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# River-based and egocentric spatial orientation in Yine

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**Abstract:** In linguistic studies on spatial reference frames, South American languages are still underrepresented. This explorative study offers a qualitative discussion of strategies that were found to encode location and orientation of objects in Yine, an Amazonian language of Peru. Geocentric and egocentric frames were attested as equally dominant strategies to provide spatial information in a picture-matching task, the results of which are split by age group of speakers. Senior Yine speakers mainly used river-oriented geocentric and intrinsic frames, whereas young adult speakers relied on egocentric and intrinsic frames exclusively. Left/right/behind relators were predominantly interpreted in allocentric-intrinsic frames by speakers of both groups but egocentric-extrinsic frames also arose in spatial descriptions elicited from younger speakers.

**Keywords:** Arawakan; cross-generational analysis; frames of reference; sociotopography; spatial cognition

## 1 Introduction

In linguistic studies on spatial reference frames following Levinson (2003) and Levinson and Wilkins (2006), languages of South America have been underrepresented.<sup>1</sup> South America is estimated to host between 397 (Hammarström et al. 2019) and 403 (Eberhard et al. 2020) living languages, many or most classified as threatened or shifting. This explorative study offers a qualitative discussion of attested strategies to encode location and orientation of objects in Yine, an Amazonian language of Peru. Geocentric and egocentric references are attested as equally dominant strategies to provide spatial information in a picture-matching task (Pérez Báez 2008) with a split determined by age group of speakers. Left/right/behind relators are predominantly interpreted in the allocentric-intrinsic frame type but egocentric-extrinsic interpretations also arise in spatial descriptions elicited from younger speakers. How far-reaching the observed cross-generational differences are must be answered by quantitative follow-up studies (see Section 3.1).

### 1.1 Language, geography and society

Yine is an Arawakan language of the Southern Maipuran branch and is spoken by 2,500–5,000 people in the Peruvian Amazon and across the Brazilian border. It is polysynthetic and head-marking with a strong suffixing preference and flexible constituent order (Hanson 2010). The Yine are traditionally known as river navigators and canoe makers. The dominant subsistence mode is a combination of slash-and-burn practices, fishing and hunting (Gow 1991), plus some commercial trade of food and other goods. Electricity is mainly generator-operated in the villages. Villagers are often multilingual, using Spanish and Yine in their daily lives, as well as further Amazonian and Andean languages to varying degrees. According to speakers, the contact with Spanish and other indigenous languages, due to marriages and influx of workers, continues

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<sup>1</sup> A notable exception being Meira's (2006) research on Tiriyo.

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to have an increasing influence on Yine use in formerly Yine-dominant communities. A standard Yine alphabet was introduced in 2007 which is increasingly used, while not completely agreed upon. Maintenance efforts such as the production of first and second grade school books are initiated by individual community members. Many or most primary schools in Yine communities are partly bilingual with Spanish (Urquía Sebastián 2006).

My data were collected in Spring 2019 in Bufe Pozo, in Atalaya province (Sepahua district, Ucayali, Peru). Ucayali borders the Brazilian state of Acre, with rainforest covering these vast territories almost entirely. In the Sepahua district, communities where Yine is spoken are situated along the Urubamba river, which conflues with the Tambo to form the Ucayali, the name giver of the region (see Figures 1 and 2)

The Urubamba river is the main travel route between the towns of Sepahua and Atalaya, boat trips being an indispensable means of traveling within the region. The importance of the riverine ecosystem and *riverine cultural system* in the different groups of Western Amazonia receives special attention in Gow (1991) who, inter alia, states that “direction up-river or down-river is more salient to local people than actual distance” (Gow 1991: 73). Gow’s statement reflects the dependence of travel speed on both direction and strength of the river flow, and highlights again the role of the river as the most effective means of transport, in contrast to the forest, which is partly impassable and more dangerous to enter. In riverine communities like the Yine, most houses are situated close to the river, whereas some are located deeper in the forest.<sup>2</sup> Further towards the forestal hinterland one finds slash-and-burn fields and *chacras*, kitchen gardens in their different stages.

## 1.2 Yine spatial terminology

Lexemes corresponding to upriver/downriver distinctions are documented in Matteson (1965), Nies (1986), Gow (1991: 73) and Hanson (2010). Matteson (1965: 358) also cites translations for the perpendicular cardinal directions *tkatši himtixityawaka* ‘sunset place (west)’, *tkatši hišpatyawaka* ‘sunrise place (east)’, *tkatši kehnete*

