbs

Depicting verbs or "classifier predicates" normally have information about the action or state of being of the subject.

#### Classifiers

A classifier represents a hand shape that works together with the articulatory properties of KSL like location, orientation, movement and non-manual features to form a predicate – Valli and Lucas [56]. Classifiers are used to show what things look like, where they are in space, or how things behave. Classifier predicates are used to map real word space by using the signing space – Lucas et al [57]. KSL has classifiers for:

- A person – IN: **FOLLOW**, **MEET**, **WAKE UP** OR **WALK**
- People – IN: **A QUEUE**
- Books – IN: **ON A SHELF**
- Eyes – IN: **LOOKING UP**, **DOWN**, **STARRING**
- Vehicles IN: **OVERTAKING**, **IN TRAFFIC**, **PARKED**

**WAKE UP** for example is a classifier predicate, which gives us information about movement. This is an example of a classifier called a whole entity morpheme in terms of hand form. That is "... hand shapes that refer to an object as a whole such as a car, an animal, or a person standing ..." Valli and Lucas [58]



The classifier **STAND** exemplifies a classifier predicate that informs us about the noun for example in **MAN STAND**. The verb **STAND** a whole entity morpheme in KSL is signed using the V- hand form or the active articulator facing down and the open palm of the passive articulator facing up as its place of articulation.

#### Verb aspect

Aspect is a category of grammar that correlates with verbs that show a temporal view of the event or state expressed by the verb. Verbs in KSL can be inflected for aspect, by changing the signs movement. **E.g. WALK SLOWLY, WALK FAST, LOOKING, OGLING, STARING**. These verbs are produced with the repetition in movement especially for the adverbs **SLOWLY and FAST**. The verb **LOOK** also can be inflected to mean different things e.g. **LOOK AT, LOOK FOR, LOOK AROUND, LOOK GOOD, OGLING, STARING** etc.

Valli and Lucas [59], assert that any information contained in a predicate that tells us how the predicate does its action is talking about aspect. When the action of the verb is executed by referring to time, we talk about temporal aspect. In contrast, Richards et al [60] view aspect as a category of grammar concerned with how we regard the events described by a verb. Whether progressive, habitual, repeated, momentarily etc. Quirk and Greenbaum [61] instead see the concept of aspect as regarding how the action of verb is experienced or regarded.

In KSL, repetition is one of the ways in which habitual aspect can be expressed. As Spencer and Woll [62] put it: repetition is one of the ways that the BSL verbs are altered to indicate different features of aspect whether slow or fast. However, for some verbs repetition is used to show how long the action lasted. For example:

- EAT EAT- eat continuously
- LAUGH LAUGH- laugh continuously
- BREAK BREAK – break continuously

In **EAT, LAUGH** and **BREAK** the verbs are repeated fast to shows the continuous nature of the activity of the verb. This fast repetition goes along with non-manual signals. Habitual aspect in KSL is exemplified using the repetition/reduplication example:

**GO FASTFAST** is signed with quick movement for **GO** followed by a hold then by reduplication (movement) of **FAST** giving us **FASTFAST** to mean in-a-hurry (or hurry up). The basic structure for **FAST** is **HMH** however in **FASTFAST** there is a change in the basic structure of the sign from hold to movement that is – **HMMH** structure.

**TELL, BREAK** and **GO** also exemplify what Johnson and Schembri [63] call dynamic verbs or durative verbs –that need time to unfold. When reduplicated, durative verbs indicate action that is carried out for a long time. These verbs are used to represent a class of brief and instantaneous action –they are also habitual verbs. They reduplicated rapidly to signal habitual action.

In KSL, the Verb **FINISH** is used for purposes of emphasis to indicate the time of an event or when an event took place. When **FINISH** is used in reference to an event, it indicates the completive nature of the action being described. **FINISH** when used as a completive marker indicates aspect. It therefore exemplifies verb inflection, which normally occurs sentence finally with the verb. For example in **ME EAT FINISH** (I have already eaten). As a completive marker it has the same meaning as “already” in English. **FINISH** occurs frequently in past time context. However, as Meir [64] posits when used to denote the same meaning as “already” in English, it functions as an aspectual marker indicating a perfect construction and not as past tense marker. This function of **FINISH** as an equivalent of “already” as a marker of a perfect construction in KSL has also been noted in Israel Sign Language (ISL). However, in ISL, **FINISH** can appear before the verb while in KSL **FINISH** appears only sentence finally e.g. **ACCEPT FINISH, KEEP FINISH**.

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### 3. Conclusion

This paper set out to discuss Aspects of KSL morphology by examining how components of signs that are meaningful are put together to construct signs that are more complex. From our analysis of data, we identified the various meaningful ways that KSL signs are combined to build complex signs. Some of the identified ways include Derivation (suffixation, prefixation, pluralization, numerals, compounding and borrowing) and inflection (Location, pronouns and verb morphology). Our paper has not only explored new words formation strategies in KSL but has also stipulated the morphological structure of the language.

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## Compliance with ethical standards

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