

# The Acquisition of an Absolute System: Learning to talk about SPACE in Marquesan (Oceanic, French Polynesia)<sup>1</sup>

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## 1. Introduction

This paper examines how Marquesan children aged 4 to 8 acquire the preferred spatial system in their speech community. For small-scale spatial arrays adult speakers of Marquesan preferably use an absolute or geocentric system which is based on two salient local landmarks of their environment, namely the SEA and the INLAND-area. The Marquesan absolute system has one main SEA/INLAND-axis and an axis orthogonal to the main axis which is lexically undifferentiated and labelled on both ends of its coordinates as *ko* "left or right side of valley" (henceforth: "across"). The ACROSS-axis is often lexically differentiated by using place names of the neighbouring valleys:

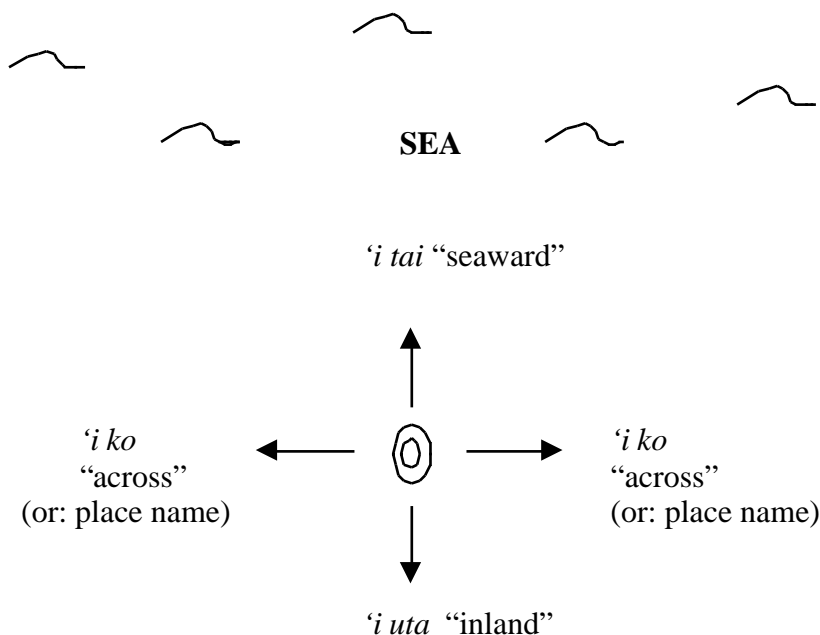


Fig. 1: Marquesan absolute system

Adult speakers of Marquesan constantly use *tai* "sea", *uta* "inland" and *ko* "across" and place names, regardless of whether they are outside or inside a house and regardless of whether they are referring to a location within a valley or to a location of an object in a house or on a table. For a speaker of Marquesan it is not unusual to say that the plate on the table is **inland of the glass** or to localise a crumb on another person's cheek as being on the **seaward** or **inland**

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cheek. This is also how a speaker of Marquesan differs with respect to a speaker of English who would most probably refer to a crumb on a cheek as being on the **left** or **right** cheek.

In order to use an absolute system adequately speakers have to be able to keep track of their own current position in relation to the fixed local landmarks (Levinson, 1996; 2002) **at all times**, i.e. day and night, and most importantly **in all places**, i.e. in **familiar** and **unfamiliar** surroundings alike. This means that they need an acute sense of orientation when they move their body around in the environment. And in order to be able to localise their own current position they need, of course a detailed mental map or spatial representation of their environment. So speakers of Marquesan constantly have to localise their current position in relation to the fixed local landmarks upon which their absolute or geocentric system is based. Children have to learn that landmark expressions are not only used in **large-scale** reference (e.g. ‘Daddy is **seaward**’, i.e. at the SEA-region), but that they are also used in **small-scale** reference, i.e. inside a house or on a table-top space (e.g. ‘The plate is **inland of** the glass’).

