# Multimodal Representation of Shared Cultural Knowledge in a Creolophone Community

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## Abstract

This paper discusses how cultural aspects interact with both vocal and gestural features in multimodal communication, and, more specifically, how shared cultural knowledge influences the form and function of gestures. For this, the multimodal representation of shared cultural knowledge in Kreol Seselwa (KS), a French-based creole language spoken on the Seychelles, will be analysed. The domain of shared cultural knowledge investigated here is spatial orientation and conceptualisation, focusing on the three spatial Frames of Reference (FoR) defined as intrinsic, relative and absolute. Both elicited and semi-spontaneous data collected on the Seychelles show that one striking feature of this creolophone community seems to be a dynamic use of several FoRs in everyday communication. It will be illustrated that in KS it is the availability of culturally shared knowledge, amongst other factors such as modality and context, which influences the choice for a certain FoR. On the gestural level, the data show how culturally shared knowledge of Kreol Seselwa speakers is represented by phonological features as well as the use of abstraction in pointing gestures referring to existing places. Furthermore, the data illustrate the dynamics of merging deictic and iconic elements in gestures accompanying locally-anchored narrations and how this reveals aspects of shared background knowledge. The representation of shared cultural knowledge in KS across modalities emphasises the importance of interpreting multimodal data in the light of the micro-ecology of communication, taking both linguistic and extra-linguistic factors into account.

Index Terms: Spatial Reference, Frames of Reference, Multimodality, Shared Cultural Knowledge, Micro-ecology of Communication, Creole Languages

## 1. Introduction

### 1.1. Speech, Gesture, and Culture

Efron, [1] was one of the first researchers to systematically compare gesture use across cultures – a line of research being followed by several studies since then [2] – [8]. While often these comparisons have focused on the interaction between gesture and speech, some studies have also taken into account the interface of gesture and culture, thus considering not only speech but also "[g]estural practices as cultural tradition" [3, p. 328]. An important notion in the interface of communication and culture is the so-called micro-ecology of communication, i.e. the environment in which a communicative act is being performed. This includes all extra-linguistic factors that may influence the shape of language and gesture use in a certain community [3, pp. 305f.]. It is commonly acknowledged that human communication interacts with e.g. cultural, historical,

social, political and ecological factors. The claim made in this paper is that shared cultural knowledge is one of these factors playing a role in the micro-ecology of communication, shaping not only speech but also gesture. Shared cultural knowledge can be seen as practices of knowledge organisation that are socially distributed and both created and interpreted by a certain community [9] – [12]. In other words, we are looking at the kinds of resources a society uses to link and anchor entities and concepts to one another. Such shared cultural knowledge and its representation in the visual modality has been described for both gesture systems [7], [13], [14] and sign languages [15] – [17]. Typical domains of shared cultural knowledge are for example kinship systems and person reference [18], [19], environmental knowledge [20] and medical knowledge [21], [22]. The domain of shared cultural knowledge investigated in this paper is spatial orientation and conceptualisation. The data analysis suggests that KS speakers apply a mix of strategies to refer to spatial setups and that it is the interaction with shared cultural knowledge which shapes the dynamics of speech and gesture interaction.

### 1.2. Spatial Reference in Speech and Gesture

Reference to space involves topological relations, frames of reference, motion events, toponyms and deixis, and has been found to differ across cultures [23]. This paper will focus on the representation of frames of reference in multimodal interaction and will discuss the dynamic interaction with shared cultural knowledge. According to Levinson [7], there are three major frames of reference (FoR) – the object-centred or intrinsic FoR, the egocentric or relative FoR, and the geocentric or absolute FoR. While in an intrinsic FoR a ground object's features are being used for locating a figure, the relative FoR involves the speaker's perspective to create a coordinate system with the help of which both the figure and the ground are located. Finally, in an absolute FoR fixed external features such as cardinal directions are the source of information necessary to locate a figure. Examples (1) – (3) illustrate the expression of different FoRs in speech:

(1) The dog is at the car's front. (intrinsic FoR)
(2) The dog is left to the car. (relative FoR)
(3) The dog is north to the car. (absolute FoR)

