

CROSS-MODAL PERCEPTION IN KIRUNDI

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ABSTRACT

Languages do not always use specific perception words to refer to specific senses. A word from one sense can metaphorically express another physical perception meaning. For Kirundi, findings from a corpus-based analysis revealed a cross-modal polysemy and a bidirectional hierarchy between higher and lower senses. The attested multisensory expression of auditory verb kwûmva 'hear' allows us to reduce sense modalities to two –vision and audition. Moreover, the auditory experience verb kwûmva 'hear' shows that lower senses can extend to higher senses through the use of synaesthetic metaphor (e.g. kwûmva akamôto 'lit:hear a smell'/ururîrimbo ruryôshé 'lit: a tasty song'/ururirimbo ruhimbâye 'lit: a pleasant song). However, in collocations involving emotion words, it connects perception to emotion (e.g.; kwûmva inzara 'lit: hear hunger', kwûmva umunêzêro 'lit: hear happiness'). This association indicates that perception in Kirundi gets information from both internal and external stimuli. Thus, considering feelings as part of the perception system.

KEYWORDS

Sense Modality, Kirundi, cross-modal perception, lexical semantics, synaesthetic metaphor.

1. INTRODUCTION

This paper discusses the lexicalisation of sensory perception in Kirundi [JD62], a native language all Burundians. Burundi, being located in the East Africa at the centre of Great Lakes, some languages spoken in the neighbouring regions such as *Kinyarwanda* [JD61] in Rwanda, *Kiha* [JD66], *Kihangaza* [JD65], *Kishubi* [JD64] and *Vinza* [JD67] in Tanzania (Mberamihigo, 2014, p. 27) are mutually intelligible with Kirundi. Moreover, it examines the relationship and/or associations between senses. That is, the identified basic verbs will be analysed in their contexts of use for their different meanings in the physical perception domain.

1.1. Perception Verbs

None would deny the prominence of sensory perception in our everyday communication. Sense organs– eyes, ears, skin, mouth and nose – collect information from the outer world for us, which the language translates it into words. However, languages do not give sense perception the same importance and do not always use specific perception words to refer to specific senses. A word from one sense can metaphorically express another physical perception meaning. Languages differ in how they lexicalize the sense perception (Moravcsik, 2012) and in the number of basic verbs they use to express them (Viberg, 1983). Viberg argues that the more a language avails basic verbs for each sensory modality the less it combines more than one sense modalities into a single verb. Thus, the conflation of senses results into cross-modal meaning extensions.

To comply with Majid & Levinson's (2011) wish for more knowledge about how people around the world express perceptual experience, the present study deals with Kirundi sensory lexicalization patterns with focus on the semantic extensions of basic Verbs of Perception (henceforth, VoP) across sensory modalities. Although perception has attracted much attention in linguistics and cognitive sciences (e.g., A. Aikhenvald & Storch, 2013; Evans & Wilkins, 2000; Levinson & Majid, 2014; San Roque et al., 2018; Sweetser, 1990; Vanhove, 2008; Viberg, 1983), less is known about Kirundi. Moreover, many studies focusing on meaning extensions of perception words and the various meanings paid more attention on transfield polysemy (Evans & Wilkins, 2000; Sweetser, 1991; Vanhove, 2008) but a few on intra field polysemy (San Roque et al., 2018). As San Roque et al. claim that "Polysemy is a linguistic habit practiced by everyone, every day", this paper describes the lexicalisation of the basic senses to demonstrate cross-modality in Kirundi and their effect on Viberg's (1983) directional hierarchy of sense modalities. The significance of this study lies in enriching literature on the lexicalisation of the field of perception since universal claims (Sweetser, 1991; Aake Viberg, 1983) were criticised for not resulting from representative data. Therefore, there is still need of examining findings from typological studies on the language of perception to make sure they apply to all the worldwide language and language users.

Regarding sense modalities, Viberg's (1984) paradigm reveals that the basic VoP refer to the five Aristotelian senses—*Sight, Hearing, Touch, Smell* and *Taste*— which he considers as the most important semantic components of the perception field. However, there is no agreement on the number of senses to consider. Sense recognition is a culturally bound aspect. Speakers, depending on their language and their cultural background may have more than five senses (Classen, 1993) or less (Ritchie, 1991) or can join more sensory modalities together (Howes, 2006c). From the five senses, Viberg claims that vision verbs dominates and that VoP have a unidirectional hierarchy. However, not all scholars agree with it. Evans and Wilkins (2000) attests it, while A. Aikhenvald and Storch (2013) and San Roque et al. (2015) do not. To verify what holds for Kirundi, the present analysis limits itself to how Kirundi expresses perceptual experiences through verbs.

1.2. Method and Data

This study adopted a corpus-based approach for which corpus data are of great importance since they reflect language uses, which can be analysed both quantitatively and qualitatively. In addition, to analyse concordances of VoP from the BantUgent corpus, a construction-based approach was favoured. For a usage-based analysis, the semantics of lexical units are determined by the meaning of the constructions in which they are involved (Goldberg, 1995, 2006) taking into account both perceptual and socio-cultural aspects of the language producer (Caballero & Paradis, 2015).

To find out how Kirundi organizes perceptual experiences, twenty-five native speakers were asked to translate Viberg's (1984:125) basic paradigm of VoP into Kirundi. These native speakers also served of reference for validation of possible uses not found in the corpus.

The grid paradigm contains fifteen sentences referring to the basic five senses (*Sight, Hearing, Touch, Taste* and *smell*) and the three semantic components (controlled perception, uncontrolled perception and the source-based perception) as *Table 1* indicates it.

