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Reference frames identified through projective prepositions

Aurélie Barnabé

Introduction

- 1 Reference frames (RFs) are used by speakers to identify the position of objects in a spatial environment through the viewing experience (Herskovits, 1986: 156). RFs refer to coordinate axes that describe a space and the spatial relationships within it (Shusterman and Li, 2016b: 1). RFs representing the spatial links between items are viewer-centred, object-centred, and environment-centred, also called relative, intrinsic and absolute respectively (Levinson, 2003: 32). These RFs are not used by all languages. English uses the relative RF, which presupposes the point of observation of the viewer, a located object (LO) and a reference object (RO) (Hying, 2007). This RF uses coordinates that are fixed on the point of observation to assign directions to the LO and the RO (e.g. *The ball is to the left of the tree.* (Levinson, 2003: 43)). With the relative RF, the coordinates of the point of observation are mapped onto the RO, which reveals (i) a 180-degree rotation or (ii) translation (movement without rotation). With (i) the rotation model, entities' left-right and front-back axes are being rotated with respect to speakers' left-right and front-back coordinates. Conversely, with (ii) the translation model, entities' left-right and front-back lines are described when transferring the coordinate axes of the speaker onto the RO (Shusterman and Li, 2016a).
- 2 When the RO is a non-fronted object (e.g. a ball), English refers to it without rotation along the left-right axis (e.g. *The triangle is on the left of the ball*), while describing it with rotation along the front-back line (e.g. *The square is behind the ball*)¹. In comparison to this model, the present paper explores the way English refers to a RO embodied by an animate entity or by a human entity, which inherently displays left-right and front-back sides: do English speakers refer to fronted and non-fronted items identically? To answer this question, animate and human entities will be alternatively examined, and it will be seen whether the human feature, that distinguishes both entities, constitutes

a significant factor or not, when speakers refer to human vs. non-human items along horizontal lines.

- 3 The linguistic items presumed to identify the location of an entity relative to another are projective prepositions (e.g. *in front of*²), which determine a point of observation. They express the position of entities along the front-back and left-right axes. To assess the projective prepositions used by speakers when locating animate entities, the present experiment relies on spoken corpora collected with 33 English-speaking students, asked to describe the position of animate and human items, when used as RO. The point of observation picked out by speakers is being questioned, as well as the projective prepositions selected to refer to animate, fronted items, in comparison with the existing, English, prepositional model defined with non-fronted units. The first part of this paper highlights the triadic distinction of the relative RF, and it displays the methodology and the hypotheses of the experiment. The second section focuses on the data of the experiment related to the left-right axis, while the last part reveals results pertaining to the front-back axis.

I. Reference frames and projective prepositions

I.1. The spatial roles underlain by reference frames

- 4 The concepts of RFs are abstract mental structures. They reveal coordinate frameworks that organize spatial relations. These coordinate frameworks can be derived from entities in the world onto which axes may be imposed (Shusterman and Li, 2016a: 116). It is not languages that make use of a RF but speakers. Languages do indeed restrict the RFs for which they provide ready-made expressions. A RF consists of 'base axes' (Herskovits, 1986: 156), which horizontally correspond to the front-back and left-right lines: the direction in which the observer's eyes are facing defines the front axis, and the back axis is opposed to the front one (Ibid.: 157). The present study exclusively focuses on the two axes defining the horizontal plane: the front-back and left-right lines. Humans use multiple RFs and a consensus in the literature suggests that organisms entertain multiple representations of space simultaneously (Shusterman and Li, 2016b: 121).
- 5 The present paper adds to this body of literature by testing the way English speakers identify a RO represented by an animate entity in a spatial combination including a LO and a RO. RFs are captured via a set of spatial roles composed of (i) the LO (Hying, 2007: 1), also called the figure (Levinson, 2003: 65), (ii) the RO (Hying, 2007: 1), also called the ground (Levinson, 2003: 65), and (iii) a point of observation. The cognitive function represented by the figure is performed by the concept that needs anchoring, while the ground is performed by the concept that does the anchoring (Talmy, 2000b: 311).
- 6 Figures and grounds refer to two entities relating to each other in space in an event of motion or location.
- 7 The present analysis highlights location events. This paper explores the way the speaker combines knowledge of an animate entity functioning as the ground with the speaker's visual perspective, to determine a specific, linguistic RF. The RF referring to the ground is linguistically selected through a projective preposition.

- 8 Take, for example, the RF expressed through the English unit *front*: Svorou (1994) and Heine (1997) demonstrate how this term has progressed from body-part to generalized thing-part, and then from thing-part to spatial region projected off from that part, gradually acquiring more spatial and regional interpretations (Levinson, 2003: 105). The spatial nominal *front* participates in the construction of complex prepositions like *in the front of*³, hence revealing a process of grammaticalization (Ibid.: 106). Spatial nominals play a specific role in frame of reference information. They are involved in the coding of topological, spatial relations, which may be expressed through projective prepositions. Herskovits precisely defines the term *projective* included in “projective preposition”:

English includes a set of prepositions which are used to define directions about an object, and then specify the location of another object in relation to these directions. I have called these prepositions “projective”, because all fundamentally involve the experience of viewing and the idea of a point of observation. (Herskovits, 1986: 156).

- 9 Such prepositions are used to define directions to specify the location of the ground in relation to these directions:

[Viewing] allows human beings to specify a frame of reference. [...] A projective preposition may be used with an inanimate reference object and without explicit reference to an observer. Yet, one can always infer a point of observation [which] can correlate with a point or quasi-point in space (corresponding to the observer’s eye); the line of sight (some axis oriented away from the observer); and the observer’s intrinsic up axis. [...] A point of observation encapsulates where a real or imaginary observer stands and looks, allowing one to ascribe base axes to the reference object. (Ibid.: 156-160)

- 10 An ‘effective point of observation’ can be defined in every case and it may correspond to an explicit or implicit observer in the context (speaker, hearer, or third person) (Ibid.: 160). The point of observation spotted by Herskovits echoes the viewpoint identified by Levinson (2003). The specificity of the RF entirely follows from the viewpoint (real or virtual) chosen by the speaker. The perspective on the grounds here explored depends on the viewpoint.

1.2. Reference frames: a tripartite taxonomy

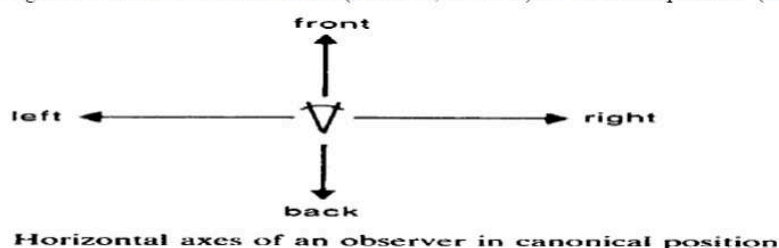
- 11 To interpret an expression with a projective preposition, the addressee must figure out the RF intended by the speaker. Conversely, a speaker building up such an expression must abide by certain rules, so that the addressee can figure out the RF intended (Herskovits, 1986: 163). Levinson notes that the RF revealed through projective prepositions represents a complex amalgam of orientational, perceptual, functional, and cultural factors (2003: 77). Three types of RF are used in English (Shusterman and Li, 2016a: 118): (i) the absolute RF displays an environment-centred frame in which objects are represented with respect to salient features of the environment (i.e. gravity, magnetic poles, etc.), and fixed bearings or ‘cardinal directions’ (e.g. *He is north of the house* (Levinson, 2003: 40)). Through (ii) the intrinsic RF, a figure is located relative to a ground, implying an object-centred coordinate system, where the coordinates are determined by the ‘inherent features’⁴ of the object used as the ground element (Kelleher and van Genabith, 2006: 214). The figure is hence located with respect to what are called intrinsic or inherent features of the ground (e.g. *He is in front of the house*. (Levinson, 2003: 40).