While the cross-linguistic differences in the availability of and choice for a certain FoR have usually been investigated concerning speech, Levinson [7, pp. 244ff.] has also listed certain gestural features that may be observed. According to him, gestures within an absolute FoR, such as the one found in Guugu Yimidhirr [24], [13], are characterised by specific

phonological features: the use of extended gesture space, no restrictions towards a dominant articulator, and body torque being used only in those cases where required by biomechanics. Furthermore, gestures and gaze are independent, i.e. a pointing gesture does not necessarily have to be accompanied by eye gaze in the same direction. Also, absolute gestures are often characterised by a certain veracity of the vectors projected by e.g. a pointing gesture – a feature that has been analysed for Guugu Yimidhirr speakers in detail [13]. This means that any vector projected by a pointing gesture directly points to the actual or associated position of a referent. This veracity is constant under rotation and, as Le Guen [6] mentions, includes an absence of metaphorical pointing. If used metaphorically, pointing gestures do not project vectors to the actual position of a referent but rather point into empty space. Further features are the representation of complex vectors in one gesture and the fusion of semiotic types, e.g. iconic and deictic gestures [7]. Finally, gestures have been observed to follow what Levinson [7] calls natural lines – the further away a referent, the higher the pointing gesture. Also, there seems to be a certain distribution of typical handshapes: while flat hand gestures tend to convey information about a vector, locations are more likely to be referred to by index pointing. These characteristics have also been reported for speakers of Yolŋu languages in the Northern Territory of Australia [25]

## 2. Subjects and Methods

Kreol Seselwa is spoken on the Seychelles, a group of 115 islands located in the Indian Ocean. It is the native language of 99% of the population. Being a creole language, KS is characterised by its mixed nature: while the lexicon is mainly derived from French with occasional influences from other languages such as English or Eastern Bantu languages, its grammatical structure involves creole features such as TMA markers or a fixed S-V-O word order.

The data was collected in 2014 and 2015 on Mahé, the main island of the Seychelles. The data collection involved a triangulation of methods, including a sociolinguistic interview, elicitation tasks and semi-elicited conversations. The interview sessions were conducted with two native speakers who were asked to talk to each other in KS. While the elicitation tasks involved pointing tasks to specific locations on Mahé, route descriptions and the "Man and Tree" space game designed by Levinson et al. [26], the semi-elicited conversations dealt with locally-anchored narrations about the role of family and neighbourhood on Seychelles and a flood that took place in 2013. All interview sessions were video-recorded after the participants explicitly signalled their consent. The data analysed for this paper comprises 67 min of video data coming from 7 native speakers. The data annotation was done with ELAN, and includes detailed annotation of over 700 gesture strokes.

## 3. Multimodal Reference to Space in KS

### 3.1. Gestural and Vocal Repertoire for Spatial Reference

As already described in a previous paper [27], KS has several typical word classes at its disposal for expressing spatial reference, such as prepositions, demonstratives and adverbs. For all three FoRs terms are available. The left-right distinction for the intrinsic and relative FoRs can be expressed by the terms *(a) gos / (a) drwat*. Furthermore, the four cardinal directions

potentially relevant for an absolute FoR are *(dan) nor / sid / was / les*. The lexical origin of these spatial terms in the French language is clearly visible. This is also the case for toponyms on the Seychelles, such as e.g. *La Misère* or *Beau Vallon*. However, KS is not merely a dialect or 'broken' version of French. Rather, the lexical origins are combined with very idiosyncratic phonological, grammatical and pragmatic structures to form an independent language system. Furthermore, it will become clear in the following sections that the gestural system reveals additional instances of very distinct idiosyncratic realisations and conceptualisations of spatial reference.