Table 1: The basic paradigm of VoP (Adapted from Viberg, 1984:125)

Dynamic system:	Base selection: Activity	Experience r-based Experience (state/inchoactive)	Source-based Copulative (State)
Sense modality			
Sight	Peter was looking/ looked at the birds.	Peter saw the birds.	Peter looked happy
Hearing	Peter was listening/ listened to the birds.	Peter heard the birds.	Peter sounded happy
Touch	Peter was feeling/ felt the cloth. /to see how soft it was/	Peter felt a stone under his foot.	The cloth felt soft
Taste	Peter was tasting/ tasted the food. /to see if he could eat it/	Peter tasted garlic in the food.	The food tasted good/bad/of garlic.
Smell	Peter was smelling/smelled the cigar. /to see if he could smoke it/	Peter smelled cigars in the room.	Peter smelled good/bad/cigars.

//test frame

As of the corpus used for this study, it contains raw materials compiled from 1485 files containing both spoken and written language productions. A concordance of *BantUgent Kirundi* corpus using *Wordsmith Tools* (Scott, 2016) yielded a wordlist of 3 567 037 tokens. Referring to both the distribution of the basic VoP and their uses, the analysis of VoP constructions gives an in-depth description of how Kirundi users express the basic perceptual experiences and, the linguistic and cognitive mechanisms that allow perception lexicalisation intra- and trans-modal meaning extensions.

2. BASIC VERBS OF PERCEPTION IN KIRUNDI

In this section, the discussion focusses on the different translations of Viberg's grid frames. Examination of translations from the twenty-five participants shows that the fifteen English sentences in the grid paradigm correspond to thirty sentences in Kirundi. The difference in lexicalizing perceptual experiences between Kirundi and English finds motivation from the fact that Kirundi can count more than one verbs for each of the provided English olfactory, gustatory and tactile perception events. For the perceived-oriented event, all the provided events translates into more than one verbs.

Table 2: Basic Verbs of Perception in Kirundi

	Perceiver-oriented		Perceived-Oriented (Phenomenon)
Sensory modality	Activity	Experience	Copulative
Vision	<i>Kurāba/LOOK1</i>	<i>Kubóna/ SEE</i>	<i>Gusa /LOOK2</i> <i>Kubóneka /SEE+STAT</i> <i>Kunêzêrwa * / BE HAPPY</i>
Hearing	<i>Kwûmviriza/</i> HEAR+APPL+APPL+CAUS	<i>Kwûmva /</i> HEAR	<i>Gusa/SOUND</i> <i>Kuvúga/SOUND</i> <i>Kunêzêrwa * / BE HAPPY</i> <i>Kwôroha*/BE SOFT</i> <i>Kuryôha*/BE TASTY</i> <i>Kumôta /SMELL</i> <i>good</i> <i>Kunuka/ SMELL bad</i>
Touch	<i>Gukórakora/TOUCH-REDUPL</i> <i>Gukora (ku)/Touch (on)</i>	<i>Kumôterwa</i> SMELL <i>good+APPL+PASS</i> <i>Kunûkirwa</i> SMELLbad+APPL+PAS <i>S</i>	
Taste	<i>Guhônja/TASTE</i>		
Smell	<i>Kwîmotereza/</i> REFL+SMELL <i>good+APPL+CAUS</i> <i>Kwînûkiriza</i> REFL+SMELL <i>bad+APPL+APPL+CAUS</i> <i>Kumôtiêra/SMELL</i> SMELL+APPL		
			<i>Kwîmûkama /</i> HEAR+STAT+ASSOC

Taking into consideration of the translations of the grid and the language uses from the corpus, Table 2 displays basic verbs that encode both perceiver-oriented and perceived-oriented perception events in Kirundi. In the following sub-sections, usage-based from the corpus illustrates the basic VoP in context per sense modality.

2.1. Sight

For the experiencer-based perception, on the one hand, Kirundi distinguishes two verbs: *kurāba* (1) as an activity verb to mean ‘Look at’ and *Kubóna* (2) as an experience verb to express ‘See’.

(1) *Rāba Thomas ibigānza...* (*Turirim bire umukama.txt*)

Rāb-a Thomas i-bi-gānza
 IMP-to.look-FV Thomas AUG-NP-palm
 Thomas, **look** at the palms...

(2) *Narámubônye ejó* (*ISA_UburundiBura_2014-10-27.txt*)

n-á-ra-mu-bón-ye ejó
 1SG-PST-DISJ-OBJ_{3SG}-see-PFV yesterday
 I **saw** him yesterday.

The source-based perception, on the other hand, the stative construction [[*kubóna*]V -ik-]V = [x can be seen] is used to mean ‘(not) *visible, can be seen*’.

(3) *agakôko katabonéka* (*Inyigisho zijanye n'inyifato.txt*)

a-ka-kôko ka-ta-bón-ik-a
 AUG-NP-animal 3SG-NEG-see-STAT-IMPFV
 An **invisible** animal.

(4) [...], *birabónéka*, [...]. (*IragiNdanga.txt*)

[...], bi-ra-bón-ik-a,[...]

However, when used in an intransitive construction (12-13), the verb *kwûmvá* expresses ‘(lack of) ability to hear’.

(12) [...] *amatwí yûmvá n'âmâso aboná.* (Impanuro.txt)

[...] *a-ma-twi a-ûmv-a na a-ma-iso a-bón-a*
 AUG-NP-ear REL-3PL-to.hear-FV and AUG-NP-eye REL-to.see-FV
 [...] **receptive ears** and keen eyes.

(13) [...] *umûntu atûmvá kãndi w'íkîragi.* (UbwuzureBushasha.txt)

u-mû-ntu a-ta-ûmv-á kãndi wa í-ki-ragi
 AUG-NP-person REL-3SG-NEG-to.hear-FV and of AUG-NP-dumb
 [...] **a deaf** and dumb person.