- 12 In (iii) the relative (or viewer-centred) RF, objects are represented in a retino-centric, or head-centric coordinate system which presupposes the viewer's point of observation (V), a figure and a ground, distinct from V (Ibid.: 32). The relative RF is based on a different entity (other than the ground) providing a perspective (e.g. *There is a box to the right of the ball* (Tenbrink and Kuhn, 2011: 5)). This frame is centred on the main axis of the body. Although the position of the body of the viewer may be one criterion for anchoring the coordinates, the direction of gaze may be another. Relative systems are actually hooked into visual criteria (Levinson, 2003: 44). The relative RF is composed of the viewer's point of observation that locate the figure relative to the ground, and hence relative to the reference object. The triangulation of three points is the first step in the definition of a full relative system, as illustrated below.

1.3. The relative reference frame: a triadic distinction

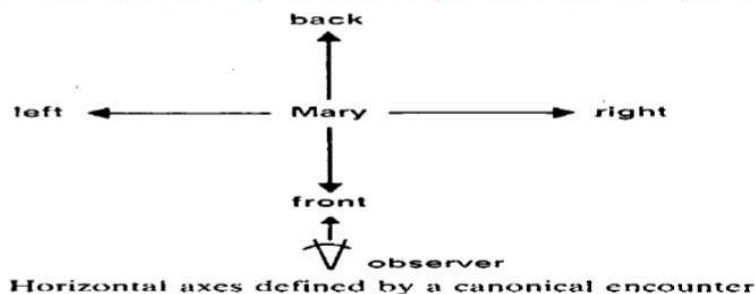
- 13 The relative RF displays three subtypes corresponding to the *translation* model, the *reflection* model, and the *rotation* model: all of them present differences pertaining to the point of observation selected by the viewer. Distinct points of observation, filtered through the various perceptive stimuli of each model, will hence give rise to alternative projective prepositions used to depict the same visual information (Levinson, 2003: 86-88). When identifying the location of the figure relative to the ground, the axes set up by one's body can be applied onto the ground. In this case, the speaker's left-right axis is imposed onto the ground (Shusterman and Li, 2016a: 117). Levinson calls this pattern the *translation* model, when the egocentric axes are translated onto the ground (Levinson, 2003: 85). The direction in which the observer's eyes are facing defines the front axis, and the back axis is opposed to the front one. The direction of the speaker's perceptual apparatus is the normal direction of movement (Herskovits, 1986: 156-57). The front direction is thus provided by the speaker's view direction, the right direction by the speaker's right, and so forth, yielding the order front-right-back-left in clockwise direction (Tenbrink and Kuhn, 2011: 5). Herskovits calls this oriented system the "canonical position", also designated through the "coincidence situation" (Herskovits, 1986: 158), pointing at some visual "basic order", as illustrated in Figure 1:

Figure 1 – The TRANSLATION model (Levinson, 2003: 88) or "canonical position" (Herskovits, 1986: 158).



- 14 In Figure 1, the observer's (or speaker's) posture contrasts with the situation Herskovits called the "encounter situation", also defined as the "canonical encounter" (Ibid.: 159), which points at some visual "mirror order". Figure 2 illustrates this model, in which the 'front' of the entity 'encountered' (in Herskovits's terms) faces the observer. The "encounter case" (Ibid.: 162) also echoes the *reflection* model defined by Levinson (Levinson, 2003: 86):

Figure 2 – The REFLECTION model (Levinson, 2003: 86) or “canonical encounter” (Herskovits, 1986: 159)

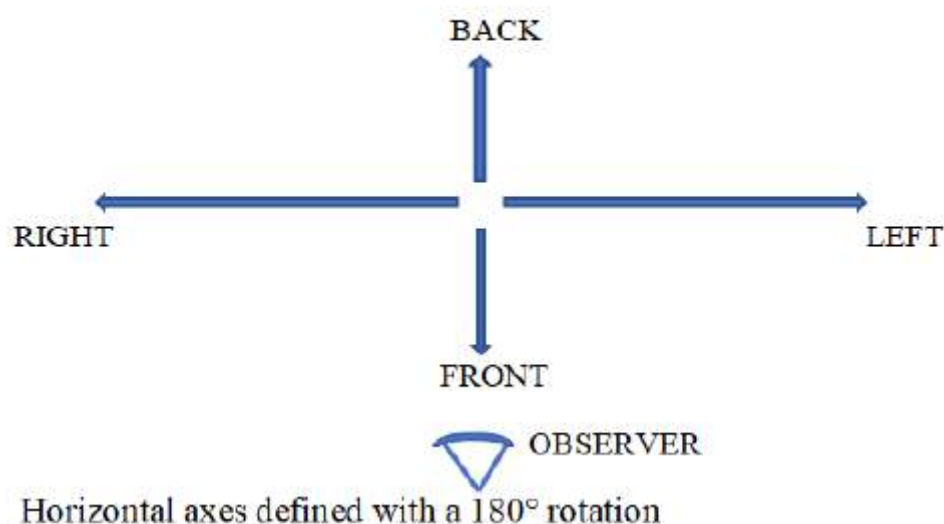


- 15 Figure 2 shows a most usual interaction between two people, namely the observer and Mary:

The most important property is that they will be facing each other a short distance apart. [...] In this situation, the speaker “combines” the point of view of the person encountered with his or her own. Thus, the axes are taken about Mary; *the front and back axes are those of Mary, pointing in directions opposite to those of the onlooker; but right and left axes have the same direction as the observer’s right and left, the opposite of Mary’s right and left* [we are underlining the text] (Herskovits, 1986: 159).

- 16 The reflection model displays the way the speaker’s coordinates are translated onto the ground with and without rotation: the front-back axis is involved with rotation, while rotation does not concern the left-right line. The reflection model hence reveals a mixed rotation system (Shusterman and Li, 2016a: 120).
- 17 Through the third subtype of the relative RF, namely the *rotation* model (Levinson, 2003: 87), the speaker’s egocentric axes are mapped onto the ground under a 180-degree rotation so that the speaker’s right is the listener’s left, if we imagine the listener as a person facing the speaker. The rotation model differs from the reflection pattern aforementioned, in the sense that the front-back axis is switched (cf. Figure 2), but the left-right axis is turned around as well⁵, as shown by Figure 3:

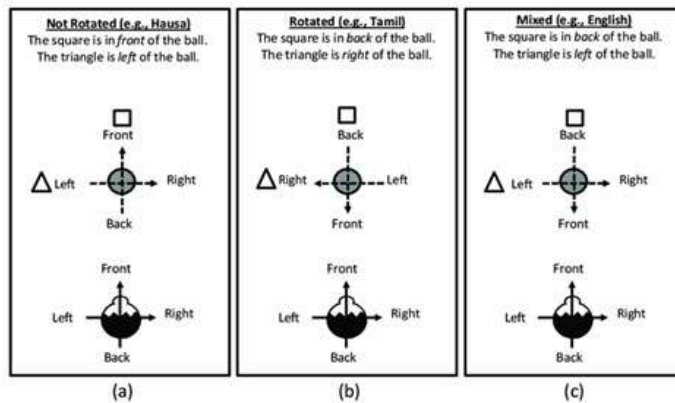
Figure 3 – The ROTATION model (Levinson, 2003: 87)



- 18 This model exemplifies a complex reflection of coordinates, which are shifted onto the entity encountered and then rotated, so that the ‘front’ of the entity faces the speaker, and the ‘right’ of the entity corresponds to the speaker’s left.