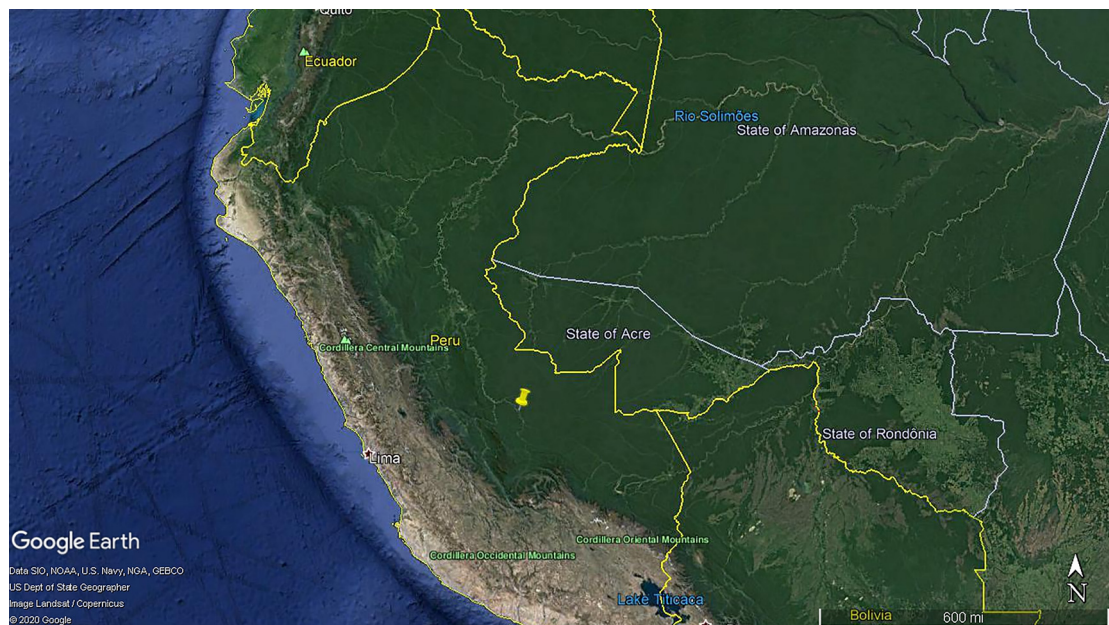
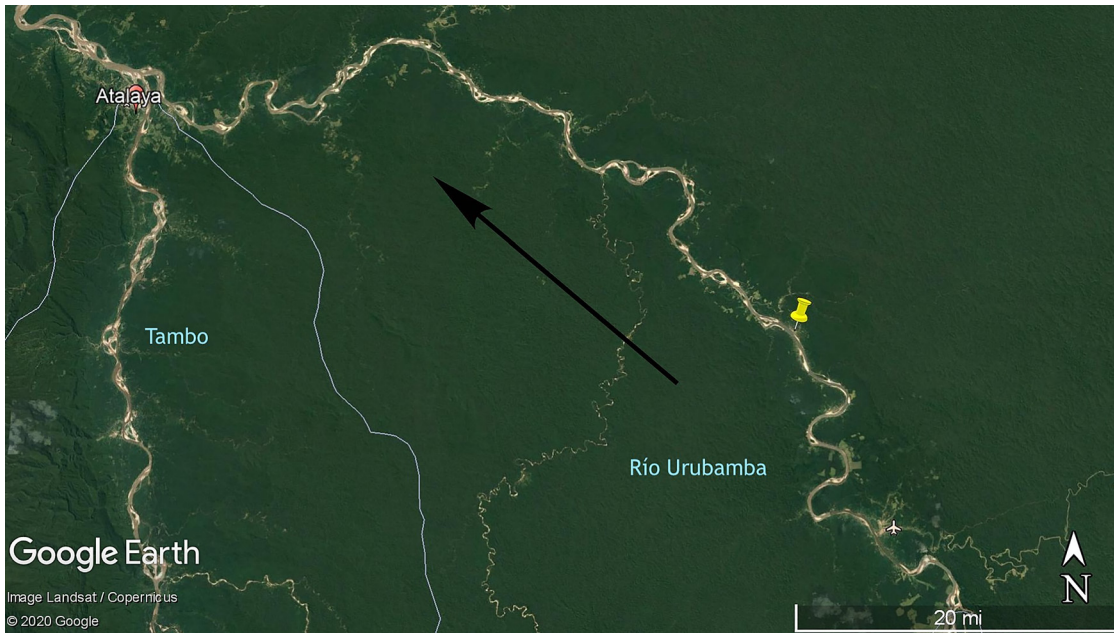


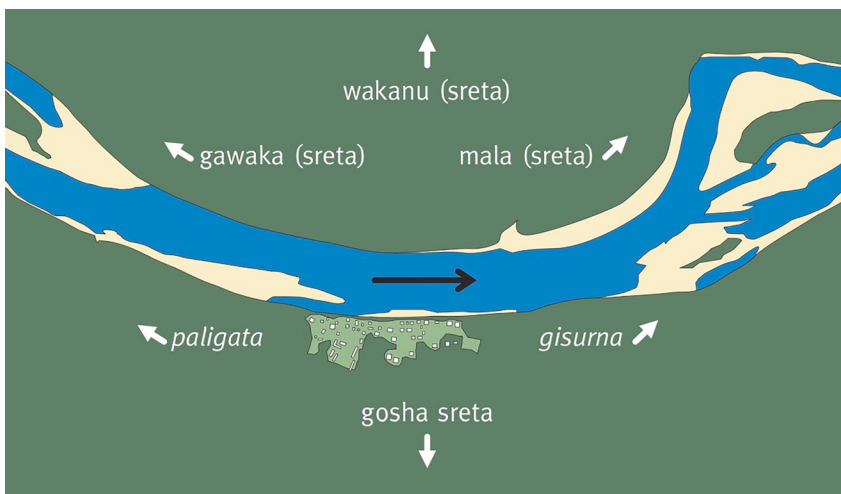
Figure 1: Field site marked by yellow pin.

<sup>2</sup> Gow (1991: 81–85) discusses cultural implications of the living space, such as the perceived differences between housing close versus far from the river bank, and differences between riverine Amazonian cultures and Amazonian forest dwellers, who are “out of contact with riverine commerce”, at the time of his fieldwork.



**Figure 2:** Field site and direction of the Urubamba's flow.

*sretate* 'left side of the sun (south)' and *tkatši potukle sretate* 'right side of the sun (north)'.<sup>3</sup> Matteson adds that "[t]he concept of [cardinal] directions is a recent acculturation resulting from government bilingual schools". Spatial descriptions in older sources show predominantly riverine orientation (cf. texts in Matteson 1965) in large-scale space. Relators in Yine are mainly freestanding spatial adverbs, among them the river-based terms *gawaka (sreta)* 'upriver (side)', *mala (sreta)* 'downriver (side)', *wakanu (sreta)* 'other side (of the river)' and *gosha sreta* 'forest side, forestwards'. While *gawaka* and *mala* strictly relate to the direction of the river flow, *wakanu* refers to the entire area that is on the other side of the river from the point of view of the village. *Gosha sreta* refers to the general direction of the forest, i.e., to the limitless area that does not belong to the village, including its chacras (see Figure 3).



**Figure 3:** River-based spatial terminology (the black arrow indicates the direction of the river flow).

<sup>3</sup> In Matteson's (1965) orthography, *š* represents IPA /ʃ/, *h* represents IPA /h/ and *tx* represents IPA /c/.

The salience of the bidirectional river axes is emphasized by the motion verbs *paligata* ‘go upriver’ and *gisuma* ‘go downriver’. The verb pair poses a second lexical layer to the riverine adverbs, forming a quadripartite, bidirectional semplate (Levinson and Burenhult 2009). For the spatial domains *wakanu* (*sreta*) and *gosha sreta* no dedicated motion verbs are attested.<sup>4</sup> A general left/right distinction can be expressed via *kegnete* (*sreta*) ‘left (side)’ and *potukle* (*sreta*) ‘right (side)’ (cf. Figure 4). These adverbs can ambiguously be interpreted in allocentric-intrinsic fashion, similar to *kapto* ‘behind’ (see Section 2.2.3). Unambiguously allocentric-intrinsic references are achieved by using nouns such as *tjimne* ‘backside’ and *sta* ‘chest, front’.