To express a perceived-oriented perception, speakers use a stative derivation *kwûmvîkana* ‘to be heard’ of the HEAR verb *kwûmvá* as illustrated in (14) and (15).

(14) *hûmvîkanye umurîndi* (IcaGatandatu.txt)

ha-a-ûmv- ik-an-ye u-mu-rîndi
 LOC-PST-to.hear-STAT-ASSOC-PFV AUG-NP-hurried.sound.of.footstep
 They **heard** a hurried sound of footsteps.

(15) [...] *inyuma y'âmasâsu yûmvîkanye* (RPA_JP_2014-10-16.txt)

i-nyuma ya a-ma-sâsu a-a-ûmv-ik-an-ye
 LOC-after CONN AUG-NP-bullet 3PL-PST-STAT-ASS-PFV
 [...] after a burst of gunfire **echoed**

However, ‘*he sounded happy*’ can translate into ‘*yavúga nk'úwunêzerewe*’ where ‘*sound*’ corresponds to ‘*Kuvúga/speak/say*’ a SPEAK verb when the speaker, with low degree of certainty infers from how his interlocutor sounded when speaking (16).

(16) *yavúga nk'úwunêzerewe*

i-á-vúg-a nka u-u- nêzêr-w-ye
 3SG-PST-*speak*-IMPFV like REL-3SG-please-PASS-PFV

He **sounded** happy

Nevertheless, with high degree of certainty, the SPEAK verb and the conjunction *nka* ‘like/as though/as if’ are omitted as (17) shows it.

(17) *Aranêzerewe*

a-ra-nêzêr-w-ye
 3SG-FOC-please-PASS-PFV
 He **is happy**

Therefore, the expression of epistemic modality, using HEAR or SEE verbs, is associated with the presence/absence of source-based verbs (*kubóneka* ‘seems/appears/look’ and *kuvúga* ‘sound’) and the conjunction *nka* ‘as though/as if/like’.

It is worth mentioning that the same SPEAK verb *kuvúga* can convey the speaker’s report of a hearsay (that he heard something being talked about). The passive form (18) of verb is used, read as ‘*say/mention*’.

(18) *murí abo haravúgwa umushîngamátêká Bernard Busokoza ...* (IGIHE140331Uprona.txt)

murí abó ha-ra-vúg-u-a u-mu-shîngamátêká Bernard
 Busokoza
 among them LOC-DISJ-say-PASS-FV AUG-NP-member.of.parliament Bernard
 Busokoza

Even if it would be a *soft cloth*, [...]

2.4. Taste

The gustatory sense modality has only one active verb *Guhônja* (24) “to taste a small quantity of sth or to give a small quantity of something to taste to somebody” to express a controlled gustatory perception and an evaluative verb *kuryôha* ‘be tasty’ (25), which can be replaced by any evaluative gustatory verb. There can be verbs describing the different kind of taste such as *kubîha* ‘have an unpleasant taste’, *kubába* ‘have a spicy taste’, *kugāsha* ‘go bad’, *gusôsa* ‘have a sweet taste’, *kurura* ‘have a sour taste’, etc.

- (24) *Ivyárivyó vyöse azōza avyîremētse abariyo abahônje.* (Marriage Didier & Annick-2019.txt)

Ivyárivyó	bi-öse	a-zō-əz-a	a- bi-îremēk-ye
Whatever	PP-all	3SG-FUT-to.come	3SG-to.carry.on.one’s.head-PFV
a-ba-rí-yo		a-ba-hônj-e	ba-ûmv-ir-ir-i-e
AUG-3PL-to.be-LOC		3SG-3PL-to.taste-IPFV	3PL-to.hear-APPL-APPL-CAUS-IPFV

However it may be, she will bring them a small quantity (of potatoes) so that they can *taste* them

- (25) *Ziraryôshe cāne.* (RPA_Akayabagu_Claude_Irengarenga.txt)

Zi-ra-ryôh-ye	cāne
3PL-DISJ-be.tasy-PFV	a.lot

They are very *tasty*.

To express uncontrolled perception, the hearing verb *kwûmva* is involved (26).

- (26) *Igihimba twūmvîsha uburyôhe* (Inyigisho menyeshantara 2.txt)

i-ki-himba	tu-ûmv-ish-a	u-bu-ryôh-e
AUG-NP-part	2PL-to.hear-INST-FV	AUG-NP-to.be.tasty-FV

A body part with which we *taste*.

2.5. Smelling

Apart from the Hearing verb *Kwûmva*, which can be used with nouns denoting smell, the evaluative verb *Kumôta* and its derivational forms *kumoterwa* and *kumotereza* respectively express source-based, non-controlled and controlled perceptions. We realize that Kirundi distinguishes good from bad smell. The latter brings in another set of verbs *kunûka*, *kunûkirwa* and *kwînûkiriza*. Consequently, SMELL is the sense modality that has a larger number of basic verbs.

- (27) *amasábuné amôta [...]* (USCRI_H_Asthma.txt)

a-ma-sabuni	a-Ø-môt-a [...]
AUG-NP-soap	3PL-PRS-smell.good-IMPV

Sweet-smelling soaps [...]

- (28) *Ya mbwa imotewe, [...]* (Dusome4.txt)

i-i-á	n-bwa	i-môt-ir-w-e
AUG-PP-DEM	NP-dog	3SG-smell.good-IMPV

When the dog *got a sweet smell*, [...]