The basic problem of acquiring the usage of the Marquesan absolute system is rooted in the linguistic as well as in the cognitive domain. It is a linguistic problem because children have to learn

- the lexical meaning of the local landmark expressions;
- the different linguistic constructions in which landmark expressions occur and
- how the different units of a construction are combined and semantically interact.

And it is a cognitive problem because children have to learn to keep track of their own current position at all times, and in particular in all places, i.e. in familiar and unfamiliar surroundings (Cablitz, 1998; 2002). Moreover, they have to develop a spatial representation of their local environment in order to use the absolute system.

My data reveal that three factors play a role in the child’s acquisition of the Marquesan absolute system:

- a) **perceptual clues from the environment** such as the inclination of the land;
- b) the **familiarity of surroundings** (at home vs. an unknown place), and
- c) the child’s **difficulty of localising his or her own current position**;

I will show that the linguistic behaviour of Marquesan children indicates that the acquisition of the absolute system seems to be rather rooted in the cognitive domain, or more precisely in the children’s ability or lack of ability to orientate themselves in their environment.

In the subsequent sections I will give a brief description of the local environment in which Marquesan children live and how adults use the absolute system in their language by briefly explaining the different linguistic construction types. These sections are followed by a description of the Marquesan child data. This description includes

- a general outline of the development of the Marquesan absolute system from age 4 to 8;
- the types of non-adult-like interpretations of locatives used in the absolute system;
- a discussion and evaluation of their linguistic behaviour.

## **2. Local environment of the Marquesan speech community**

Using expressions such as SEA and INLAND when referring to the location of objects in a house or on a table is a perfect natural solution for a speaker of Marquesan. This is quite evident when one considers the environment in which they live and the cultural importance it has. The Marquesas islands are situated in the middle of the vast Pacific ocean and the landscape of the islands is characterised by high volcanic mountains. Marquesan valleys are typically deep and narrow. The **land steeply rises** from the SEA to the INLAND-area as well as to the SIDE-regions of a valley. A valley inhabitant is surrounded by high mountains and has, almost everywhere in the valley, visual access to the sea:



**Ph. 1: View from the INLAND-area of the Marquesan valley of Ha'akuti ('Ua Pou)**

Important in this context is that the places of the local landmarks are perceptually salient. Let me emphasise that the land does not only rise towards the INLAND-area of the island, but also to the side-regions of a valley. This feature of the environment will become a crucial aspect when discussing the types of non-adult-like interpretations of the landmark term INLAND by children.

### **3. The adult system**

The SEA/INLAND- and ACROSS-axes are used in **large-scale** as well as **small-scale** reference. In **large-scale reference**, *tai* "sea", *uta* "inland" and *ko* "across" can be used to refer to specific places within a valley. For instance, *tai* "sea" can refer to the place around the landmark SEA, i.e. the beach and its surroundings; *ko* "across" can likewise refer to the left or right side-region of a Marquesan valley.

In **small-scale reference** (i.e. in a house or on a table-top space) speakers of Marquesan constantly refer to the orientation and location of objects by using the SEA-,INLAND-, and ACROSS-expressions, as I have already mentioned. Moreover, the landmark terms are often used to distinguish objects in a house or on a table (**inland**-switch vs. **seaward**-switch etc.).

**Ko** "across" together with the landmark expressions *tai* "sea" and *uta* "inland" are nominals occurring as lexical heads in complex noun phrase constructions which are marked by different locative prepositions ('*i* "location/goal/direction/orientation", *ma* "path, region" and *mei* "source"). These locative NPs can be combined with three different types of attributive

NPs and several modifiers (e.g. demonstratives, directional particles expressing deictic movement between speaker and addressee) in varied and complex ways.

The following examples (1-3) are the basic locative constructions used by adults in spatial description of static arrays in small-scale reference.