## 2 Spatial orientation in Yine

Diverging classifications of spatial reference frames in languages have been proposed since Levinson’s (1996, 2003) basic distinction between absolute, relative and intrinsic frame types.<sup>5</sup> Spatial reference frames are “cognitive axis systems involved in (linguistic and nonlinguistic) representations of space” (Bohnenmeyer et al. 2015: 170), in other words, spatial coordinate systems that are conceptually different not only across but also within languages (Palmer et al. 2018). In this study, the data were analyzed as to basic egocentric (observer-based) versus geocentric (river-based) distinctions. Since “all spatial relators are at least potentially ambiguous or vague, permitting interpretations in multiple types of frames” (Bohnenmeyer et al. 2015: 185), another focus is on the speakers’ interpretation and use of ambiguous relators such as ‘left’, ‘right’ and ‘behind’. This means that these terms can either be used and interpreted in allocentric-intrinsic frames, i.e., based on the ground object’s intrinsic facets, or in egocentric frames, based on the position of the observer.

In an allocentric-intrinsic frame, an object is located in relation to a ground object’s intrinsic facets, e.g., “the ball is left of the chair”, which refers to the chair’s perceived intrinsic left side (i.e., where the left armrest is from a sitting position), regardless of the observer’s position at the time of the utterance. In an egocentric frame, “the ball is left of the chair” is interpreted from the observer’s perspective (i.e., the observer’s left side), regardless of which intrinsic side of the chair the ball is at. In a geocentric frame, the observer’s position is once again irrelevant and objects are located, or their orientations identified, in relation to an external feature of the environment, for example “the ball is upriver of the chair”. Since the upriver/downriver distinction was only tested in one location in this study, it is broadly analyzed as geocentric frame use and is neither necessarily restricted to being a subtype of Levinson’s (1996, 2003) intrinsic macro frame, nor of the abstracted absolute frame type (Bohnenmeyer et al. 2015). It can further be analyzed as corresponding to a re-evaluated notion of ‘absolute’ frames by Palmer (2015), as it clearly is motivated by the external physical environment.<sup>6</sup>

### 2.1 Method, setting and speakers

The data were collected via a modified version of the Ball-and-Chair [B&C] picture-matching task (Bohnenmeyer 2011; Pérez Báez 2008: 29–32) which involves linguistic descriptions of a set of picture cards that show two objects (ball, chair) in a number of different spatial configurations. The elicitation game was played with two dyads of speakers, each consisting of a male and a female, aged 21–24 (*Young people’s Yine*, YY) and 72–76 (*Traditional Yine*, TY).<sup>7</sup> All speakers are literate and grew up speaking Yine and Spanish with Yine as home language. Both TY speakers and the female YY speaker use Yine daily and reside in the village. The male YY speaker is more exposed to Spanish as he works and partly resides in the nearby town.

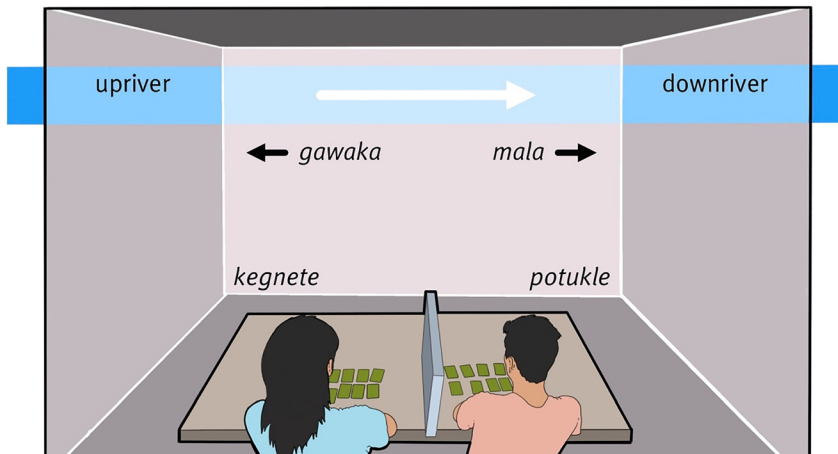
<sup>4</sup> Gow (1991: 74) mentions the verb *koprugata* ‘crossing’ which may refer to river crossing but also more generally crossing bridges (Hanson 2010: 24) or land (Matteson 1965: 432).

<sup>5</sup> The terminology in the analysis part of this article is based on Bohnemeyer et al. (2015: 175) who provide an overview and analysis of previous classifications and their differences and overlaps.

<sup>6</sup> A more in-depth analysis of how fixed, abstract and arbitrary the upriver/downriver distinction may be can only be obtained by further research that also includes other test locations.

<sup>7</sup> The abbreviations are not intended as true dialectal classifications but as shortcuts to refer to the speech of the two age groups.

The sessions took place indoors, so that both dyads had no visual access to the river (see Figure 4 for an abstracted scheme). Both houses in which sessions were run are not directly placed on the river edge but separated from it by one or two neighboring houses and a street that runs parallel to the river. Both houses are situated in close proximity to each other and contain longish tables in their main rooms that are both aligned parallel to the river, so that test conditions were consistent.