- 19 Not all languages have the relative RF, and hence relative expressions do not surface in all the world's languages (Shusterman and Li, 2016a: 119). When using the relative RF, some languages use the speakers' perspective in relating the figure to the ground, while others make use of the perspective of an imaginary listener facing the speaker to relate figure and ground (Shusterman and Li, 2016a: 119). These various instantiations can be seen in Hausa, Tamil, and English when these languages locate a figure relative to a non-fronted object, namely an object that has no front, such as a ball, as illustrated in Figure 4:

Figure 4 – Rotation in Hausa, Tamil, and English (Shusterman and Li, 2016: 120).



Relative languages develop conventions to resolve ambiguities. Languages may differ in whether the coordinates of the speaker are translated onto the ground object with (b) or without (a) rotation. Sometimes, rotation varies across axes within a language (c).

- 20 In Hausa, the coordinate system of the speaker is projected onto the ball to determine front-back and left-right through the translation model. In Tamil, the coordinate system of the speaker is rotated onto the ball so that the front-back and left-right relation corresponds to the perspective of someone imaginary (some imaginary person) facing the speaker. In English, determining left-right conforms to the translation model like in Hausa (cf. (a)), but defining front-back corresponds to a rotation system like in Tamil (cf. (b)). This model (cf. (c)) echoes the “reflection model” displayed in Figure 2. Through this model, the ground is represented by a non-fronted item (e.g. a ball). The present paper does not question the models defined in the three languages. According to Figure 4, English speakers stick to their egocentric coordinates when locating a non-fronted object along the left-right axis. In comparison to this model, the next section explores the way English users locate the ground represented by an animate, fronted entity along the left-right line, to see if English speakers also stick to their egocentric axes with animate entities that inherently display left and right sides.
- 21 Animate, fronted entities functioning as the ground will give rise to a twofold analysis: a first description task investigates the way animate items are identified through projective prepositions. A second descriptive task studies the way human entities are depicted through projective prepositions. Animate and human entities are both fronted items, inherently displaying left and right sides. The aim of the experiment is hence to see whether English speakers hold on their coordinates or not with animate items. Secondly, the task consists in observing whether there is some difference between animate items and human items. The descriptive tasks will provide clues about the potential significance of the human feature, which may influence speakers' spatial reasoning, when identifying human items through projective prepositions.

II. Exploratory investigation

II.1. Methodology of the experiment

II.1.1. Participants and instructions

- 22 The transcriptions display depictions delivered by 33 English-speaking participants. All of them are students, aged between 21 and 26. Among them, there are 18 female English-speaking language users: 8 of them are English, 2 of them are Irish, and 8 students are American. Among the 15 male English-speaking students examined, 10 of them are American and 5 students are English. All participants were interviewed during a period of time they spent in France. The experiment lasted 10 months: it started in January 2021 and ended in September 2021. Speakers were initially told that the descriptive task was a test for young children to avoid influencing the linguistic feedback expected⁶. As the experiment is divided into two sub-experiments⁷ composed of two description tasks carried out one after the other, the first depictive work lasted between five and ten minutes with each participant⁸.
- 23 Speakers are asked to describe the combination of two entities located in a photograph⁹: in the first pair of entities, an inanimate entity represented by flowers is next to a human character that faces the observer. In the second combination of items, the same inanimate entity (i.e. the flowers) is next to a rabbit that stands for the animate entity. The animal also faces the speaker, as shown by Picture 1¹⁰ below. The same instruction is given to all participants: *Can you describe the location of the entities included in both pairs of items in the picture?*¹¹

Picture 1 – Combination of animate and inanimate entities along the left-right axis



II.1.2. Setting and requirements

- 24 Each participant sits in a room with an individual showing him or her the slide the description is based on, on a computer screen. The experiment is processed by the same individual, in the same room with all speakers. Participants discover the slide once they are given the instruction aforementioned, so that they cannot think about the picture before depicting it. They hence describe it spontaneously, with nothing particular to disturb them, and the person in charge of the investigation sits in front of them during the experiment. On the basis of the 33 depictions collected, each clause

concerning the description of the entities considered are singled out. To examine the way (i) the human character and (ii) the animate entity used as grounds are identified through projective prepositions, the following requirements are applied for each clause:

- 25 - The clauses examined identify the inanimate entity (i.e. the flowers) functioning as the figure, relative to (i) the human character or the (ii) animate entity (i.e. the rabbit) functioning as the ground.
- 26 - Each clause analysed displays a projective preposition associated with the horizontal axis, signalling *left* or *right* directions. Herskovits established an inventory of projective prepositions related to the left-right axis (1986: 157):
 - {at/on/to/by} the (left/right) of
 - {at/on/in/to/by} the (left/right) {hand} side of
 - (right/left) of
- 27 This list includes a fundamental set of such prepositions, but there are others, e.g. *on one side*, *on the far side*, *at the extreme left*. Composites with *edge* are excluded, since they depend only on the geometry of the reference object, and not on a point of observation. The prepositions used by speakers to highlight the left-right axis are displayed in section II.3.
- 28 - The clauses examined correspond to the two word-orders mainly used by speakers:
 - There BE {x} PROJECTIVE PREPOSITION {y}, e.g.: *There are flowers to the left of the rabbit.*
 - {x} BE (+VB+-EN) PROJECTIVE PREPOSITION {y}, e.g.: *Flowers are (positioned) to the left of the rabbit.*
- 29 The 33 depictions collected contain 104 clauses reporting the position of the inanimate item relative to the animate entities. Among them, 28 clauses were left out: some did not conform to the word orders aforementioned, making the projective preposition used irrelevant to identify a potential rotation process. Some clauses did not describe the location of the entities in the environment and revealed, instead, assessments that were not significant to our study (e.g. *The man looks old*). The clauses disclosing speakers' confusion of left and right were also left out, as the analysis precisely focuses on the spontaneous linguistic choice between left and right: occurrences specifically corrected by the speaker himself at a later point in the dialogue were considered irrelevant, and were hence left out (e.g. *There are flowers to the left of the man, sorry to the right of the man*). Indeed, speakers' confusion between left and right compromises the accuracy of the participants' natural, linguistic choice. Therefore, uncertain answers were left out. Finally, the clauses without projective prepositions were rejected (e.g. *There's a bunny and a man*). After removing 28 clauses filtered out through the conditions aforementioned, 19 other clauses were deleted when the projective preposition inserted in the clause was used in reference to the inanimate item, as in:

(1) There's a bunny on the right of the flowers. (M2)¹²

- 30 In (1), *on the right of* does not allow us to identify if there is rotation or not, as flowers correspond to a non-fronted item. As cases with the flowers used as the ground are irrelevant to our prepositional assessment, the 19 clauses corresponding to this model were removed, along with the other 28 instances aforementioned, on the basis of the initial 104 clauses. The analysis hence focuses on the 57 remaining clauses. Among them, 26 clauses represent the way the human character is identified through

projective prepositions, and 31 instances display the way the animate entity is accordingly determined.

II.2. Hypotheses related to the left-right axis

- 31 Distinguishing right from left presents difficulties, as underlined by Fillmore (1971): “There are no simpler concepts in terms of which the notions ‘left’ and ‘right’ can be explicated” (in Herskovits, 1986: 158). Levinson notes that the use of the terms ‘left’ and ‘right’ is often ambiguous in a spatial, ternary relation structured though the relative RF with projective prepositions. Piaget correctly predicted that the ternary relation should be hard for children to learn, and that the full ‘left’/ ‘right’ uses may not be fully acquired until late childhood (Piaget and Inhelder, 1956). The complexity of these terms is such that the correct analysis of the ‘left/right’ system is still, despite considerable work, quite unclear (Levinson, 2003: 84). Levinson specifies that, when seeing a tree, we assimilate it to the “canonical encounter” (cf. Figure 2), defining the ‘front’ of the tree towards us. But he notes that we fail to make the rotation¹³ of ‘left’ and ‘right’ because that is too conceptually complex¹⁴.