### Orientation of an object

When speakers want to express the orientation of an object on a table, they simply mark the local landmark nouns by the preposition 'i. For instance, if the front of a toy car is facing seawards, a speaker would simply express it by 'i tai "seawards":

⇒ **'i-construction**

(1) hu'i te upoko 'i tai.  
 turn ART head LD sea  
 'Turn the head **seaward.**'

Place names can be used in the same way, and only in this way (e.g. the front of car is facing towards Hakata'o -> 'i Hakata'o) etc.

### Location of an object

In order to express the relation between two objects on a table, as e.g. in 'The ball is **seaward** of the glass', a speaker uses the preposition *ma* with a possessive construction:

a) ⇒ **ma-possessive construction** (spatial relation between two objects)

(2) ena te popo ma tai o te vea.  
 exist ART ball REG sea POSS ART glass  
 'There is a ball **seaward of the glass.**'

I call this construction type the *ma*-possessive construction which has a structural similarity with the type of locative constructions found in Indo-European languages such as Eng. *in front of* (see Cablitz, 2002).

When there is no explicit reference object against which another object can be localised as in (3), speakers of Marquesan simply use the 'i-construction to localise an object on a table in the absolute FoR (the glass is 'i tai, i.e. "seawards"). 'I-marked landmark nouns are constructionally less complex because they always occur without a possessive construction.

b) ⇒ **'i-construction** (simple location of **one** object, **not in relation** to another object)

(3) ena te vea 'i tai.  
 exist ART glass PREP sea  
 There is a glass seaward.

### Children's learning task of the linguistic system

The challenge for the Marquesan child is to learn how the different units of these complex noun phrase constructions (i.e. preposition, landmark noun, possessive attribute and modifiers) are combined and semantically interact. For the use of the absolute system in 'table-top' space Marquesan children in particular have to learn the semantic and constructional distinctions which exist between the **prepositional 'i- vs. ma-**marking, that is to say they have to learn which different spatial relations these two prepositions express.

#### 4. The data collection and analysis

The child data which are presented here, were collected by conducting interactional ‘**space games**’. In each interaction there were two players seated side by side and separated by a screen. One of the players, called the Director, had to explain a spatial array of farm animal toys to another player, called the Matcher, who had to reconstruct the spatial array of toy objects on the basis of the Director’s instructions. The stimuli of the Director mostly consisted of an array of real toy objects which were placed in front of the Director. Although the set-up of these interactional space games provides us with comprehension as well as production data, I have mostly analysed the comprehension data; but I will present some production data to enhance my argument if necessary.

Two aspects were important for my data collection, namely the familiarity of the surroundings and the direction of gaze of the children during the ‘space games’.

##### 4.1 Familiar vs. unfamiliar surroundings

Thus, I collected data in surroundings which were both **familiar** and **unfamiliar** to the children. One reason to do this was motivated by findings that the familiarity of the surroundings has an influence on the child’s spatial competence (Conning & Byrne, 1995:27ff.). In a developmental study by Conning & Byrne (1995) preschool children were asked to point to salient landmarks of their environment in familiar as well as unfamiliar surroundings. The study showed that the unfamiliarity of the surroundings had a negative effect on the child’s spatial competence.

##### 4.2 Direction of gaze

During the ‘space games’ I varied the **direction of gaze** of the players. So, in one interaction the children were facing towards one of the ACROSS-regions, in another interaction they were facing towards the SEA-region and so forth.

During the recordings I realised that the initial reaction of a number of children whose direction of gaze was towards one of the ACROSS-regions was the following: they often referred to the ACROSS-direction by using the INLAND-expression, or when instructed to put something INLAND they were placing it ACROSS. At this point I would like to remind the reader that not only the **inland**-region, but also the **side**-regions of a Marquesan valley steeply rise. So the children’s reference or interpretation of the INLAND term might not be unmotivated. It is quite possible to assume that children orientate themselves by perceptual cues from the environment such as **rising land** and therefore interpret the rising land of the ACROSS-region as INLAND. So, if children make wrong inferences on the basis of perceptual cues, the question is what Marquesan children will do in unfamiliar surroundings where they are more likely to be disoriented. As for my recordings in unfamiliar surroundings, I therefore seated the children facing to one the ACROSS-directions. The houses in which these recordings were made, the children had **visual access** to the ACROSS-direction, i.e. they saw **land rising** in their line of sight.