**Figure 4:** Experiment setup for picture-matching task with geocentric and egocentric directions.

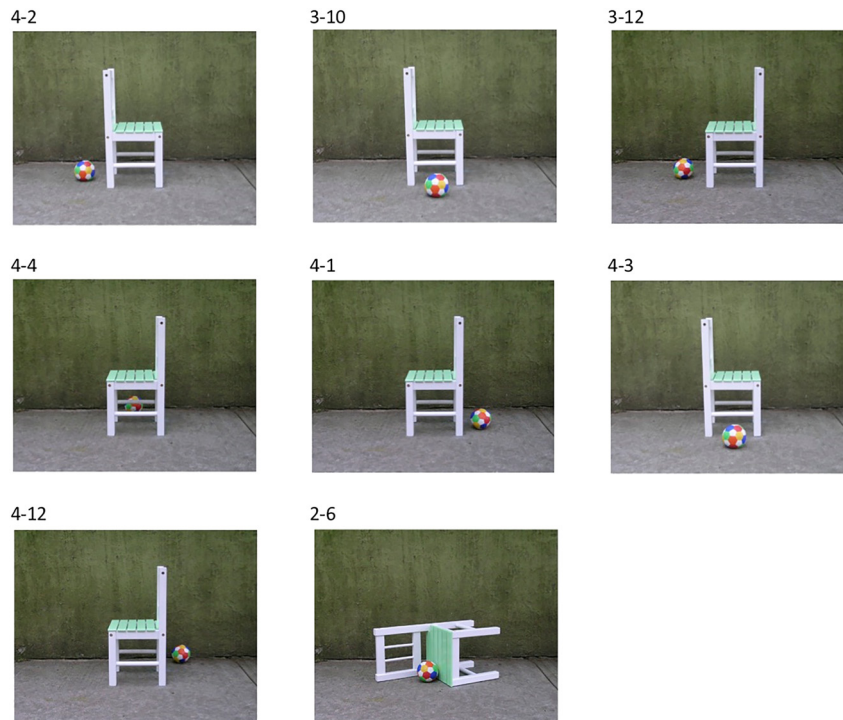
Two speakers sat next to each other, separated by a screen, with the picture cards spread before them. The director then chose a card and described the picture to the matcher, who searched the respective cards in front of her and who was allowed to ask questions to find the correct card. The task was adapted to the field situation insofar as a reduced set of cards was used in the main round to approach a first outline of basic features of the Yine spatial system. The change between director and matcher was handled less strictly than advised (see Bohnemeyer 2008 for a detailed outline of the original experiment design) which allowed for speakers who felt more comfortable in the role of director to produce more utterances.

## 2.2 Results

The YY dyad employed two strategies in equal distribution: i) Combined egocentric-extrinsic ('relative') and allocentric-intrinsic ('object-centered') orientation, and ii) purely egocentric-extrinsic descriptions (see Sections 2.2.1 and 2.2.5). The chair was always identified as either facing left (*kegnete*) or right (*potukle*). The ball was located via combinations of relative and object-centered frames or in the same relative fashion as the chair. The interpretation of *kapto* 'behind' as either allocentric-intrinsic or egocentric-extrinsic sparked a discussion (see Section 2.2.3). No instances of either river-based terminology or vertical descriptions are attested in the YY data. (1)<sup>8</sup> shows a typical spatial description in YY, involving relative and allocentric-

<sup>8</sup> The transcription is based on the official orthography and only slightly modified to indicate morpheme boundaries. As in Yine standard orthography, the laryngeal /h/ is written as *g*, the palatal stop /c/ as *x*, the palatal fricative /ç/ as *j*, and the close central unrounded /i/ as *u*. Abbreviations: ACTN = action, ANTIC = anticipatory, APPL = applicative, ASSRT = assertive, COMPL = completive, DIM = diminutive, DUR = durative, ELV = elative, EMPH = emphatic, EXTS = extensive, F = feminine, IMP.DECL = impersonal declarative, INTS = intensive, LIM = limitive, LOC = location, M = masculine, NEG = negative, NMLZ = nominalizer, PART = particle, PASS = passive, PFV = perfective, POR = possessor, PROX = proximal, PSSD = possessed, REF = referential article, REIT = reiterative, REM = remote, SG = singular, SIM = simulative, SPEC = specific, VCL = verb-stem closure.

intrinsic information. Figure 5 provides an overview of the B&C picture cards that are discussed in this section by means of examples.



**Figure 5:** Selection of B&C picture stimuli presented in the order as discussed in Section 2.2 (taken from Appendix F in Pérez Báez 2008).

- (1) *Potukle sreta t-yiga-ta tuplapije gawa kegnete sreta t-gwa-sagi-ta*  
 right side 3SGF-see-VCL chair and left side 3SGF-be-ball.of-VCL  
*pelota. P-geta, kegnete [correcting Sp.] potukle t-yiga-ta tuplapije*  
 football 2SG-see left ... right 3SGF-look-VCL chair  
*gawa tuplapije-tjimne t-gwa pelot(a)-sagi.*  
 and chair-backside 3SGF-be football-ball.of  
 ‘The chair looks to the right side and on the left side is the ball. Look, to the left... *no*, to the right the chair is looking and at the chair’s back is the ball.’ [B&C 4-2]

The TY dyad predominantly used the river-based geocentric frame to identify the orientation of the chair (see Section 2.2.2). In almost half of all cases, however, its orientation was not specified and the ball was located via elaborate frame-free descriptions (see Section 2.2.4) which led to correct matching even when the chair’s orientation was left unaddressed. The ball, if not identified entirely in frame-free fashion, was located via allocentric-intrinsic strategies or combinations of allocentric-intrinsic, topological and/or vertical information (see Section 2.2.6). A typical spatial description attested in the TY data is (2).

- (2) *Galukta mala sreta ti-yiga-ta-tnaka gawa to-tjimne*  
 PART downriver side 3SGF-look-VCL-REIT and 3SGF.POR-back  
*to-sagi t-gwa, [...] wane gowukana t-gwa,*  
 3SGF.POR-ball.of 3SGF-be [...] there far.DIM 3SGF-be  
*gi wa gowuka-potu-nanu wane-stsi nshinikanu seyni maleka*  
 NEG REF far-INTS-EXTS there-side somewhat but outside  
*t-gwa. Chiji.*  
 3SGF-be ground  
 ‘So, it [the chair] looks downriver again and at its back is the ball. [...] There further it is, not too far away, somewhat close (lit. on the side) but outside [of the chair] it is. On the ground.’ [B&C 4-2]

The preferred strategy of the TY dyad to identify cards was a hybrid one involving geocentrically and intrinsically framed information to describe location and orientation of the two objects. In TY, the orientation of an object with inherent intrinsic features such as front or back (here the ‘chair’) was predominantly coded by geocentric means, i.e., the front side was described as facing either upriver (*gawaka*) or downriver (*mala*). On the other hand, an object without visible inherent intrinsic features (‘ball’) tended to be organized allocentric-intrinsically in relation to the ground object (‘chair’). The terms *gosha sreta* ‘forest side’ and *wakanu (sreta)* ‘other side (i.e., the riverbank farther away)’ were never used as relators for cards where the chair faces the viewer or away from her (i.e., the viewer facing the chair’s backside). Referring to these cards, object-centered and topological descriptions were drawn on entirely. This suggests that the bidirectional river axes are more salient than the ‘across’ directions which seem less prominent in the spatial model. During debriefing, speakers ruled out the option to use *gosha sreta* or *wakanu (sreta)* in small-scale space (see Table 1).