Gestural reference to space mainly involves three typical handshapes (see Figure 1): two flat hand gestures (B and 5) and the extended index finger (IX). The two flat handshapes (B and 5) are usually produced in extended gesture space and accompany spatial reference to existing locations beyond the immediate surrounding. Furthermore, they are usually not involved in the specification of a referent. The IX-handshape, on the other hand, is distributed across gesture space and usually accompanies reference to a location in the immediate surroundings, often involving the specification of visible referents.
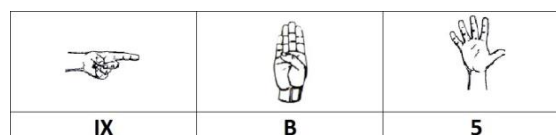


Figure 1. *Handshapes associated with spatial reference in KS.*

The use of gesture space in instances of spatial reference is summarised in Table 1. Over 60% of gestures associated with spatial reference were produced in extended gesture space (periphery or extreme periphery), whereas only 38% of spatially referential gestures were produced in central gesture space (centre or centre-centre). Those gestures produced in the extreme periphery were usually produced in the two upper thirds, i.e. from the waist upwards. Furthermore, they frequently involved back-pointing.

Table 1. *Use of gesture space in KS spatial reference.*

| Central gestures (total) | 38% |
|---|---|
| Centre | 25 % |
| Centre-Centre | 13% |
| Peripheral gestures (total) | 62% |
| Periphery | 33% |
| Extreme periphery | 29% |

### 3.2. Dynamic Use of Spatial FoRs

The data analysed suggest that KS speakers apply both a relative and an absolute FoR in their spatial references. As presented in Tables 2 and 3, the two different contexts in which speakers produced spatial reference were the Man and Tree space game on the one hand, and locally-anchored narrations and pointing tasks on the other hand. While in the first context only the relative FoR was used by the speakers, the latter involved a mix of relative and absolute FoRs. This mix of FoRs

has been found to be divided according to modality: the relative FoR is mainly represented in the vocal channel, while the absolute FoR appears almost exclusively in the gestural channel.

Table 2. *Use of FoRs in KS according to context*.

| Context | Frame of Reference |
|---|---|
| Locally anchored narrations | absolute-relative |
| Pointing tasks & route descriptions | absolute-relative |
| Space game | relative |

Table 3. *Representation of FoRs in KS across modalities*.

| Frame of Reference | Modality |
|---|---|
| Relative | Speech (Gesture) |
| Absolute | Gesture |

Example (4) illustrates the mix of FoR in a naturally occurring situation. The topic of the conversation was a certain kind of perfume and the speaker's association of it with her former workplace. While in her speech she does not give any spatial information, her gestures show several of Levinson's (2003) characteristics of an absolute FoR. Two subsequent pointing gestures are produced in extended gesture space and are instances of back-pointing. Furthermore, we find a veracity of pointing, as Figure 2 illustrates. In addition, there is no body torque involved and the speaker's gaze does not follow the pointing gesture.

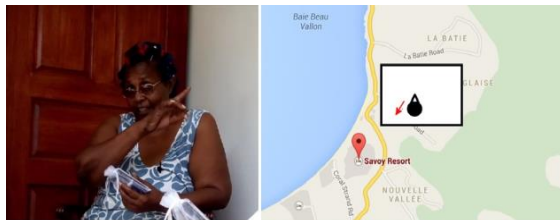    (4)   I used to work in a hotel…a hotel de Sesel.



Figure 2. *Features of gestural reference to space in a locally-anchored narration*

In comparison, the gestures produced in the context of the Man and Tree space game did not show any absolute features. Both in the gestural and the vocal channel the relative FoR was applied, as illustrated by Example (5) and Figures 3-4.

    (5)   En pe vir **anfas ek nou**, enn pe vir **par deryer**.

        One is oriented **towards us**, one is oriented **to the back.**

The speaker's viewpoint is made explicit in speech, when the speaker refers to one figure as facing the observer (*nou*).

Figure 3 shows the speaker employing two gestures referring to the orientations of the two figures. Figure 4 displays the differences in both figure orientation (A and B, marked in black) and speaker orientation (marked in red). The left box illustrates this setup at the moment the speaker looked at the stimulus picture. The right box illustrates the setup after the speaker has turned around to describe the picture to her interlocutor. The two arrows represent the vectors projected by the gestures produced by the speaker, which are also shown in Figure 2. It becomes clear that in the gestural channel the original setup between figure orientation and speaker orientation is rotated by nearly 180 degrees. This rotation of not only the speaker but also the conceptualisation of the stimulus setup is exactly what is expected in a relative FoR. In an absolute FoR, in contrast, a change in the speaker's orientation should not have an impact on the orientation of the gestural representation of a figure.