- (29) [...], kwîmôtereza. (Inyigisho menyeshantara 4.txt)

Ku-i-mōt-ir-ir-i-a
INF-REFL-smell.good-APPL-APPL-CAUS-IMPV

To smell /to see if something smells good/

(30) *sinzôbá nkirimōtēra. (Karaba.txt)*
I will no longer smell it

It is a derived verb form[-mōt –APPL] from *kumōta* ‘smell’, a source-based VoP, where the applicative morpheme does not add the semantic value of ‘smelling *x* for’ but indicate the intension of the agent of the verb.

Although the language has different lexical verbs to encode each of all the five senses, the *Table 2* reveals that the cross-modality extension of the hearing verb *Kwûmva* can reduce the lexicalization of perceptual experiences into two sense modalities only –SIGHT and HEARING – using three basic verbs –*Kurāba* ‘LOOK’, *Kubóna* ‘SEE’ and *Kwûmva* ‘HEAR’. The two first verbs expressing visual perception and the last for non-visual perception. A question, which arises here, is why or how could it be possible? The verb glosses (*Table 2*) show that the auditory verb *kwûmva* can extend its meaning to all non-visual perception events. In addition, depending on the degree of the experiencer’s consciousness and focus in a perception event, the language creates new verbs *kwûmviriza* ‘listen’ and *kwûmvikana* ‘*x* is audible’ from existing ones to convey the needed interpretation. That is, to distinguish perceiver-oriented controlled from uncontrolled events or perceiver-oriented from perceived-oriented perception ones, Kirundi uses derivational verb extensions devices. Referring to the different mechanisms languages use to encode perceptual experiences (Usoniene’s, 1999: 2), the examination of data shows that Kirundi uses both linguistic and cognitive means. To elaborate on this, Section 3 details all the linguistic means Kirundi uses to encode perception experiences.

3. LINGUISTIC WAYS TO CREATING THE MISSING SPECIFIC VERBS

For the linguistic means, the classification of the VoP shows that Kirundi uses both lexical and morphological means. The latter complete lexical ones to avail a perception verb where it initially did not exist. Hence, extended verbs that can express a controlled or a phenomenon-based perception within a sense modality are created. For instance, whereas the visual perception has two basic lexical forms –*kurāba* /LOOK₁ and *Kubóna*/ SEE– to refer respectively to ACTIVITY and EXPERIENCE, the experience auditory verb *Kwûmva*/ HEAR needs to be attached to derivational morphemes to express an active perception (31.b). However, both visual and auditory EXPERIENCE verbs need a bound morpheme to make a copulative verb (32. a & b). Therefore, Communicational needs in terms of perception event typology influences the language user to use either a simple lexical or a complex one by deriving a new verb from an existing one to fit in another *class* (Goldberg, 1995). The example is of the causative-applicative morphology, which changes a HEAR-class (31.a) into a LISTEN-class (31.b). The lexicalised verb *kwûmviriza*/to listen to equals a conative-intensive construction, where the implied attention of X to Y causes him to hear Z. X,Y and Z respectively referring to the listener, the speaker/interlocutor and the message.

- (31) a) Pētéro *yarûmvise* inyoni/
Pētéro i-á-ra-ûmv-ye i-n-nyoni
Pētéro 3SG-PST-DISJ-*to.hear*-PFV AUG-NP-bird
Peter *heard* birds
b) Pētéro *yarûmvirije* inyoni/
Pētéro i-á-ra-ûmv-ye i-n-nyoni

Pētéro 3SG-PST-DISJ-*to.hear*-APPL-APPL -CAUS-PFV AUG-
NP-bird

Peter *listened to* birds.

(32) a) Pētéro *yūmvīkana* nk'úwunêzerewe

Pētéro i-á-ûmv-ik-an-a

nka

Pētéro 3SG-PST-*to.hear*-STAT-ASS-IMPFV

as.though/as if

u-u-nêz-ir-w-e

REL-3SG-pleasure-APPL-PASS-IMPFV

Peter *sounded* happy

b) Pētéro *yabóneka* nk'úwunêzerewe.

Pētéro i-á-bón-ik- a

nka

Pētéro 3SG-PST-*to.see*-STAT-IMPFV

as.though/as if

u-u-nêz-ir-w-e

REL-3SG-pleasure-APPL-PASS-IMPFV

Peter *looked* happy

Derivation is not the only morphological process that Kirundi uses to create lexical perception verbs. It also uses reduplication of a verb stem to show intensity or durativity (21). Thus, the present analysis shows that Kirundi, as an agglutinative language, uses derivational and reduplication morphological processes not only to express in one word what other languages would syntactically express in more than many words but also to make semantic and pragmatic nuances among perception events. Therefore, without considering the different forms of the same lexeme and that *kunūka* is an antonym of *kumōta*, Table 3 display Kirundi basic primitive VoP and their frequencies in the used corpus.

Table 3: Distribution of Kirundi VoP in the corpus

	<i>Root verb</i>	<i>Root Verb + extensions</i>	TOT	
<i>Vision</i>	<i>Kubóna</i> “see”	14727	4208	1893
	<i>Kurāba</i> “look ₁ ”	7221	196	7417
	<i>Gusa</i> “look ₂ ”	152	0	152
<i>Hearin</i>	<i>Kwūmva</i> “hear”	11415	6337	1775
<i>g</i>				2
<i>Touch</i>	<i>Gukora</i> (<i>ku</i>)/ <i>Touch</i> (<i>on</i>)	234	51	285
<i>Taste</i>	<i>Guhônja</i> “to taste/give a small quantity of sth (edible/drinkable) to determine its quality”	9	0	9
<i>smell</i>	<i>Kumōta</i> “ to smell”	68	71	139
	<i>Kumōtēra</i> “ to smell”	3	-	3

Figures in the above table indicate that visual and auditory perception verbs dominate in the corpus with a representation of 59% and 40% respectively. The possible order being *Sight>Hearing>Touch>Smell>Taste*, where SMELL interchanges the place with TASTE when compared to Viberg’s directional hierarchy. This predominance in frequency of the two sense modalities *Sight* and *Hearing* in the corpus allows us to predict cross-modal meaning extension of verbs from the two sense modalities. Thus, use of cognitive means to express sensory modality. To verify this hypothesis, Section 4 discusses cross-modal meaning extensions for Kirundi VoP.