**Table 1:** Attested combinations.

| Orientation of object | Location of object |                      |           |             |                        |
|-----------------------|--------------------|----------------------|-----------|-------------|------------------------|
|                       | Relative           | Relative + intrinsic | Intrinsic | Topological | Topological + vertical |
| Relative              | YY                 | YY                   | YY        | YY          |                        |
| Geocentric            |                    |                      | TY        |             |                        |
| ∅                     |                    |                      |           | TY          | TY                     |
| Geocentric + relative |                    |                      | TY        |             |                        |

Descriptions usually involved the identification of the chair’s orientation and subsequently the identification of the ball’s location. There is no combination of strategies to identify cards that has been observed in both TY and YY, including test rounds. The TY dyad used rather detailed descriptions involving different combinations of strategies to refer to both orientation and location of objects, whereas the YY dyad tended to identify the chair in relative frames, and alternated between different strategies to identify the ball’s position. Another efficient strategy frequently used by the TY dyad is to establish a connection to the card discussed before.

- (3) *Pixka-ya t-gwa seyni mala sreta t-yiga-ta-tnaka wala.*  
 SIM-APPL 3SGF-be but downriver side 3SGF-look-VCL-REIT 3SGF  
 ‘It is similar now but that one looks downriver again.’ [B&C 3-10]

### 2.2.1 Egocentric-extrinsic spatial reference

The relative frame type was applied by the TY dyad only once in the main round and only additionally, enriching the river-based description. In the training round, the left/right relators were used only in relation to the chair’s intrinsic facets. In the YY data, egocentric alignment of both ball and chair is one of two dominant strategies. The male YY speaker, referring to a card showing the ball at the intrinsic front side of the chair, offered the following description.

- (4) *Tuplapije kegnete sreta t-yiga tuplapije, kegnete*  
 chair left side 3SGF-look chair left  
*t-gwa koca pelot(a)-sagi.*  
 3SGF-be also football-ball.of  
 ‘The chair, the chair looks to the left side, also to the left is the ball.’ [B&C 3-12]

The female YY speaker first interpreted and described the relators *kegnete* ‘left’, *potukle* ‘right’ and *kapto* ‘behind’ in object-centered fashion to identify the ball’s position. Later, she switched to the egocentric-extrinsic viewpoint after an in-game discussion on the matter (see Section 2.2.3).

- (5) *Sato tuplapije kegnete sreta t-yiga-ta seyni*  
 SPEC.F chair left side 3SGF-look-VCL but  
*kapto sreta sato pelota.*  
 behind side SPEC.F football  
 ‘That chair looks to the left side but behind (lit. on the behind side) is that ball.’ [B&C 4-4]

### 2.2.2 Allocentric-intrinsic and riverine spatial reference

The TY dyad combined geocentrically framed descriptions of the chair’s orientation with topologically, vertically and allocentric-intrinsically coded information on the ball’s location, with respect to the chair’s intrinsic facets and orientation. (6) is a typical hybrid description provided by the male speaker (TY2). The female speaker (TY1) inquired the ball’s position with regard to intrinsic properties of the chair.

- (6) TY2: *Xani p-gijga-ni-lo galukta potuka wa to-sta sreta*  
 now 2-search.for- ANTIC-3SGF PART front REF 3SGF.POR-chest side  
*t-gwa seyni mala sreta t-yiga-ta-tka muchinanu,*  
 3SGF-be but downriver side 3SGF-look-VCL-PFV first  
*gawaka sreta t-yiga-na-ta xani gawa gi wa mala sreta,*  
 upriver side look-DUR-VCL now and NEG REF downriver side  
*t-yiga-ta-tnaka gwa wa gakatsreta-sagi-ta-ka-luro. Tuplapije*  
 3SGF-look-VCL-REIT be REF kick-ball.of-VCL-PASS-NMLZ.F chair  
*wa satu-nshinikanu t-gwa seyni chiji t-gwa-sagi-ta. [...]*  
 REF other-idea 3SGF-be but ground 3SGF-be-ball.of-VCL  
 ‘Now you are to search the front, it [the ball] is at its [the chair’s] front side but before (lit. first) it looked downriver, now looking upriver and not again [as before] downriver, again it is facing the ball. Moreover, the ball is on the ground.’  
 TY1: *Tuplapije to-sta sreta t-gwa-sagi-ta?*  
 chair 3SGF.POR-chest side 3SGF-be-ball.of-VCL  
 ‘The ball is at the chair’s front side?’  
 TY2: *To-sta sreta seyni chiji t-gwa-sagi-ta.*  
 3SGF.POR-chest side but ground 3SGF-be-ball.of-VCL  
 ‘At the front side but on the ground is the ball.’ [B&C 3-12]

### 2.2.3 Ambiguity between allocentric-intrinsic and egocentric-extrinsic spatial reference

In the YY data, a change in strategy by the female speaker was observed in the course of the game, switching from an object-centered frame to an egocentric-extrinsic frame, adapting to the male speaker’s dominant strategy. The male speaker, on the other hand, added allocentric-intrinsic descriptions to his predominantly egocentric descriptions, adapting to the female speaker’s initial default strategy. (7) shows a discussion that evolved during the game. The female YY speaker (YY1) employed *kapto* ‘behind’ to refer to the intrinsic backside of the chair. The male YY speaker (YY2) guessed [B&C 4-4], a card where the ball is behind the chair from the viewer’s perspective but not at the chair’s intrinsic backside. YY2 then explained that he interprets *kapto* from an egocentric-extrinsic perspective.