##### 4.3 Remarks on data collection

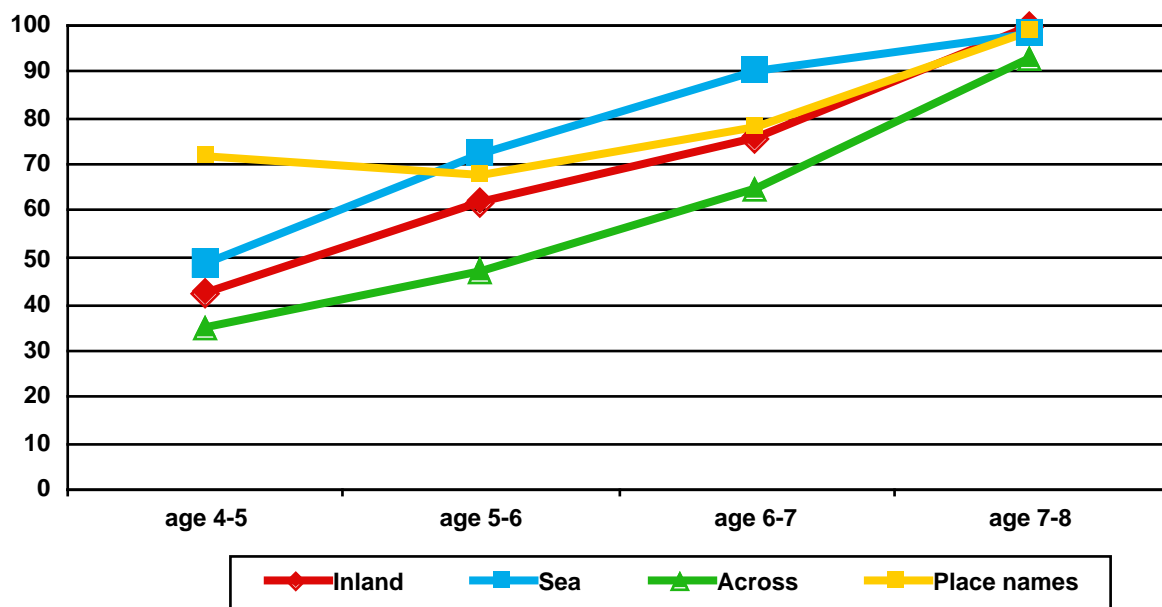
My data is more of a qualitative than of a quantitative nature: for the analysis of the overall linguistic development of the Marquesan absolute system from age 4 to age 8, I analysed the comprehension data of **one child per age group** (the youngest being 4;1 and the oldest 8;6) who I recorded several times over a period of 2-3 months. I was mainly interested in how they interpreted the landmark nouns *tai* “sea”, *uta* “inland” and *ko* “across” and place names, so if their interpretations of the landmark nouns and place names corresponded with the correct absolute direction. If a locative construction contained the landmark noun *tai* “sea” and was placed seaward, it was counted as a correct response. I also counted an ‘*i*-marked landmark noun as a correct placement even when the object was placed in explicit relation to another

object (which is, strictly speaking, non-adult-like). Until age 6, the majority of children produce the ‘*i*-construction when they intend to refer to the SEAWARD-, INLAND- or ACROSS-region of another object (type: ‘The fork is **seaward** of the glass’ (see example (2) above), and younger children always interpreted the ‘*i*-construction in that way. It seemed to me that they were focussing on getting the correct absolute direction and therefore they were probably paying less attention to the prepositional marking and the construction type. However, I also coded the different prepositional ‘*i*- and *ma*-marking separately to see if there were any patterns evolving. I wanted to see if children interpreted the same landmark noun differently when it had a different prepositional marking (e.g. *i* tai vs. *ma* tai).