4. CROSS-MODAL MEANING EXTENSIONS

As of the question on what cross-modal meanings Kirundi VoP can express, *Table 4* gives us a picture of what verbs extend their meanings to other modalities.

Table 4: Meaning extensions to other sense modalities

		Vision	hearing	touch	smell	taste
<i>Vision</i>	<i>Kubóna</i> “to see”	✓	-	-	-	-
	<i>Kurāba</i> “to look ”	✓	-	-	-	-
	<i>Gusa</i> “to look ₂ ”	✓	✓	✓	-	✓
	<i>Kubóneka</i> “to be seen/to seem”	✓	-	✓	-	✓
<i>Hearing</i>	<i>Kwûmviriza</i> “to listen”	-	✓	✓	✓	✓
	<i>Kwûmva</i> “to hear”	-	✓	✓	✓	✓
	<i>Kuvúga</i> “to speak/say”	-	✓	-	-	-
	<i>Kwûmvíkana</i> “to be audible”	-	✓	✓	✓	✓
<i>Touch</i>	<i>Gukórákora</i> “to touch repetitively to see if sth is x	-	-	✓	-	-
	<i>Gukora (ku)/Touch (on)</i>	-	-	✓	-	-
	<i>Kwôroha</i> “to be soft”	✓	✓	✓	✓	✓
<i>Taste</i>	<i>Guhônja</i> “to taste/give a small quantity of sth (edible/drinkable) to determine its quality”	✓	✓	-	-	✓
	<i>Kuryôha</i> “to be tasty”	✓	✓	✓	-	✓
<i>smell</i>	<i>Kwîmotereza</i> “to smell to see if sth/sb smells well”	-	-	-	✓	-
	<i>Kumôterwa</i> “to smell sth which has a good smell”	-	-	-	✓	-
	<i>Kumôtêra/SMELL+APPL</i>	-	-	-	✓	-
	<i>Kumôta</i> “to smell good”	-	-	-	✓	-
	<i>Kunûka</i> “to smell bad”	-	-	-	✓	-

As *Table 4* demonstrates it, there is difference in semantic variation in meaning extension to other sense modalities.

4.1. Sight

The table does not the activity visual perception verb *kurāba* ‘to look’ covering all the five sensory modalities. This is because *there* were no occurrences attesting meaning extensions of the verb *kurāba* ‘to look’ to other senses in the corpus. However, elicitation tests for the correctness and meaningfulness of the different constructions involving the verb *kurāba* allow us to deduce that *kurāba*/to look does not extend its meaning to all non-visual senses. Instead, it bases on them to mean *search for/ find* by listening (33), *check* by touching (34) or *tasting* (35) and *choose* by smelling (36).

- (33) *Rāba Thomas ikásěti ivugá nêzá.*
 Rāb-a Thomas *ikásěti* *ivugá*
nêzá
 IMP-to.look-FV Thomas AUG-NP-tape REL-3SG-to.sound-FV
 good
 Thomas, *find/search for* an undamaged tape.

By the end of the process, as speaker A had ordered B to look for an undamaged tape, A can ask about the result and put the question “*Ni iyîhé kásëti wabōnyé (saw) ivugá nêzá? / which tape did you find undamaged?*” This implies that the experience visual verb too, can extend its meaning to audition.

(34) *Rāba Thomas impūzu kó zūmyé.*

Rāb-a	Thomas	i-n-hūzu	ko	zi-ûm-ye
IMP-to.look-FV	Thomas	AUG-NP-cloth that	3PL-to.be.dry-PFV	

Thomas, *check if* cloths are thoroughly dry.

To give feedback to A, B can say it four different statements:

- “*zisa n’izūmye/ they look dry*” when he only looked at them without feeling them and realized that there are no more drops of water from the cloths.
- “*nūmva zūmye/ I feel that they are dry*”, which reflects an individuation of the involved perception modality (Matthen, 2015) after the speaker has touched the cloths to make sure they are thoroughly dry.
- “*mbona zūmye/ I see that they are dry*” while touching them to verify the accuracy of the information he acquired through vision. Looking at and touching the cloths mutually certify for the cloths’ dryness property, while for the last case “*zirūmye/they are dry*” the proposal does not tell about which verification means the speaker used.

(35) *Rāba Thomas indyá ká zihīyé.*

Rāb-a	Thomas	indyá	kó	zi-hī-yé
IMP-to.look-FV	Thomas	AUG-NP-food	that	3PL-to.be.cooke-PFV

Thomas, *ensure/check* that the food is cooked through.

Although the alternatives “*mbona zihīye/I see that they are cooked through*” and “*nūmva zihīye/ I find them cooked*” are also possible for the gustatory modality, “*mbona/I see*” does not integrate TASTE. Since the speaker only considered the food appearance without tasting them. Therefore, SEE does not base on TASTE to extend its meaning.

(36) *Rāba Thomas amavúta amōtá nêzá.*

Rāb-a	Thomas	a-ma-vúta	a-mōt-á	nêzá
IMP-to.look-FV	Thomas	AUG-NP-body.lotion	REL-3SG-to.smell-FV	
		good		

Thomas, *choose* body lotion that has a sweet smell.