- (7) YY1: *Kegnete sreta t-yiga-ta tuplapije, gawa...* [hes.]  
 left side 3SGF-look chair and ...  
 ‘To the left side the chair is looking, and... [hesitating]’

- YY2: *Potukle o wa kapto?*  
 right or REF behind  
 ‘[Is it] to the right or behind?’
- YY1: *Kapto sreta t-gwa pelot(a)-sagi.*  
 behind side 3SGF-be football-ball.of  
 ‘The ball is behind (lit. on the behind side).’  
 {YY2 picks 4.4}
- YY2: *Kegnete t-yiga-ta p-tshina.*  
 left 3SGF-look-VCL 2-say  
 ‘It looks to the left you say.’
- YY1: *Wane-ko-ni seyni kapto sreta t-gwa*  
 there-EMPH-IMP.DECL but behind side 3SGF-be  
*pelot(a)-sagi, potukle, kapto sreta tuplapije.*  
 football-ball.of right behind side chair  
 ‘Exactly, but the ball is behind (lit. on the behind side), on the right, behind the chair.’  
 [B&C 4-1]

YY2 interrupted the game and used gesture and a bystanding person as reference object to indicate the egocentrically defined space behind the person, turning the person to the side to elucidate the irrelevance of the reference object’s intrinsic back in (8).

- (8) YY2: *Kapto tshina-inri gita tuka sreta, wa potukle sreta t-gwa.*  
 behind say-ACTN.NMLZ 1SG REM.SGM side REF right side 3SGF-be  
 ‘*Kapto* in my opinion is that side {points to space behind person}, *potukle sreta* is [this] {points to his right side}’
- YY1: *Potukle sreta.*  
 right side  
 ‘[It is] on the right side.’
- YY2: *Gowuka waka wala-stsi-potu?*  
 far or 3SGF-side.of-INTS  
 ‘Far away or close (lit. on its side)?’
- YY1: *Wala-stsi-potu.*  
 3SGF-side.of-INTS  
 ‘Close.’ [B&C 4-1]

As the card was correctly matched, the game continued and YY2 hence added allocentric-intrinsic references to egocentric-extrinsic descriptions. YY1 first continued to employ the relator *kapto* ‘behind’ in allocentric-intrinsic fashion but later clarified the references to intrinsic properties by using unambiguous terms such as *to-tjimne* ‘its backside’.

## 2.2.4 Topological reference

The TY dyad pervasively referred to chair parts such as *tjimne* ‘backside’ and *sta* ‘chest, front’ as intrinsically perceived features of the chair in their spatial descriptions.

- (9) *Xani wala-ko-tnaka tuplapije-tjimne, t-gwa-tnaka-pa sagi.*  
 now 3SGF-EMPH-REIT chair-backside 3SGF-be-REIT-ELV ball.of  
*To-sta gwa-na-ta-sha p-gijga-ka-ta-ya seyni xani*  
 3SGF.POR-chest be-COMPL-VCL-LIM 2-search-ASSRT-VCL-APPL but now  
*p-gijga to-tjimne sreta t-gwa-sagi-ta-tnaka*  
 2-search 3SGF-backside side 3SGF-be-ball.of-VCL-REIT

*gakatsreta-sagi-ta-ka-luro.*  
kick-ball.of-VCL-PASS-NMLZ.F

‘Now, at the backside of that same chair, the ball is again. [The one at] its front you had already searched but now you search for its backside where the ball is again.’ [B&C 4-1]

The TY dyad further identified the space under the seat of the chair as *swa*, a noun that refers to orifices and spaces that are enclosed largely but not fully, and used the term repeatedly, cf. the incorporation in (10). These references can be analyzed as topological and therefore frame-free.

- (10) *t-gwa-sagi-ta*                      *ganikaji-swa*                      *nshinikanu*  
3SGF-be-ball.of-VCL              in.between-orifice.of              almost  
‘it is in the middle, almost in the space under the chair’ [B&C 4-3]

With this strategy, references to egocentric-intrinsic ‘in front of [me]’ and to the ambiguous relator *potukle* ‘right’ were avoided for this card, where the ball is between the chair and the viewer. [B&C 4-4], where the ball is behind the chair from the ego’s perspective, is similarly solved by addressing the side spindles of the chair.

- (11) *ganikaji*      *t-gwa*      *tyostanamle*      *t-gwa-ya-waka*  
middle      3SGF-be      chair.spindle      3SGF-be-APPL-LOC.NMLZ  
‘it [the ball] is in the middle where the chair spindle is’ [B&C 4-4]

### 2.2.5 Deictic reference

In both TY and YY, the distance relator *gowuka(na)* ‘far (DIM)’ was consistently interpreted in relation to the viewer’s perspective by all speakers if not explicitly set in relation to the reference object. The inquiry in (12) about [B&C 4-12], where the ball is further away from the viewer than elsewhere, led to correct matching immediately.

- (12) YY1: *Gowukana*      *t-gwa?*  
far.DIM                      3SGF-be  
‘It is a bit further away?’  
YY2: *T-gwa*      *pelot(a)-sagi*      *gowukana.*  
3SGF-be      football-ball.of      far.DIM  
‘The ball is a bit further away.’ [B&C 4-12]

Proximity to the chair was referred to by addressing its intrinsic features, such -*stsi* ‘side of’, in both TY and YY (see (2) above).

### 2.2.6 Vertical space

In the training round, both TY speakers independently (and beyond each other’s visual field due to a separating screen) turned the cards [B&C 2-6] and [B&C 2-7] around by 90°, so that the chair, lying on the side in both pictures, seemed in a standing position.<sup>9</sup> The potentially ambiguous vertical relator *teno*, which refers to position ‘high up’ but also ‘deep down’ (Hanson 2010), was interpreted as ‘high’ relator per default in the game and was consistently employed in relation to the chair’s intrinsic properties. [B&C 2-6], after rotating the card by 90°, was solved as follows.

<sup>9</sup> The speakers later commented that they were aware of the lying position of the chair but nevertheless favored this manipulation to facilitate the task.