Figure 3. *Gestures produced accompanying spatial reference in the Man and Tree Space Game setting.*
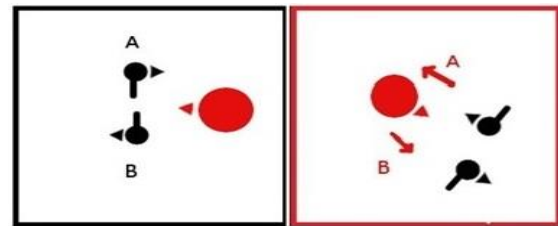


Figure 4. *Features of gestural reference to space in the Man and Tree Space Game setting.*

Further evidence that the gestural system of the participants is not entirely absolute can be found with regard to the different abstractions of pointing gestures. Comparing Levinson's [7] criterion of veracity of pointing and Le Guen's [6] observation of a lack of metaphorical pointing in absolute gesture systems with the data coming from the Seychelles, a mixed picture emerges. Table 4 represents the different levels of abstraction in all pointing gestures analysed, involving not only spatial but also person reference. Metaphorical pointing does occur frequently in the KS references analysed, showing that the KS gesture system also involves features of a relative FoR. Interestingly, however, direct pointing occurs more often in combination with vocal spatial reference than with vocal person reference, whereas metaphorical pointing is more often

associated with vocal person reference than with vocal spatial reference. This suggests that, contrary to what has been described by Haviland [13] for Guugu Yimidhirr, KS speakers may tend to use the absolute FoR only when spatial information is intended to be communicated, and not when person reference is in the focus. However, more data will have to be considered in order to adequately investigate this tendency.

Table 4. *Levels of abstraction in KS pointing gestures*.

| Direct Pointing | 42% |
|---|---|
| Metonymic Pointing | 26% |
| Metaphorical Pointing | 32% |

Finally, the last example will illustrate the dynamic and flexible use of semiotic types in a path description, reflecting the representation of shared cultural knowledge in the KS gesture system. This speaker described a looping path starting and ending in the capital of the Seychelles, Victoria (see Figure 6 for a map of the route described). In her speech, she mainly lists the toponyms of the different locations one would pass by on this path. Her gestures display subsequent and simultaneous combinations of deictic and iconic gestures, as well as her absolute orientation. The gestures displayed in Figure 5 correspond to the path segments 1 and 2. As the pictures illustrate, the speaker's gestures follow natural lines, i.e. the further away the locations indicated, the higher the gesture. At the same time, the speaker iconically treats the locations as something one can 'hold' in ones hands. Furthermore, as evident from Figure 7, the vector projected by the pointing gesture coincides with the actual location of Victoria. During the path description, however, the veracity of the pointing gesture decreases, with only the general direction being represented. Also, the representation of natural lines is being metaphorically extended: instead of representing the distance between the locations and the speaker, the distance travelled is the crucial factor determining the height of the pointing gesture. During the last path segment, represented by the number 3 in Figure 6, the gestures do not include any deictic element anymore. Instead, the speaker represents the path in her gestures by iconically modelling the topographic features of the mountainous path , thus revealing her geographic knowledge of the area (Figure 6).