Clark suggests this failure to reverse can be attributed to the symmetry of the left and right directions: indeed, this symmetry makes the left/right distinctions hard to learn and even linguistically proficient adults often confuse the two. The difficulty would probably be overwhelming if, besides drawing the distinction correctly on themselves, speakers and hearers had to reverse right and left ((Clarks, 1973) in Herskovits, 1986: 159).

- 32 Assigning left and right sides hence reveals a complex, cognitive process having its roots in perception. These locative strategies are progressively acquired in childhood through perceptive stimuli (Shusterman and Li, 2016b), before being mastered through prepositional use at a linguistic level (Levinson, 2003).
- 33 In the present experiment, the description task allows us to examine if speakers refer to animate and human items used as grounds from their own point of observation – locating the left-right axis with respect to theirs, without rotation – or if they map their coordinate system onto the ground when referring to it, implying rotation. Speakers use projective prepositions when locating inanimate figures and grounds (Levinson, 2003; Herskovits, 1986; Svorou, 1994). Therefore, animate or human grounds are presumed to be depicted through projective prepositions accordingly:

(2) There are flowers to the right of the man. (M5)

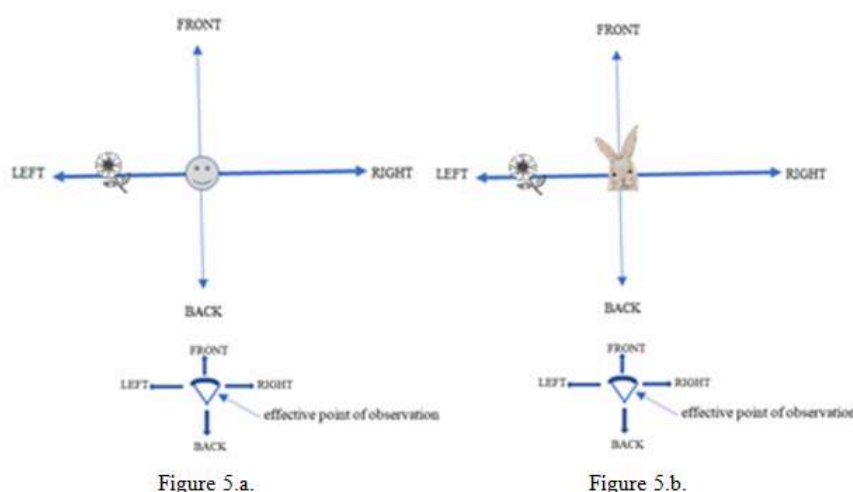
- 34 In (2), *to the right of* identifies the *flowers* relative to the inherent right of *the man*. The speaker hence maps his coordinates onto the ground, referring to the right of the man which corresponds to the speaker’s left. The preposition selected hence involves rotation, while speakers usually refer to grounds represented by a non-fronted object without rotation. We hence wonder whether animate and human entities may influence speakers’ locative perception, and accordingly bias their prepositional choice to locate such items, as exemplified in (2). The animate feature examined displays a dual inquiry, as participants are asked to identify the inanimate item (i.e. the flowers) relative to (i) a human character and to (ii) an animal. The human vs. non-human feature may potentially influence speakers’ perceptive mechanisms and represent a significant factor in the location event.

- 35 In the combinations of entities in the picture, animate items are presumed to be represented by the ground element, following Talmy's definition of figures and grounds: there are certain characteristics that render one entity more suitable for functioning as ground or another entity as figure (Talmy, 2000b: 315). Such characteristics can be considered the "associated characteristics" (following Talmy's terms) of figure and ground that involve both entities with definitional properties: the figure usually corresponds to smaller and more movable entities than the ground. The figure is geometrically simpler in its treatment and it is less immediately perceivable and more dependent than the ground. Conversely, the ground is larger, geometrically more complex, more immediately perceivable and more independent than the figure (ibid.: 312-316). On the basis of these properties applied to figure and ground, the animate (human vs. non-human) entities inherently displaying left and right sides in the picture are likely to function as the ground, in comparison to the inanimate entity they are associated with: the flowers. The data will display speakers' selection of the entities identified as figures and grounds.

II.3. The human character as the ground along the left-right axis

- 36 In the first pair of entities in Picture 1, the human character stands next to the flowers and participants usually refer to him through *the man* or *the farmer*, while the inanimate entity simply corresponds to *flowers*. In the second combination of entities, the animate item is lexically identified as *the rabbit*, *the animal* or *the bunny*. There is no lexical change for the reference of the *flowers*. In the clauses examined, flowers are used as the figure element and both animate entities (i.e. the man and the rabbit) correspond to the ground. Speakers use their own point of observation (i.e., their visual field) to describe the figure/ground relation, which seems natural in a descriptive task (Tenbrink and Kuhn, 2011: 6). In this case, the flowers are located on the left of both animate entities, which does not involve rotation, as shown by Figure 5:

Figure 5 – Translation of the speaker's coordinates onto the ground (the man/the rabbit) without rotation

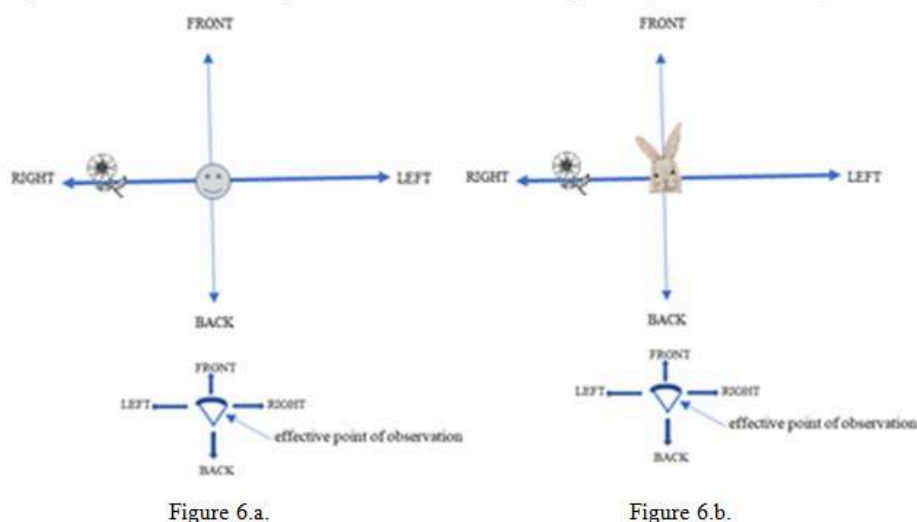


- 37 Figure 5 displays the 'effective point of observation' (Herskovits, 1986: 160) of the speaker, based on his coordinates, while the front-back and left-right axes including animate and inanimate entities represent the visual field of the speaker. The left-right arrow in bold constitutes the axis examined, showing the human character (cf. Figure

5.a.) and the rabbit (cf. Figure 5.b.) used as grounds. Figure 5 implies that speakers stick to their egocentric axes to describe the figure relative to the ground without rotation.