- (13) *Wa twu gakatsreta-sagi-ta-ka-luro galukta tuplapije*  
 REF PROX.SGF kick-ball.of-VCL-PASS-NMLZ.F PART chair  
*gogo-te t-gwa-tka, galukta t-gwa-ko seyni wa*  
 topside.3SGF-PSSD 3SGF-be-PFV PART 3SGF-be-EMPH but REF  
*to-ptostsi nshinikanu, gi wa teno-tka-lo seyni*  
 3SGF-edge/end.of almost NEG REF high/deep-PFV-3SGF but  
*tuplati-ko-waka tu... [correcting] t-gwa-tka. Gi wa*  
 sit-ANTIC.PASS-LOC.NMLZ 3SGF-be-PFV NEG REF  
*ganikaji t-gwa seyni kapto sreta t-gwa.*  
 middle 3SGF-be but behind side 3SGF-be  
 ‘This football here is thus on the upper surface of the chair, also it is almost on the edge, not high above  
 but where one sits it is placed. It is not in the center space [underneath the seating surface] but on the  
 other side (lit. behind it).’ [B&C 2-6]

Another verticality indication used by the TY dyad is *taji*, which Matteson (1965: 358) translates as ‘edge, top of hipbone’, in [B&C 2-1] where the ball is in the air, roughly in the vertical middle next to the chair.

### 3 Discussion

#### 3.1 Restrictions and scope

This exploratory study cannot offer any estimates in terms of intra-generational consistency of the attested strategies or provide a robust assessment of spatial frame use in Yine, as such evidence requires data collection with varying time frames and locations (Bohnenmeyer et al. 2015: 177). Future research must also include more speakers of diverse age groups and occupations, and with varying exposure to surrounding languages (in the style of, among others, Cerqueglini 2020). Further linguistic and nonlinguistic tasks must be added. The limited data presented here cannot cast much light on the Topographic Correspondence Hypothesis (Palmer 2015) but indicate that differences in frame use can occur in identical environment within the same community and language. It could not be assessed which differences may arise when changing to a distinct environment, which can be solved by applying the Environment Variable Method (Palmer 2015) in future investigations. The question whether the upriver/downriver distinction holds in urban environments (cf. Pederson 2006) or elsewhere outside the communities requires further research. My conclusions are therefore tentative as the findings for two dyads of speakers cannot be generalized.

Altogether, both dyads had long intervals of negotiating strategies but were successful in solving the task and identifying the pictures. The results suggest a split between the environment-motivated riverine orientation in TY and the egocentric frame use in YY when referring to an object’s orientation. The location of an object without intrinsic facets is predominantly coded in an intrinsic frame, if not topologically, in TY and partly in YY. The results clearly show that egocentric-extrinsic, allocentric-intrinsic, and allocentric-extrinsic orientation frames can be dominant strategies not only within the same language but also within the same community (cf. Palmer et al. 2018).

#### 3.2 Language contact and lifestyle as variables

The three speakers that reside in the village showed a strong tendency towards the allocentric-intrinsic frame. The speaker with the strongest egocentric-extrinsic tendency is the most exposed to Spanish on a daily basis, which may indicate a certain degree of habituation (cf. Bohnemeyer et al. 2014: 215). The YY dyad showed generally much higher frequencies of switching to Spanish and integrating Spanish loans. The impact of

Spanish in the speech of YY can be observed as well in other domains that are susceptible to replacement such as the numeral system (Comrie 2005). TY, on the other hand, qualifies as another demonstration of how saliently perceived entities of the physical environment, here the main river, can influence spatial orientation and spatial language e.g., via geocentric FoR use and corresponding lexicalized forms (cf. Palmer 2015).

Regarding Palmer et al.'s (2017: 460) finding that distinct FoR preferences can be explained by a complex interplay of sociocultural interactions with the environment, distinct subsistence modes and the resources available in the language, it is interesting that YY speakers travel on the river at least as much as, if not significantly more than, the TY speakers.<sup>10</sup> Differences in perceptions of and relationships with the environment, use of L2 and varying subsistence modes and lifestyles therefore also qualify as explanatory factors for the results of this restricted, exploratory study.

Whether the relative frame type has been relatively newly introduced remains speculative until more data is available. Hypothetically, the results indicate a superseding influence on geocentric alignment and object-centered orientation of objects by egocentric-extrinsic strategies via higher exposure to dominantly egocentrically coding languages such as Spanish (Bohnenmeyer et al. 2014). This must be investigated involving more speakers of more diverse linguistic backgrounds, as other studies find only small effects of L2 on L1 spatial language (Palmer et al. 2017).

## 4 Conclusion

This first exploration of spatial reference in Yine attests the existence of both egocentric and geocentric strategies, as well as varying interpretations of left/right/behind relators. In table-top space, a dyad of senior Yine speakers used primarily river-oriented geocentric frames and intrinsic frames, whereas a dyad of young adults made exclusive use of egocentric and intrinsic strategies. The senior speakers used geocentric frames primarily to identify the orientation of an object, whereas an object without intrinsic facets was located via allocentric-intrinsic and topological descriptions. This dyad also generally showed a greater variety of strategies and usually employed at least two frames or strategies in the same spatial description.

Solving the same tasks, the young adults always identified an object's orientation from an egocentric perspective, and combined egocentric and allocentric-intrinsic strategies to locate the object without intrinsic facets. An in-game discussion arose about the 'behind' relator *kapto* which was interpreted from an allocentric-intrinsic perspective by one speaker and from an egocentric perspective by the other. In absence of quantitative evidence, much is left to be studied in the future. The plethora of languages and the complex background and social interactions of traditionally river-based and forest-based groups makes Peruvian Amazonia a promising field also for comparative and quantitative observations. It is therefore hoped for upcoming studies and collaborative work on spatial orientation in Amazonian languages.

## References

- Bohnenmeyer, Jürgen. 2008. Elicitation task: Frames of reference in discourse – The ball & chair pictures. In Gabriela Pérez Báez (ed.), *MesoSpace: Spatial language and cognition in Mesoamerica. 2008 field manual*, 29–32. Suny: University at Buffalo. <https://www.acsu.buffalo.edu/~jb77/MesoSpaceManual2008.pdf> (accessed 23 March 2020).
- Bohnenmeyer, Jürgen. 2011. Spatial frames of reference in Yucatec Maya: Referential promiscuity and task specificity. *Language Sciences* 33(6). 892–914.
- Bohnenmeyer, Jürgen, Katharine T. Donelson, Randi E. Tucker, Elena Benedicto, Alejandra Capistrán Garza, Alyson Eggleston, Néstor Hernández Green, María de Jesús Selene Hernández Gómez, Samuel Herrera Castro, Carolyn K. O'Meara, Enrique Palancar, Gabriela Pérez Báez, Gilles Polian & Rodrigo Romero Méndez. 2014. The cultural transmission of spatial cognition: Evidence from a large-scale study. In Paul Bello, Marcello Guarini, Marjorie McShane & Brian Scassellati (eds.),

<sup>10</sup> However, it can be assumed that during their lifetime the TY speakers have more often traveled the river on their own, whereas the YY speakers often travel passively in shared water taxis.