Figure 5. *Gestures accompanying the path description.*



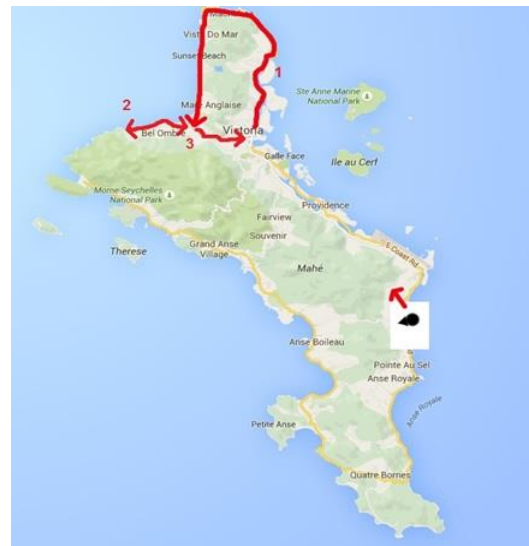Figure 6. *Gestures modelling topographic features.*



Figure 7. *Speaker orientation and subsections of the path description.*

## 4. Discussion

While section 1 has emphasised the interaction between speech, gesture, and culture, section 3 has illustrated that KS speakers employ FoRs in a mixed fashion. The question arising here is why and how a certain FoR and thus a certain strategy of spatial conceptualisation is selected in KS. This question can be addressed best by including the micro-ecology of communication into the analysis. As mentioned in section 1, the micro-ecology of communication includes extra-linguistic factors, such as socio-cultural aspects, which are assumed to interact with the form of communication of a certain speech community.

As mentioned in section 3, whether KS speakers selected the relative FoR only or whether they applied a mix of relative-absolute FoR differed across contexts. One major difference between the two contextual settings is whether shared cultural knowledge, in this case spatial orientation, was available to the speakers as a resource. While in locally-anchored narrations, pointing tasks and route descriptions the speakers referred to existing referents in a concrete environment, the space game included abstract referents in an artificial environment. In other words, the first kind of conversation was characterised by the availability of shared cultural knowledge, whereas the second one involved shared conversational knowledge only. Further evidence that the availability of shared cultural knowledge may influence the selection of a FoR in KS is supplied by the phonological features of the KS gesture system as well as the overall veracity of pointing and the semiotics displayed in gesture in the respective contexts.

One reason why absolute spatial orientation is selected as a resource of anchoring in locally-anchored narration tasks, rather than relying on shared conversational knowledge and a relative FoR, might be the geographic characteristics of the island. Mahé is a rather small island with a clear distinction between coastline and mountainous inland. As a consequence, absolute orientation is facilitated, especially for individuals who grew up and have spent the most part of their life on the island.

In opposition to other communities which apply the absolute FoR to all contextual settings, including small scale descriptions of abstract or fictional referents (see e.g. [13]), KS speakers dynamically switch from one FoR to the other. This hybridity and flexibility reflects other cultural aspects of the micro-ecology of KS communication. Besides the linguistic background described in section 2, mixed heritage can be found in other cultural domains of the Seychelles such as oral traditions, descent, food, or songs. Thus, spatial reference may be regarded as another instantiation of this mixed nature. Furthermore, being a post-colonial society, Seselwa culture may be characterised as a 'third kind', i.e. creatively combining and transforming features of the mixed heritage in an idiosyncratic fashion to form new cultural patterns [29]. Finally, as a language that relies heavily on pragmatic reference marking, KS is characterised by a certain flexibility, especially when it comes to relying on contextual factors. This general flexibility and context-dependency is reflected in the tendency of ad-hoc ascription of different FoRs, as suggested by Pederson [30]. A reflection of this ad-hoc ascription and the flexible switch from one FoR to the other can be seen in the interaction of deictic and iconic gestures produced during the path segment, where the switch between different forms of representation and spatial conceptualisation takes place within one composite utterance.

## 5. Conclusion

This analysis of KS speakers has shown the interaction of vocal, gestural and cultural factors in the domain of spatial reference. It has been demonstrated that while KS speakers tend to apply the relative FoR in their speech, their gestures display both relative and absolute features, reflecting the availability of shared cultural knowledge. Furthermore, it has been shown that shared cultural knowledge can be represented across modalities. Moreover, it is embedded in a dynamic, context-dependent frame, which relies on the micro-ecology of communication.

As a consequence, this paper highlights the necessity to take contextual, cultural and multimodal information into account in order to achieve a deeper understanding of the processes involved in spatial reference. Further cross-linguistic research combining these three aspects is necessary in order to gain a better understanding of the underlying dynamics of human communication.

## 6. Acknowledgements

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