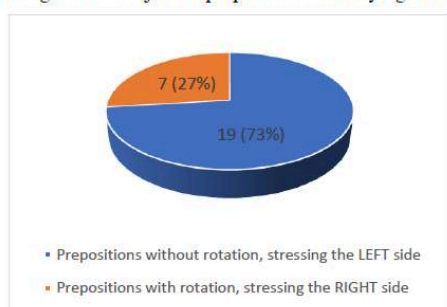
- 38 Conversely, Figure 6 displays the point of observation of the speaker with his coordinates, while the front-back and left-right lines including animate and inanimate items highlight the RF, through which items are perceived, if the speaker maps his coordinate system onto the grounds to refer to them: it hence implies rotation. In this case, flowers are located on the right of both animate entities:

Figure 6 – Translation of the speaker's coordinates onto the ground (the man/the rabbit) with rotation



- 39 Diagram 1 highlights prepositional data pertaining to speakers' description of the first pair of items (cf. Figure 5.a./ Figure 6.a.), namely the human character and the flowers along the left-right axis. The 26 clauses of the first descriptive task include projective prepositions identifying the human character as the ground. Diagram 1 displays the use of prepositions implying rotation or not:

Diagram 1 – Projective prepositions identifying a human character along the left-right axis, with or without rotation



- 40 While prepositions highlighting the left side are inserted in clauses that are not involved with rotation, prepositional units underlining the right axis imply linguistic rotation. Table 1 shows the projective prepositions used to refer to both sides, with a human character as the ground:

Table 1 – Projective prepositions used along the left-right axis with a human character as the ground

LEFT-RIGHT AXIS	PREPOSITIONS USED	FIGURES
LEFT side	<i>To the left of</i>	12
	<i>On the left of</i>	5
	<i>At the left of</i>	2
RIGHT side	<i>To the right of</i>	4
	<i>On the right of</i>	2
	<i>In the right of</i>	1

- 41 The prepositions used actually echo the list of projective prepositions displayed by Herskovits (1986: 157)¹⁵. It may be underlined that no correlation has been observed between the way the ground is lexicalized (*farmer, man, etc.*) and the way location is expressed, namely with or without rotation.
- 42 Among the clauses, 73% of them are not implied with rotation against 27% of them involved with it, which shows that most speakers use the translation model (cf. Figure 1) to point at the visual scene through prepositions:

(3) There are flowers to the left of the farmer. (F3)

- 43 In (3), *to the left of* is not involved with rotation, and the speaker does not map his coordinates onto the human character (cf. Figure 5). And yet, 27% of occurrences refer to the human entity with rotation, switching their egocentric axes onto the human item to identify the position of the flowers relative to the man (cf. Figure 6):

(4) There are flowers to the right of the old man. (M4)

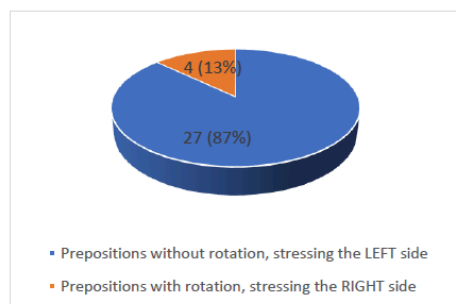
- 44 In (4), *to the right of* partly confirms Herskovits's remark on human entities functioning as the ground: when the reference object is a person, the effective point of observation is chosen to correspond to that person (Herskovits, 1986: 165). This outcome also echoes Levinson's comment about speakers facing a person: he notes that we fail to make the rotation of 'left' and 'right' through prepositions because this is conceptually too complex (Levinson, 2003: 84). Instance (4) hence gives rise to split comments on the selection of the projective preposition used to relate to the left-right axis.
- 45 Several studies highlighted ambiguous cases concerning the selection of prepositions related to left and right references (Herskovits, 1986; Svorou, 1994; Shusterman and Li, 2016a). Spatial reasoning plays a role in speakers' perceptual mechanisms and in their representations of spatial expressions (Herskovits, 1986: 193). Selecting spatial terms can be complex: it involves consideration of aspects of the context, the linguistic and situational purpose of communication. Diagram 1 shows how language is implicit and how shared tacit knowledge and aspects of perceptual system inform what is being expressed through spatial expressions (Ibid.: 194). The 27% of instances displaying speakers' rotated reference of the position of flowers relative to the character imply that speakers seem to extensively rely on their addressees to make assumptions similar to their own. A speaker tends to lean as much on the other's rationality, similarity of perception and experience, as on conventional properties of linguistic forms (Ibid.: 192).

II.4. The animate entity as the ground along the left-right axis

II.4.1. Data

- 46 Diagram 2 displays prepositional data pertaining to speakers' description of the second pair of items (cf. Figure 5.b. / Figure 6.b.): the rabbit and the flowers along the left-right axis. The 31 clauses of this second descriptive task are inserted with projective prepositions identifying the animate entity as the ground. Diagram 2 highlights the use of prepositions implying rotation or not:

Diagram 2 – Projective prepositions identifying an animate entity along the left-right axis, with or without rotation



- 47 The clauses that are not involved with rotation emphasize the left side, while prepositions highlighting the right side reveal linguistic rotation. Table 2 points out the projective prepositions chosen to refer to both sides, with the rabbit as the ground:

Table 2 – Projective prepositions used along the left-right axis with an animate entity as the ground

LEFT-RIGHT AXIS	PREPOSITIONS USED	FIGURES
LEFT side	<i>To the left of</i>	18
	<i>On the left of</i>	7
	<i>At the left of</i>	2
RIGHT side	<i>To the right of</i>	3
	<i>On the right of</i>	1

- 48 The prepositions selected correspond to the list of projective prepositions presented by Herskovits (1986: 157). Here again, no correlation has been observed between the way the ground is lexicalized (*bunny*, *rabbit*, etc.) and the way location is revealed, i.e. with or without rotation. Rotation occurs with 13% of occurrences against 87% of cases without rotation. Diagram 2 implies that a majority of animate entities (87%) are depicted through the translation model (cf. Figure 1), without rotation:

(5) And there are flowers to the left of the bunny. (F8)

- 49 When the observer is the speaker, left and right are defined by the way the speaker is looking (ibid.: 170), which corresponds to the 'coincidence (or 'prototype') situation' (cf. Figure 1). This scenario echoes the contextual and pragmatic conditions of the present experiment. And yet, a minority of cases refer to linguistic rotation, with 13% of occurrences, as in:

(6) There are flowers to the right of the rabbit. (F11)

- 50 Instance (6) linguistically displays complex reflection of the speaker's coordinates onto the rabbit, which functions as the ground (cf. Figure 6.b.). The point of observation

stems from the mapping operation of the speaker's egocentric axes onto the animal. The mapping is here operated through the front-back line, flipping over the left-right axis as well, since *to the right of* evidences that the speaker linguistically goes through left-right rotation.

II.4.2. Discussion

- 51 Diagrams 1 and 2 reveal that speakers' coordinate system is mostly being projected onto the ground to determine left-right through projective prepositions. Nevertheless, the two sub-experiments evidence that this pattern is not exclusive with animate, fronted entities, contrary to the existing model with non-fronted items (cf. Figure 4). Indeed, in both descriptive tasks, a minority of cases reveal speakers' coordinate system as being rotated onto the ground, making the left-right axis apprehended through projective prepositions from the perspective of some imaginary person facing the speaker. The data resulting from Diagrams 1 and 2 leave questions unanswered concerning the human feature distinguishing both animate entities examined: more participants tend to go through rotation when the human character functions as the ground (cf. 27%), compared to the cases displaying the animal as the ground (cf. 13%). This outcome implies that rotation seems to be more spontaneous when a human character stands for the ground, which may be interpreted as a natural reaction (Herskovits, 1986: 168).
- 52 This minor difference between the way speakers refer to the ground, alternatively represented by a human character or by an animal could be explained by the age-span of the speakers interviewed. People belonging to some other age-span could potentially confirm or infirm the outcome collected, but the quantitative tendency here observed does not allow us to reveal if speakers make a significant difference when the ground is represented by a human or a non-human entity. The present data give us some clues that could be worked through with similar descriptive tasks, organized in identical conditions with more speakers interviewed. The human/non-human feature is further explored in the next section, which investigates the way rotation is linguistically processed when speakers identify human and non-human items along the front-back axis.