Although a transitive declarative construction (*mbona amavúta amōtá/I see sweet body oil*) was not confirmed, the non-controlled visual verb SEE can base on the olfactory sense modality to extend its meaning to ‘find’ by smelling in an interrogative construction (e.g: *Ni ayâhé wabōnyé amōtá? Which one has a sweet smell?*).

As far as perceiver oriented verbs are concerned, two verb forms – *gusa* ‘look₂’ and *Kubóneka* ‘can be seen’– are multimodal. **Gusa** “look₂” in the construction *Gusa nka...* “Look like”, the V+Prep expresses a visual percept as (37a).

(37) a) *RUBERINTWARI asa nk’ūshavuye (Nyerek’akaranga.txt)*

RUBERINTWARI	a-sa	nka	u-shávur-ye
RUBERINTWARI	3SG-to.look	like	REL-3SG-to.be.unhappy/nervous-PFV

RUBERINTWARI *looks* unhappy.

Depending on the context of production, the construction *Gusa nka[...]* can also mean, “to sound” and so refers to auditory modality. The speaker considers the mood and the words he heard from his interlocutor (RUBERINTWARI), in a conversation on telephone for instance, and infers his happiness. That is why, if he wants to specify that he inferred the happiness through what he heard, he uses the derived form “kwûmvíkana” (37c) of the verb *kwûmva*. Instead, in case the speaker refers to the appearance, he uses the verb *Kubóneka* “to seem/be seen” (37b).

b) **RUBERINTWARI aboneka nk’ûshavuye**

RUBERINTWARI	a-bón-ik-a	nka	u-shávur-ye
RUBERINTWARI	3SG-to.be.seen like	REL-3SG-to.be.unhappy-IMPFV.	

RUBERINTWARI *looks* unhappy.

c) **RUBERINTWARI yûmvíkana nk’ûshavuye**

RUBERINTWARI	a-ûmv-ik-an-a	nka	u-shávur-ye
RUBERINTWARI	3SG-to.hear-NEUT-ASSOC-FV	like	REL-3SG-be.unhappy-PFV

RUBERINTWARI *sounds* unhappy.

Although *Kubóneka* “to be seen/to seem” can function as a synonym of *gusa* and can replace it as in *Kubóneka+nka*, the construction implies the involvement of the audience or a shared opinion. That is, RUBERINTWARI appears unhappy to anyone who looks at him. RUBERINTWARI’s face serves as the source of evidence for the provided information. Therefore, a clause in which the physical evaluative perception where *Kubóneka* heads the VP has a meaning of inferred evidentiality (*Aikhenvald, 2003:1*). The speaker can also use these verbs to avoid confirming what he is not sure of. Once more, he uses the verb *Gushávura* “to be unhappy/nervous” as the main verb (19), the proposal reflects a higher degree of certainty on the part of the speaker about the stated information than in (37d). Thus, a case of epistemic modality (Usonienė, 2002).

d) **RUBERINTWARI arashávuye**

RUBERINTWARI a-ra-shávur-ye

RUBERINTWARI 3SG-DISJ-shávur-ye

RUBERINTWARI *is unhappy*.

Once more, in *Ruberintwari is unhappy*, the disjunctive marker *-ra-* shows the focus on the information conveyed by the verb and thus, a case of epistemic modality if we follow Halliday (1970:349). In such contexts, the verb functions as an evaluative adjective. As they are many in Kirundi due to the limited number of lexical adjectives, this study does not elaborate all of them. It only focuses on those that came out from Viberg’s paradigm of VoP, where the verb *kuryôherwa* “to be happy”, for instance, emerges because the adjective *happy* complemented the verb “to look” in “*Peter looked happy*” (*Viberg, 1984b:125*). This is to say that there are as many evaluative verbs as many qualities speakers may attribute to things/objects or people. Although this is valuable to all the sense modalities it extends on, the gist of the construction is that the described thing/object/person lacks the targeted feature in gustatory (38b) and tactile (38a) sense modalities.

(38) **b) [...]** *impûzu zisa n’izirêmvye* (*UbwuzureBushasha.txt*)

[...]	i-n-huzu	zi-sa	na	i-zi-rêmb-ye
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AUG-NP-cloth REL-3PL-to.look like REL-AUG-3PL-to.be.soft-PFV
Cloths that *looked soft*[but which are not].

b) *urwârwa rusa n'ûruryôshé*

u-rwârwa ru-sa na u-ru-ryôh-ye
AUG-banana.wine REL-3SG-to.look like REL-AUG-3SG-to.be.tasty-PFV
Banana wine, which *appears to have a goodtaste*[but which is not].

Consequently, this discussion reveals that the choice of one of the different constructions ‘*Gusa nka/na...*, *kubóneka nka...*’ to mean ‘looks’ in the basic sentence ‘Peter looks happy’, depends on whether the author makes a subjective or objective evaluation (Polis, 2009:207). Moreover, only source based visual verbs can extend their meanings to all the non-visual perception verbs, except SMELL.

4.2. Hearing

The classification of basic VoP in Kirundi showed that *kwûmva*/ HEAR conveys an uncontrolled perception, where the perceiver is an experiencer. Nevertheless, HEAR predicate constructions in Kirundi do not always refer to audition. Despite the fact that all sense modalities may have lexical verbs to express them, the auditory verb can express all the other physical sense perception except sight. The section below demonstrates the multimodal feature of the verb *Kwûmva*. This simply means that the nose (39), the mouth (40) and the skin (41, 42) can hear too, but that the eye cannot.