## 5. Linguistic development of the Marquesan absolute system from age 4 to 8

### 5.1 Overall development

The graph depicts the developmental progression from age 4 to age 8. I analysed the data of one child per age group who I recorded several times in familiar and unfamiliar surroundings. Each coloured curve corresponds to one landmark noun or the place names used in the absolute system. The y-scale represents percentage.



### Gr.1: Developmental progression of the Marquesan absolute system from age 4 to 8

You can see that the terms for SEA, INLAND and ACROSS are below 50 % between age 4 and 5, and by age 7 to 8 children have an almost adult-like comprehension of all terms. In this graph it is obvious that the seaward term is generally better comprehended by all age groups than the inland term. As for the ACROSS-axis, place names are quite obviously better comprehended than the ACROSS term *ko*. This might be simply due to the fact that the term *ko* does not specify to which ACROSS-region it refers to.

My results might come as a bit of a surprise to those who know the acquisition studies of de León (1994) and Brown (2001) who basically say that children between 4 and 5 master the absolute system on the comprehension level. So, the question is why are Marquesan children even until age 7 not adult-like in their comprehension?

### 5.2 Familiar vs. unfamiliar surroundings

My data has to be seen in the light of the fact that I analysed data from children in familiar and unfamiliar surroundings. Looking at the data of children in familiar and unfamiliar surroundings separately, we can see that children from all age groups (i.e. from 4 to 8) have a much better comprehension and production when being in a familiar than when being in an unfamiliar surrounding. The green bars indicate the non-adult-like interpretations which is clearly on the increase in unfamiliar surroundings. Note that the numbers indicate data points (one data point being an instruction containing *tai* “sea”, *uta* “inland”, *ko* “across” or a place name):