III. Data related to the front-back axis

III.1. Methodology of the experiment

III.1.1. Participants and instructions

- 53 The reports examined display descriptions delivered by the same English-speaking participants solicited for the previous work. This description task is carried out in analogous, experimental conditions, as developed later on. Speakers are asked to describe the identical pairs of animate and inanimate entities scattered in the picture used in the first work. In the present spatial framework, the flowers are in the background of the picture while the human character and the rabbit stand in the foreground, facing the speaker, as shown by Picture 2¹⁶. Participants are given the following instruction: *Can you describe the location of the entities included in both pairs of items in the picture?*

Picture 2 – combination of animate and inanimate entities along the front-back axis



III.1.2. Setting and requirements

- 54 Compared to the first sub-experiment, each participant sits in the same room with the individual of the first experiment making him or her discover the slide meant for the second description on a computer screen. Speakers are given the instruction when visually identifying the slide not to anticipate their linguistic cues before depicting the items in the photograph. They hence describe the entities at issue as spontaneously as in the first sub-experiment. The individual in charge of the investigation sits in front of the student interviewed during the depiction task. On the basis of the 33 depictions, every clause reporting the entities considered are singled out. To examine the way projective prepositions identify the human item and the animate entity functioning as the ground, the following requirements are applied for each clause:
- 55 - The clauses worked on describe the location of the inanimate entity (the flowers) used as the figure element, relative to (i) the human character or (ii) the rabbit, used as the ground element.
- 56 - Each clause examined displays a projective preposition associated with the horizontal axis indicating *front* or *back* directions. Herskovits constituted a list of projective prepositions pertaining to the front-back axis (1986: 157):
- {at/on/in/to/by} the (front/back/side) of
 - in (front/back) of
 - before/behind
- 57 Some other prepositions may be included, such as *toward the back*.
- 58 - The clauses examined correspond to the two word-orders mainly used by speakers:
- There BE {x} PROJECTIVE PREPOSITION {y}, e.g.: *There are flowers behind the rabbit.*
 - {x} BE (+VB+-EN) PROJECTIVE PREPOSITION {y}, e.g.: *Flowers are in front of the rabbit.*
- 59 The 33 depictions collected display 91 clauses identifying the flowers relative to the location of both animate entities. Among them, 25 clauses were left out for the following reasons: occurrences did not conform to the word order selected. Some instances revealed insignificant assessments to our study (e.g. *Flowers are too far*), while occurrences identified figures and grounds without projective prepositions (e.g. *There's a man in a field*). Among the remaining clauses, 15 of them were deleted when the projective preposition referred to the inanimate unit functioning as the ground:

(7) There's a bunny in front of the flowers. (F13)

- 60 In (7), *In front of* does not allow us to identify whether rotation is involved with the point of observation of the speaker, since flowers are non-fronted. The 15 clauses corresponding to this pattern were removed, along with the other 25 instances aforementioned, on the basis of the initial 91 clauses. The analysis hence focuses on the 51 remaining occurrences. Each clause related to the position of animate entities along the front-back axis is singled out: 29 occurrences display the locative reference of the human character and 22 clauses refer to the location of the rabbit.

III.2. Hypotheses

- 61 The present section stresses the use of projective prepositions when they localise entities along the front-back axis, involving rotation or not. English goes through a 180-degree rotation to position non-fronted objects along the front-back line, so that the front and the back correspond to a rotation system like in Tamil (cf. Figure 4). In this respect, speakers' egocentric axes are translated under rotation (cf. Figure 3) or reflection (cf. Figure 2) onto the ground (Levinson, 2003: 85). We here wonder whether animate entities with inherent front and back sides may influence speakers' perceptive system. We may question whether their perceptual representations is echoed in their prepositional representations through their choice of projective prepositions.
- 62 Two options may be considered: speakers may map their coordinate system onto the animate ground to describe its spatial reference – hence implying rotation; or participants may stick to their egocentric axes to depict the animate ground without rotation. The two options offered by prepositions to identify the front-back axis of animate entities are made possible through the viewing experience, which allows human beings to specify a reference frame (Herskovits, 1986: 156) and highlight some perspective choice (Tenbrink and Kuhn, 2011: 1). The viewing experience may define the front of the entities scattered in the picture by means of the main access: it is as if the observer “encountered” the space offered to his visual field (Herskovits, 1986: 165). This situation is called the “encounter case”. The point of observation horizontally displays two options: either it represents the ‘encounter case’ (cf. Figure 2), or it embodies the ‘coincidence case’ (cf. Figure 1) (Ibid.: 165). The “encounter case” correlates with the reflection or the rotation models (cf. Figure 2 and 3), while the “coincidence case” echoes the translation model (cf. Figure 1).
- 63 In the second description task, if the speaker sticks to the English identification of a non-fronted object along a front-back axis (cf. Figure 4), the ‘front’ of the animate entity considered should correlate with the entity appearing in the foreground, and hence coincide with the front of the human character. Accordingly, the ‘back’ of the human entity should accord with the character's part that is invisible to the visual perception of the speaker. The inanimate entity located in the background of the picture (i.e. the flowers) should hence be identified in a backward position, relative to the animate items. The human vs. non-human feature of both animate entities could represent a significant factor influencing the prepositional choice to locate the inanimate item relative to the animate units.

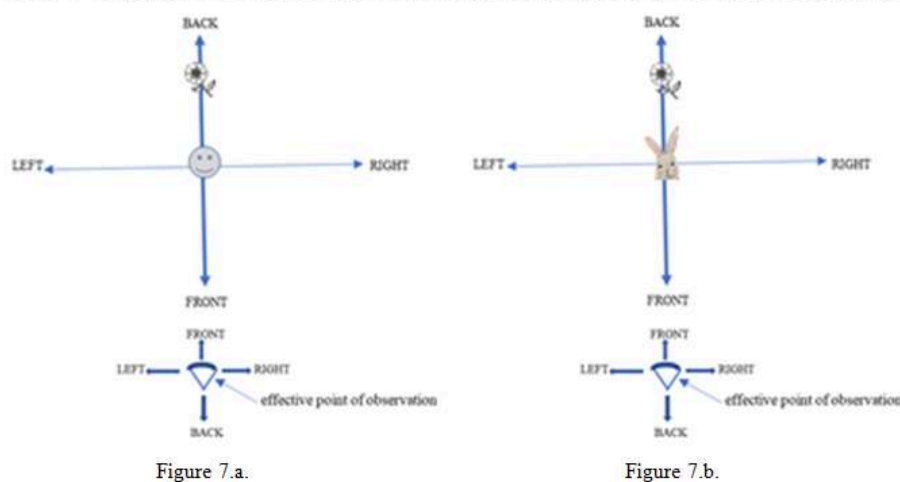
III.3. The human character as the ground along the front-back axis

- 64 Prepositional references involving a backward direction to position the flowers relative to the human character imply that speakers go through rotation, as in (8):

(8) And there are flowers behind the man. (M12)

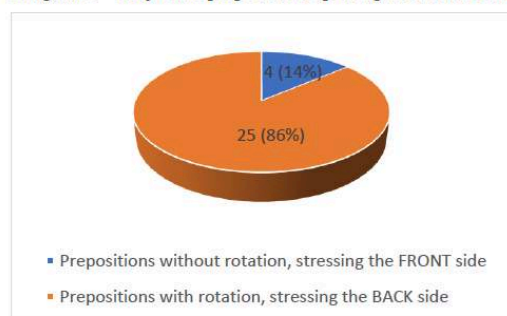
- 65 Indeed, the human character clearly faces the speaker, with the flowers located in the background of the picture. In (8), the projective preposition *behind* identifies the *flowers* relative to *the man* with rotation, as illustrated in Figure 7:

Figure 7 – Translation of the speaker's coordinate system onto the ground (the man/the rabbit) with rotation



- 66 Figure 7 displays the point of observation of the speaker, based on his coordinates, while the front-back and left-right axes including animate vs. inanimate entities represent what visually faces the speaker. The front-back arrow in bold constitutes the axis examined, with the character (cf. Figure 7.a.) and the rabbit (cf. Figure 7.b.) functioning as the ground. Figure 7 reveals the 'encounter situation', in which the front-back axis corresponds to the opposite of the speaker's (Herskovits, 1986: 159).
- 67 Diagram 3 displays the prepositional data pertaining to speakers' description of the inanimate entity relative to the human character along the front-back axis.