(39) *Wûmvirize utuvûta tumôta câne* (Ndamuhevye.txt)

u-ûmv-ir-ir-i-e u-tu-vûta tu-môt-a câne
IMP-2SG-to.hear-CON-IMPV AUG-NP-oil REL-3PL-to.smell-FV much
Smell to make sure the oil is fragrant.

Since the verb *kumôta* ‘smell’ can go through word-formation processes to express active (*kwîmôtereza*) and experience (*kumôterwa*) verbs, *kwûmva*+N or *kwûmva*+V constructions make light verb-constructions (Jespersen, 1954) because a single derived verb can replace it. This then reveals that *kumôterwa* ‘catch a smell of x’ can replace the multiword units “*Kwûmva akamôto* (V+N) or *kwûmva ibimôta* (V+ Rel.Clause)” in an experience olfactory perception, while the same is possible for *kwîmôtereza* in the place of *kwûmviriza akamôto* (V+N) or *kwûmviriza ibimôta* (V+Rel.Clause). If we consider the association between sensory modalities, we can also refer to these light verb constructions as synesthetic metaphor constructions (Hui, 2007; Lievers, 2015). As in Lievers’ example “*She has a very sweet voice*” (p2), sweet (taste) connects to voice (hearing), the Kirundi verb phrases V +N are cases of synaesthesia too. V stands for *hearing* and N for any noun related to smell, taste (40) or touch.

(40) *Igihimba twûmvîsha uburyôhe* (Inyigisho menyeshantara 2.txt)

i-ki-himba tu-ûmv-ish-a u-bu-ryôh-e
AUG-NP-part 2PL-to.hear-INST-FV AUG-NP-to.be.tasty-FV

A part with which we **taste**.

For tactile perception, the verb *Kwûmva* “to hear” heads a VP, where the verb collocates with a word related to the tactile field.

(41) [...] *nûmva ikûntu kîmfashé ukubóko*. (IcaGatandatu.txt)

[...] n-ûmv-a i-ki-ntu ki-n-fát-ye u-ku-
 bóko
 1SG-hear-IMPV AUG-NP-thing 3SG-PP_{1SG-} to.hold-PFV AUG-
 NP-arm
 [...] I **felt** something holding my arm

(42) [...] *nûmvisegákaze* (RTNB_Ninde_2016-08-24.txt)
 [...] n- ûmv-ye ka-kár-ye
 [...] 1SG-hear-PFV REL-3SG- be.acrid-PFV

[Today, I decided to soak up the sun until] I **feel** it burning.

All the above constructions refers to external information that one can perceive through four sense modalities – *Hearing, smell, Taste* and *Touch*, which the auditory verb *Kwûmva* “to hear” can express. Although (*Wierzbicka, 1980, p. 106*) has vindicated that human perception finds motivation from external stimulus, Kirundi speakers’ perception can result from an internal stimulus and then use the auditory verb *kwûmva*. Referring to Evans & Wilkins’(2000), we can talk of the body’s ear when it comes to associating this auditory verb with emotion or feeling terms (43 & 44).

(43) *nûmva intûntu nyînshi* (*UbwuzureBushasha.txt*)
 n- ûmv-a i-ntûntu nyînshi
 1SGt-hear-FV AUG-sadness a.lot

I **feel** very sad.

(44) [...] *nûmva ndahîmbāwe*. (*Ubuzima.txt*)
 [...] n-a-ûmv-a n-ra-hîmbār-u-e
 1SG-PST-hear-FV 1SG-DISJ-plead-PASS-IMPV
 [...] I **felt** pleased.

In a source-based auditory perception event, the extended verb *kwûmvîkana* can extend its meaning to *touch, taste* and *smell*. When words relating to the taste field combine with the verb *kwûmvîkana*, the construction expresses an evaluative gustatory perception event. With it, we express all what can be *audible, felt, smelled* or *tasted*. However, as of a percept expression in gustatory perception event, where the object of stimulus-based perception is the subject, the enclitic locative -mwó (inside) attaches to the derived form “kwûmvîkana” (45).

(45) *umutóbe wûmvîkanamwó isúkãri*
u-mu-tóbe u-ûmv-ik-an-a-mwó i-súkãri
AUG-NP-juice REL-3SG-to.hear-STAT-ASSOC-FV-LOC AUG-sugar

A sugary juice.

Affixation plays an important role in semantic disambiguation of the different syntactic encodings of perception events in Kirundi.

4.3. Taste

The gustatory *Guhônja*, when associated with words relating to hearing or to sight fields, respectively reads ‘hear a piece of x’ and ‘see a piece of’. Therefore, through a metonymic relationship, it conveys that the perceiver gets a small introductory part of what s/he is going to listen to or watch (46). The overall meaning of the construction is that the journalist introduces a part of the program to the followers, who will get more details later.

- (46) ***Kwāri ukubáhōnja*** (*ISA_UburundiBura_2014-09-22.txt*)
 Ku-a-ri u-ku-ba-hōnj-a
 INF-PST-to.be AUG-INF-3PL-to.tatse

It was an introduction.

Among the considered lower senses in a Perceiver-Oriented perception event, only the gustatory verb ***Guhōnja*** can extend its meaning to other sense modalities, upper sense modalities included. This verb contradicts Viberg’s hypothesis about the directional hierarchy of VoP. This verb extends its meaning to both *visual* and *auditory* modalities.

As of the gustatory evaluative verb *Kuryōha* “to be tasty/delicious or to have taste”, it can also express *auditory* (47a), *visual* (47b) and tactile (47c) perceptions.