- Proceedings of the 36th annual conference of the cognitive science society*, 212–217. Austin, Texas: Cognitive Science Society. <https://mindmodeling.org/cogsci2014/papers/047/paper047.pdf> (accessed 23 March 2020).
- Bohnenmeyer, Jürgen, Katharine T. Donelson, Randi E. Moore, Elena Benedicto, Alejandra Capistrán Garza, Alyson Eggleston, Carolyn K O'Meara, Gabriela Pérez Báez, Alejandra Capistrán Garza, Néstor Hernández Green, María de Jesús Selene Hernández Gómez, Samuel Herrera Castro, Enrique Palancar, Gilles Polian & Rodrigo Romero Méndez. 2015. The contact diffusion of linguistic practices: Reference frames in Mesoamerica. *Language Dynamics and Change* 5. 169–201. [http://www.acsu.buffalo.edu/~jb77/Bohnenmeyer\\_et\\_al\\_2015.pdf](http://www.acsu.buffalo.edu/~jb77/Bohnenmeyer_et_al_2015.pdf) (accessed 23 March 2020).
- Cerqueglini, Letizia. 2020. Cross-generational differences in linguistic and cognitive spatial frames of reference in Negev Arabic. *Sociotopography: The Interplay of Language, Culture and Environment in Representing Space*. [Special Collection of Linguistics Vanguard].
- Comrie, B. 2005. Endangered numeral systems. In Jan Wohlgemuth & Tyko Dirksmeyer (eds.), *Bedrohte Vielfalt: Aspekte des Sprach(en)tods*, 203–230. Berlin: Weißensee-Verlag.
- Eberhard, David M., Gary F. Simons & Charles D. Fennig (eds.). 2020. *Ethnologue: Languages of the world*, 23rd edn. Dallas, Texas: SIL International. <http://www.ethnologue.com/> (accessed 23 March 2020).
- Gow, Peter. 1991. *Of mixed blood. Kinship and history in Peruvian Amazonia*. Oxford: Clarendon Press.
- Hammarström, Harald, Robert Forkel & Martin Haspelmath. 2019. *Glottolog 4.1*. Jena: Max Planck Institute for the Science of Human History. <http://glottolog.org/> (accessed 23 March 2020).
- Hanson, Rebecca. 2010. *A grammar of Yine (Piro)*. Bundoora: LaTrobe University dissertation.
- Levinson, Stephen C. 1996. Frames of reference and Molyneux's Question: Crosslinguistic evidence. In Paul Bloom, Mary A. Peterson, Lynn Nadel & Merrill F. Garrett (eds.), *Language and space*, 109–169. Cambridge, MA: MIT press.
- Levinson, Stephen C. 2003. *Space in language and cognition: Explorations in cognitive diversity*. Cambridge: Cambridge University Press.
- Levinson, Stephen C. & David Wilkins (eds.). 2006. *Grammars of space: Explorations in cognitive diversity*. Cambridge: Cambridge University Press.
- Levinson, Stephen C. & Niclas Burenhult. 2009. Semplates: A new concept in lexical semantics? *Language* 85(1). 153–174.
- Matteson, Esther. 1965. *The Piro (Arawakan) Language (University of California Publications in Linguistics 42.)*. Berkeley & Los Angeles: University of California Press.
- Meira, Sergio. 2006. Approaching space in Tiriyo grammar. In Stephen Levinson & David Wilkins (eds.), *Grammars of space: Explorations in cognitive diversity*, 311–358. Cambridge: Cambridge University Press.
- Nies, Joyce. 1986. *Diccionario Piro (Tokanchi gikshijikowaka-steno) (Serie Lingüística Peruana 22)*. Yarinacocha: Ministerio de Educación and Instituto Lingüístico de Verano.
- Palmer, Bill. 2015. Topography in language: Absolute frame of reference and the Topographic Correspondence Hypothesis. In Rik De Busser & Randy J. LaPolla (eds.), *Language structure and environment: Social, cultural, and natural factors*, 177–226. London: John Benjamins.
- Palmer, Bill, Alice Gaby, Jonathon Lum & Jonathan Schlossberg. 2018. Diversity in spatial language within communities: The interplay of culture, language and landscape in representations of space. In Stephan Winter, Amy Griffin & Monika Sester (eds.), *Proceedings of the 10th international conference on geographic information science (GIScience 2018)*. LIPIcs–Leibniz International Proceedings in Informatics, vol. 114. Melbourne, Australia: Dagstuhl Publishing. <https://doi.org/10.4230/LIPIcs.GISCIENCE.2018.53.53:1–53:8>.
- Palmer, Bill, Jonathon Lum, Jonathan Schlossberg & Alice Gaby. 2017. How does the environment shape spatial language? Evidence for sociotopography. *Linguistic Typology* 21(3). 457–491.
- Pederson, Eric. 2006. Spatial language in Tamil. In Stephen Levinson & David Wilkins (eds.), *Grammars of space: Explorations in cognitive diversity*, 400–436. Cambridge: Cambridge University Press.
- Pérez Báez, Gabriela (ed.). 2008. *MesoSpace: Spatial language and cognition in Mesoamerica. 2008 Field Manual*. Suny: University at Buffalo. <https://www.acsu.buffalo.edu/~jb77/MesoSpaceManual2008.pdf> (accessed 23 March 2020).
- Urquía Sebastián, Rittma. 2006. La situación sociolingüística de la lengua yine en 2006. In Stephen A. Marlett (ed.), *Situaciones sociolingüísticas de lenguas amerindias*, 1–2. Lima: SIL International & Universidad Ricardo Palma. [http://lengamer.org/publicaciones/trabajos/yine\\_socio.pdf](http://lengamer.org/publicaciones/trabajos/yine_socio.pdf) (accessed 23 March 2020).