Diagram 3 – Projective prepositions spotting the human character along the front-back axis with or without rotation



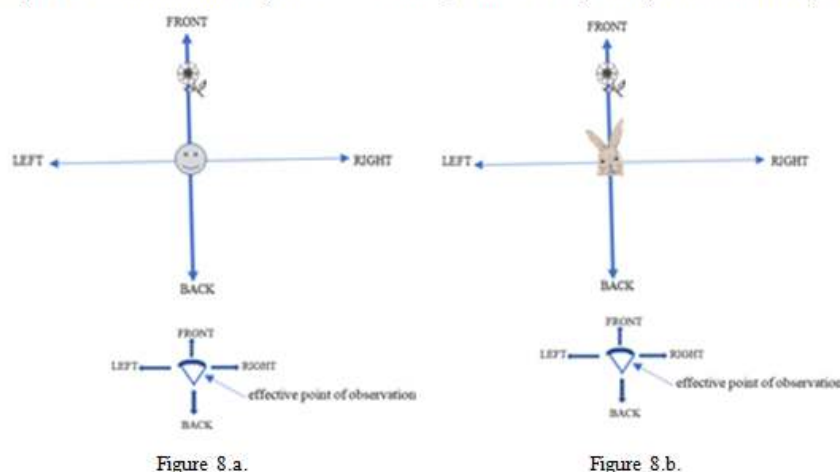
- 68 Prepositions underlining the back side imply linguistic rotation (cf. Figure 7), while those revealing the front side do not imply rotation (cf. Figure 8 below). Table 3 displays the projective prepositions used to refer to the front-back axis:

Table 3 – Projective prepositions used along the front-back axis with a human character as the ground

FRONT-BACK LINE	PREPOSITIONS USED	FIGURES
FRONT side	<i>To the front of</i>	2
	<i>In front of</i>	2
BACK side	<i>Behind</i>	20
	<i>In the back of</i>	5

- 69 In Table 3, prepositional units exemplify the projective prepositions provided by Herskovits (1986: 157). Diagram 3 is based on the analysis of 29 clauses with projective prepositions: 86% of them reveal rotation, which mainly illustrates the ‘encounter situation’. Conversely, 14% of occurrences reveal the ‘coincidence situation’, without rotation, as shown in Figure 8:

Figure 8 – Translation of the speaker’s coordinate system onto the ground (the man/the rabbit) without rotation



- 70 Figure 8 implies that the speaker sticks to his egocentric axes to describe the figure relative to the ground, i.e. the rabbit and the human character. The translation of the speaker’s coordinates onto the ground is exemplified as follows:

(9) Flowers are in front of the man. (F1)

- 71 In (9), *in front of* does not involve rotation. Through this prepositional reference, speakers ignore the front and back sides of *the man*, whereas the human character clearly highlights inherent front and back sides on the picture. In this respect, Herskovits remarks that speakers sometimes ignore the privileged directions of physical entities. Privileged directions echo inherent features of items which are defined by their natural front and back sides (Ibid.: 173). Herskovits refers to physical items but clause (9) seems to imply that privileged, natural directions of animate entities may be ignored as well.
- 72 Consequently, if the present model describing the location of a human ground along the front-back line reveals similarity with the location of non-fronted objects (cf. Figure 4) along the front-back axis, the present work implies that results pertaining to a human entity are not exclusive: in both models (with non-fronted vs. fronted, human entities), projective prepositions signal that rotation is mostly involved, and yet, the model here examined reveals that 14% of speakers do not resort to rotation. This minority may give rise to several hypotheses: first, the present result may be associated with the age-span of the participants interviewed. Similar experiments with elder

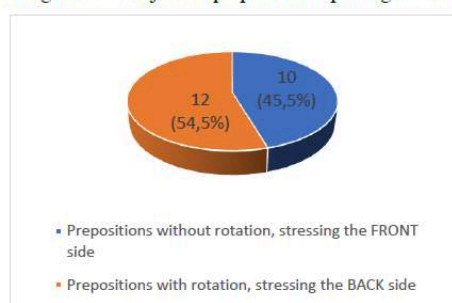
people may provide additional information on the tendency here observed. This outcome may also be due to the small number of participants interviewed: more speakers examined would hence be likely to confirm or infirm the tendency here observed, as the present result displays limitations as far as generalisations are concerned.

III.4. The animate entity as the ground along the front-back axis

III.4.1. Data

- 73 The present section emphasizes the projective prepositions used to locate an animate entity functioning as the ground along the front-back line. The front and back sides of the entity may be identified by speakers, as the rabbit's head and eye are distinctly visible in the foreground of the photograph. If prepositional references identify flowers in a backward position relative to the animal, it implies that rotation is involved (cf. Figure 7) in speakers' visual apprehension of the scene. Conversely, if flowers are positioned in front of the rabbit, prepositions do not highlight rotation (cf. Figure 8). Diagram 4 displays data of prepositional uses referring to the rabbit functioning as the ground:

Diagram 4 – Projective prepositions spotting the animate entity along the front-back axis with or without rotation



- 74 Prepositions referring to the back side imply linguistic rotation (cf. Figure 8), and those emphasizing the front side are not involved with rotation (cf. Figure 7). Table 4 reveals the projective prepositions used to point at the front-back axis:

Table 4 – Projective prepositions used along the front-back axis with an animate entity as the ground

FRONT-BACK LINE	PREPOSITIONS USED	FIGURES
FRONT side	<i>To the front of</i>	4
	<i>In front of</i>	4
	<i>At the front of</i>	2
BACK side	<i>Behind</i>	12

- 75 Diagram 4 is based on the analysis of 22 clauses: 54,5% of them are involved with rotation, identifying the flowers behind the rabbit:

(10) Flowers are behind the bunny. (F14)

- 76 In (10), *behind* indicates that the egocentric axes of the speaker are mapped onto the ground, i.e. *the bunny*, hence assigning a backward position of the *flowers*, relative to the rabbit. This backward, prepositional reference of the flowers is found out in 54,5% of

cases. The data also display 45,5% of prepositions pointing the flowers *in front of* the rabbit through the ‘coincidence situation’ (cf. Figure 8):

(11) There are flowers in front of the bunny. (M7)

- 77 When locating flowers *in front of* the rabbit, speakers seem to ignore the front and back sides of the animal. The split results of Diagram 4 raise questions pertaining to speakers’ spatial, perceptive assumptions of the scene. Indeed, (10) and (11) highlight flexibility in the use of projective prepositions referring to the same visual information. Ambivalent usage of projective prepositions to depict visual stimuli reveals various aspects of perceptual proceeding in speakers’ spatial intuitions. The interaction of prepositions’ representations with the situational context, and speakers’ pragmatic knowledge tends to generate degrees of individual variation in the selection of projective prepositions (Herskovits, 1986: 191). Indeed, 45,5% of projective prepositions used without rotation imply that the entity functioning as the ground has no influence on a linguistic mapping of speakers’ coordinates to spot it. Besides, no correlation has been observed between the way the grounds are lexicalized (*farmer, man, etc./rabbit, bunny, etc.*) and the way location is expressed, namely with or without rotation.