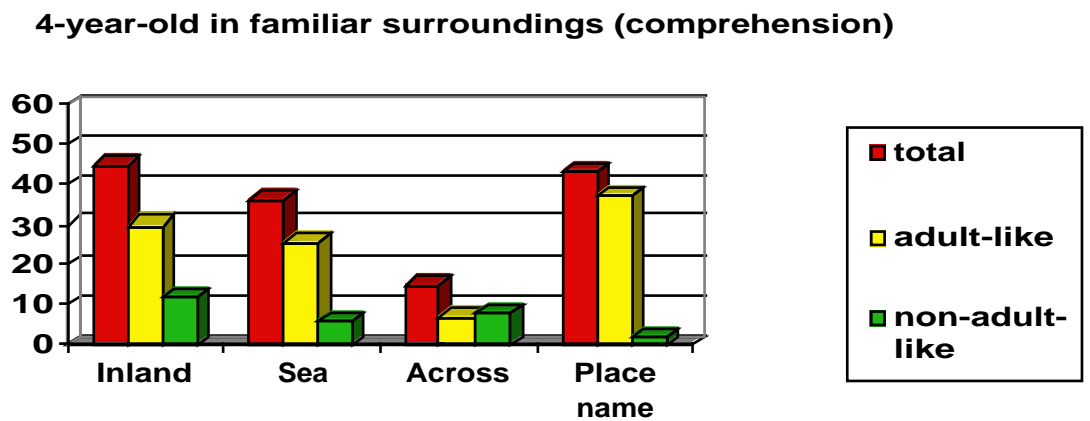


Fig.5.1

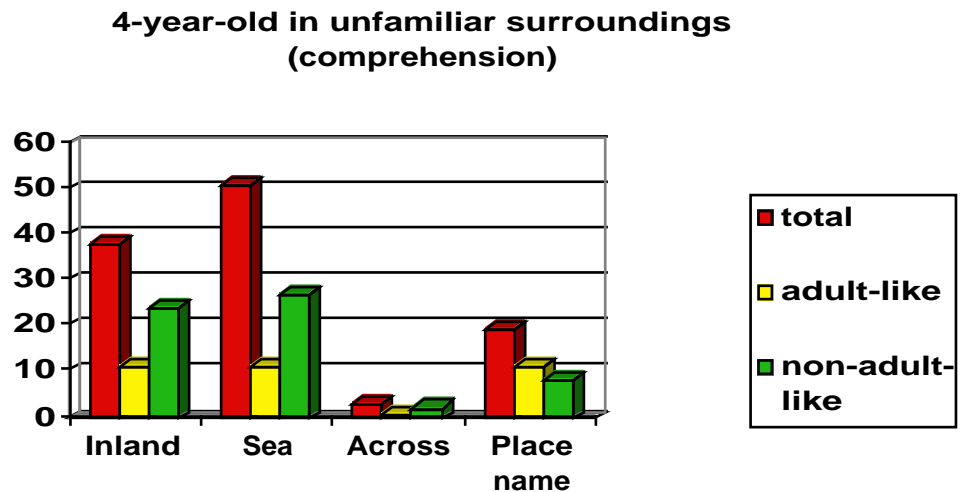


Fig.: 5.2

The same observation can be made for production data of a 6-year-old:

**6-year-old in familiar surroundings (production)**

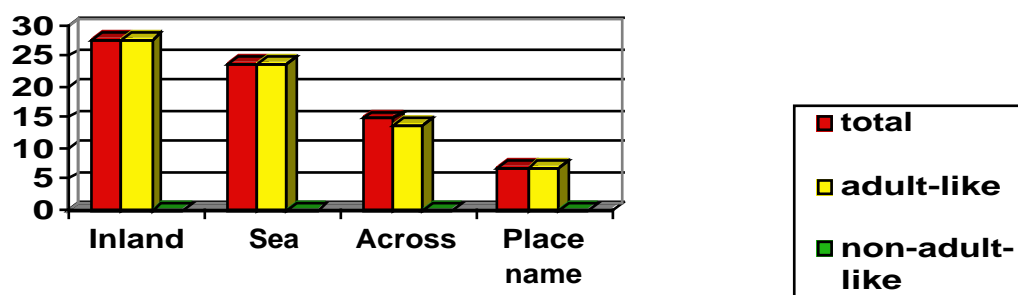


Fig.5.3

**6-year-old in unfamiliar surroundings (production)**

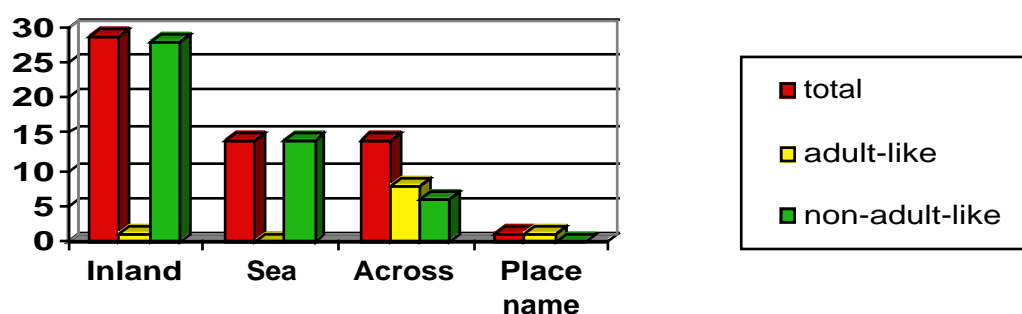


Fig.5.4

In general we can observe that children perform much better (and more-adult-like) in surroundings which are familiar to the child. This is a general tendency for children in all the different age groups.

In general, there is a noticeable difference between 4-year-olds and 5- and 6-year-olds. The 5- and 6-year-olds seem to have an almost adult-like comprehension and production in familiar surroundings, whereas the 4-year-olds have not<sup>2</sup>.

### 5.3 Types of non-adult-like interpretations

If we now look at the type of non-adult-like interpretations or productions of landmark terms we can see that their performance is not arbitrary.