- (47) a) ***akūnda amajāmbō amuryōhera*** (*Abahungu.txt*)
 a-kūnd-a a-ma-jāmbō a-mu-ryōh-ir-a
 3SG-to.love-IMPV AUG-NP-word 3PL-2SG.OBJ-to.have.taste-APPL-FV
 S/he likes ***tasteful*** words
- b) ***igishōbora kuryōhera ijīsho [...]*** (*Abahungu.txt*)
i-ki-shōbor-a *ku- ryōh-ir-a* *i-ri-jīsho* **[...]**
 AUG-NP-to.be.able-IMPV INF--to.have.taste-APPL-FV AUG-NP-eye POSS

S/he will not neglect anything that can ***attract*** the boy’s eye.

- c) ***Unó mũsi hāri akazūba karyōshé*** (*Ninde_2020-14-01_RTNB*)
[...] *ha-a-ri* *a-ka-zūba* *ka- ryōh-ye*
 LOC-PST-to.be AUG-NP-sun REL-3SP-to.have.taste-PFV

There was a ***warm sun*** today.

Again, as already discussed above, this is another case of synaesthesia. The perception event involves an association of tactile and gustatory senses. Hence, a gustatory-tactile transfer.

4.4. Touch

Among all the tactile perception verbs, only the tactile evaluative verb *kwōroha* “to be soft” can extend its uses to all the other modalities as illustrated in (48, a-d).

- (48) a) ***Agatāmbāra kōróshe*** (*Inyigisho menyeshantara 4.txt*)
 a-ka-tambara ka-ôroh-ye
 AUG-NP-piece.of.cloth REL-3SG-to.be.soft-PFV
 A ***soft*** piece of cloth.

With word related to sound, the verb conveys an auditory perception meaning (47b).

- b) ***umuzikíwōróshe***
 i-mu-ziki u-ôroh-ye
 AUG-NP-music REL-3PL-to.be.soft-PFV
 A ***soft*** music

When the mouth is the organ of perception of the lightness/softness, especially with drinks, the evaluative verb indicates a gustatory perception (47c).

- c) ***inzogá yōróshe***

i-n-zoga	i-ôroh-ye
AUG-NP-beer	REL-3PL-to.be.soft-PFV
Light beer	

The verb *kwôroha* extends to “smell” to mean *a sweet smell* or *not a strong smell*(47d).

d) parfum yôroshe

parfum	i-ôroh-ye
Perfume	REL-3PL-to.be.soft-PFV

A sweet perfume (a perfume, which is not strong).

Taking into consideration the different meaning extensions, the order of Kirundi VoP reads as follows:

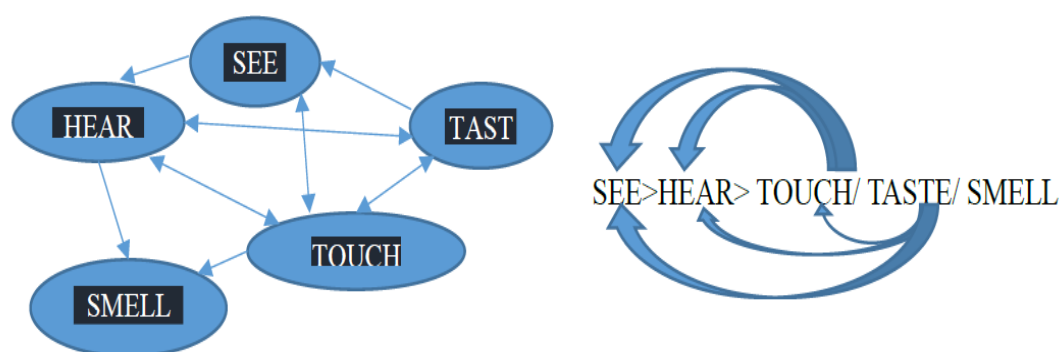


Figure 1: Cross-modal meaning extensions in Kirundi

From both perceiver and perceived-oriented angles, only SMELL cannot expend its physical meaning to other sense modalities. The hierarchy of basic VoP in Kirundi attests bidirectional relationships between some sense modalities such as SEE-TOUCH, HEAR-TOUCH, HEAR-TASTE and TOUCH-TASTE. That is, for Kirundi, the reverse arrows indicates a reverse relationship between the modalities, where the lower sense modality conveys a higher sense. Thus, the Viberg’s VoP hierarchy does not apply to Kirundi. Regarding the two predominant senses – *Sight* and *hearing*, SEE connects to other senses through a synaesthetic simile (e.g: *isa nk’iyôroshe* /it looks soft) while HEAR extends its use through metaphoric synaesthesia (*Kwûmviriza itâbi* ‘Taste cigar’) and metonymy (*guhônja indirimbo* ‘taste a song’-play or sing/listen to a short part of a song).

5. CONCLUSION

The aim of this paper was to find out the basic VoP in Kirundi, their intra field meaning extensions and the extent to which Viberg’s claim on the cross-modal unidirectional hierarchy applies to Kirundi VoP. The analysis attests the use of both linguistic and cognitive means. By linguistic means, Kirundi has lexical items referring to perception(Kumôta ‘SMELL’, kwûmva ‘HEAR’). In case of scarcity, Kirundi uses word formation patterns to derive new verbs or reduplicate the roots of the primitive verb to satisfy communication needs. Through cognitive means, the hearing verb *kwûmva* (and its morphologically derived forms *kwûmviriza* and *kwûmvikana*) extends its physical meaning to non-visual senses –*Touch, Taste* and *Smell* –using metonymy or metaphor. Moreover, Kirundi verbs of audition distinguish external from internal world information. Possibly that this poly functionality is not only cross modal. A hypothesis

that needs examination is that, as in other languages, Kirundi VoP can express different domains other than perception. Therefore, further studies would focus on cross-field meaning extensions.

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