III.4.2. Discussion

- 78 The use of projective prepositions identifying animate entities as the ground along the front-back line reveals that the English model involving rotation with non-fronted objects does not apply with animate items exclusively. A minority of cases in Diagram 3 (cf. 14%) and nearly half cases in Diagram 4 (cf. 45,5%) reveal that speakers tend to ignore the inherent front and back sides of fronted entities used as grounds, when spotting them along the front-back line. If some English tendency to ignore the front-back sides of animate units has been highlighted with the use of projective prepositions, this propensity seems to be rare when human entities are used as grounds. Indeed, speakers mostly resort to rotation when the human character functions as the ground (cf. 86%). But when the rabbit stands for the ground, the use of projective prepositions displays competing points of observation (cf. 54,5% with rotation and 45,5% without). The human feature hence seems to influence speakers’ point of observation. Accordingly, this factor displays a significant element on the prepositional choice to refer to both types of animate grounds. This observation echoes Hying’s comment, according to which the key feature with projective prepositions seems to pertain to the physical representations of the items prepositions refer to (Hying, 2007: 8): the type of entity considered seems to reveal a significant factor influencing the selection of projective prepositions (Ibid.: 9).

Conclusion

- 79 Animate entities used as grounds are identified through projective prepositions along horizontal axes with or without rotation. Two experiments allowed us to see whether rotation linguistically occurs or not when depicting human vs. non-human items, as compared to the existing model related to non-fronted items. Speakers mostly translate their coordinates onto the ground to locate animate items along the left-right axis, but this pattern is not exclusive with animate entities, compared to the model

with non-fronted items. Results raise questions related to the significance of the human feature dividing the entities used as grounds: rotation seems to be more spontaneous with a human entity symbolizing the ground, as compared to patterns in which the ground is embodied by an animate item. Additional, analogous experiments involving more speakers interviewed could confirm the tendency here observed.

- 80 Speakers seem to resort to rotation to identify entities along the front-back axis. This is evidenced when a human entity functions as the ground. But this model is not exclusive: a few instances reveal that the front and back sides of human entities may be ignored. In such cases, human entities are identified without rotation. This observation is enhanced when an animate entity is used as the ground: half prepositional references to animate grounds occurs with rotation, and the other half without rotation. This result implies that the front/back parts of animate entities are ignored by speakers who stick to their coordinates to depict the entity considered. Thus, the English model involving rotation with non-fronted items along the front-back line reveals a blended pattern with animate items. This outcome may even be different if speakers had to depict identical items while immersed in a genuine scene: we may presume that participants' references to left-right and front-back lines would be expressed differently, as they would be experienced differently.
- 81 A final outcome of the present work concerns the human feature which seems to represent a significant factor. The use of projective prepositions involving rotation seems to be more spontaneous with human entities used as grounds. As for animate items, prepositions present split results, which involve rotation or not. The descriptive tasks show that the way projective prepositions reveal rotation seems to depend on the type of entities considered, which makes perceptive models vary, hence influencing the selection of prepositions. The interaction of spatial knowledge and the linguistic representations of projective prepositions still remain superficially understood (Herskovits, 1986: 191). Approximations in spatial reasoning and inconsistency in speakers' intuitions give rise to various degrees of the use of projective prepositions, classified as ambiguous since speakers' concerns are not observables easily captured by definite parameters (Ibid.: 194).

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NOTES

1. These examples describe the location of the ball, the square, and the triangle represented in Figure 4 (c) [cf. I.3.].
2. The spatial nominal *front* is inserted in the complex preposition *in front of*. Complex prepositions including 'spatial' (Svorou, 1994) or 'projective' terms (Levinson, 2003; Herskovits (1986) (e.g. *front*, *left*, *right*, etc.) will be referred to as projective prepositions, following the terminology of Levinson (2003), Svorou (1994), and Herskovits (1986).
3. Some authors identify certain prepositional phrases (e.g. *in the front of*) as projective prepositions (Svorou, 1994; Levinson, 2003), when the selected phrases include a projective term: *The projective term included in 'projective preposition' defines a specific direction (e.g. right for the projective preposition to the right of (Hying, 2007: 1))*. In this paper, prepositional phrases including a projective term will be identified as "projective prepositions".
4. "Inherent features" refer to the way people normally use or interact with them (Herskovits, 1986: 168), which is partly a matter of convention (Levinson, 2003: 79).
5. This is not the case with the *reflection* model (cf. Figure 2).
6. To make sure each participant agreed to take part to the study, they had to fill and sign a form with their signature on it, once they were told about the linguistic objective of the experiment. They were told the experiment was meant for academic purposes on research on the English language at the University of Clermont Auvergne (UCA). None of them refused to take part to the project.
7. Section II deals with the left-right axis and section III focuses on the front-back line. Each section displays a sub-experiment (i.e. a descriptive task) displaying data associated to it.
8. The two sub-experiments took place in a single room at the University of Clermont Auvergne (UCA).

9. Picture 1 is free of rights: it was photographed by the author of the present paper in Châteaugay (63119).
 10. The symmetry giving rise to some visual alignment between both pair of items in the picture is intended. But the fact that the human faces “front left” and the rabbit “front right” is not on purpose.
 11. Participants were told that the children, for whom the experiment was meant, would not be asked similar, technical questions: instead, the young participants would be given simpler rephrased questions.
 12. Information in brackets refer to the male (M) or female identity (F) of the participant, followed by a figure indicating the order in which the speakers were interviewed. Each depiction corresponds to a number. In (1), the clause was uttered by the second male participant interviewed: M2.
 13. The rotation here discussed is different from *mental rotation*, as a form of mental imagery which consists in imagining the rotation of a body in absence of real movement (Pierpaoli *et al.*, 2020: 1).
 14. Children in fact learn to make the rotation to others’ lefts and rights by the age five or six, long before they master this mixed-up system (Levinson, 2003: 84).
 15. This analysis explores the way English treats the location of animate entities used as grounds. It hence examines the way rotation is dealt with through projective prepositions. But this work does not focus on the semantics of the prepositions selected, which will hence not be commented upon. This issue could represent some ulterior, singular analysis concerning the comparative uses of projective prepositions.
 16. Picture 2 is free of rights: it corresponds to the first picture displayed in II.1.1.
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ABSTRACTS

English uses the relative Reference Frame (RF) which includes the speaker’s viewpoint assigning directions to identify a Located Object (LO) and a Reference Object (RO). Projective prepositions express the position of the LO and the RO along the front-back and left-right axes: the speaker’s egocentric axes are either mapped onto the RO under a 180-degree rotation so that the speaker’s right is the listener’s left; or the speaker’s egocentric axes are translated onto the RO without rotation. When the RO is a non-fronted object (e.g. a ball), English refers to it without rotation along the left-right axis, but it depicts it with rotation along the front-back line. In comparison to this model, this paper explores the way English treats the location of a RO represented by animate and human entities. The use of projective prepositions to consider animate, fronted items used as RO is here examined through spoken corpora collected with English-speaking students, describing the position of such items with or without rotation.

L’anglais utilise le Cadre de Référence (CR) relatif qui inclut le point de vue du locuteur : celui-ci attribue des positions à un Objet Localisé (OL) et à un Objet de Référence (OR) pour les localiser. Les prépositions ‘projectives’ situent la localisation de l’OL et de l’OR le long des axes avant-arrière et gauche-droite : soit les axes égocentrés du locuteur sont projetés sur l’OR par une rotation à 180 degrés, auquel cas la droite du locuteur correspond à la gauche de l’interlocuteur ; soit les axes égocentrés du locuteur sont transposés sur l’OR sans rotation. Quand l’OR est dépourvu de toute direction (ex : une balle), l’anglais s’y réfère sans rotation le long de l’axe

gauche-droite, mais l'OR est décrit avec rotation sur l'axe avant-arrière. En comparaison à ce modèle, cette étude analyse la manière dont l'anglais localise l'OR représenté par une entité animée ou humaine. On examine ici l'emploi des prépositions projectives qui se réfèrent à ces entités dotées de directions faisant office d'OR, à partir de corpus oraux recueillis auprès d'étudiants anglophones, sommés de localiser ces entités, avec ou sans rotation.

INDEX

Mots-clés: Cadres de référence – préposition projectives – rotation – transfert – entités animées/humaines

Keywords: Reference frames – projective preposition – rotation – translation – human/animate entities

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