There was a clear tendency to extend the interpretation of the INLAND-term to the ACROSS-axis, and in all the cases I found, the INLAND-term corresponded to that side of the ACROSS-axis which was in the direction of gaze of the children. So, when children's direction of gaze was ACROSS towards the valley of Hakata'o, the INLAND-instruction was interpreted as being towards the side of the valley which lies in the direction of Hakata'o.

One finds these kinds of interpretations of the INLAND-term in children of all the age groups I have analysed, i.e. from 4 to 8 years and older.

<sup>2</sup> Note that the data is not provided here, but this is a general tendency I could observe in my data.



There were basically two patterns evolving.

### **1. pattern:**

Two children (=4- and a 6-year-old) were systematically interpreting the ACROSS-axis as the SEA/INLAND-axis, i.e. INLAND corresponded to the ACROSS-direction in their direction of gaze, and SEAWARD corresponded to the opposite ACROSS-direction which was not in their gaze direction.

### **2. pattern:**

Other children (aged 5, 7 and two 8-year-olds) interpreted the ACROSS-region which was in their direction of gaze as INLAND; but all interpretations of the other landmark terms corresponded to the correct absolute directions.

When looking more closely at the non-adult-like interpretations of *uta* of these children, one can see, however, that the INLAND-term *uta* was always marked by the preposition *ma*. '*I*-marked *uta*, on the other hand, was correctly interpreted as being INLAND. It is possible that children use the principle of CONTRAST, as described in Clark (1992), when they distinguish the location of an '*i*-marked from a *ma*-marked *uta*-construction (contrasting locations due to different prepositional marking).

However, if the principle of CONTRAST plays a role, children should show this behaviour in familiar as well as unfamiliar surroundings and I observed this behaviour only in **unfamiliar** surroundings.

In unfamiliar surroundings children's interpretations of INLAND as ACROSS can be observed in children well until age 8;6. A simple explanation would be that children are simply disoriented in unfamiliar surroundings because they cannot keep track of their own current position. One strategy to overcome this disorientation is to infer from perceptual cues of the environment such as **land rising** where the local landmarks are. So, when they see **land rising**, they infer that this must be the INLAND-direction, although it actually corresponds to an ACROSS-direction.

## **6. Conclusion**

One can summarise that the three factors, which I mentioned at the beginning (§ 1), play a role and are somehow interrelated in the child's acquisition of the Marquesan absolute system: a) **perceptual clues from the environment** (e.g. inclination of the land), b) **familiarity of the surroundings** (at home vs. an unknown place) and c) the **child's difficulty of localising the his or her own current position**. The less familiar the surroundings are the more likely it is that young children get disoriented because they cannot keep track of their own current position. To overcome disorientation they use perceptual clues from the environment to infer where the fixed local landmarks are. The Marquesan data suggest that children rely on environmental features of the landmarks for a long time because they do not keep *constantly* track of their own current position when they **move around in the environment**. They constantly need perceptual input from the local environment upon which the absolute system is based. That they need perceptual input from the local environment is also shown in their gesture behaviour which differs from that of Marquesan adults. When Marquesan adults use the absolute system their speech is sometimes accompanied by gestures in the direction of the landmarks; these gestures are produced without looking and turning their body and gaze (which has been defined as 'geo-anchored gesturing' (Kita, 1997)). Children also accompany the use of absolute terms by using gestures, but in contrast to adults they first gaze into the direction of the landmark, then gesture and finally produce the utterance. This can be regarded as further evidence that children strongly rely on perceptual input from the environment in order to use an absolute system.

The linguistic behaviour of Marquesan children shows that the basic problem of acquiring the usage of such an absolute system is less rooted in the linguistic, but rather in the cognitive

domain. They have to acquire an acute sense of orientation, i.e. they have to learn how their *ego* is located in relation to the fixed local landmarks at all times and in all places. And this seems to be a difficult task for a Marquesan child acquiring an absolute system.

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