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Semantics of French Direct Transitive Motion Verbs

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1. Introduction

This paper deals with the semantics of French verbs capable of denoting a "motion event" when they enter into the *Direct Transitive Construction* (henceforth DTC) :

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|-----|--------------------|-------------|---------------------|
| (1) | NPLéon (Trajector) | Vtraverse | NPla rue (Landmark) |
| | 'Léon | is crossing | the street' |

As a starting point for our investigation, we use the list of verbs defined in the "lexique grammaire" perspective by Guillet & Leclère 1992. This list contains about a hundred verbs (like *passer* 'pass', *monter* 'climb up', *heurter* 'hit', *atteindre* 'reach'...) which can all express a motion event when appearing in the DTC. This does not entail that these verbs constitute a homogeneous lexical class of spatial verbs, as they may have different lexical properties. Indeed, the global interpretation of a process as a "motion event" does not always result from the semantics of the verb alone. The interaction with the properties of participants in the process also plays a determining role in the interpretation.

We present here a detailed analysis of the interaction between the semantics of verbs and their arguments. We introduce a distinction between two types of verbs which is based on their lexical properties and the kind of relation they establish with their direct objects. This leads us to investigate the problem of the articulation between syntactic and semantic transitivity : cognitively, it seems paradoxical to express motion (i.e. a perfectly continuous phenomenon) in a DTC which prototypically expresses a telic, discontinuous action where the subject (Agent) affects the object (Patient). We put forward criteria which make it possible to determine the assignment of the thematic roles Trajector and Landmark, rather than Agent and Patient, to the subject and the object of the transitive construction, respectively. The aim is to determine whether it is possible to classify the processes either as motion-events (which exploit the Trajector and Landmark roles) or as actions (which use Agent and Patient thematics).

In addition to its descriptive interest, this work on the semantics of French verbs raises several theoretical questions : Are cognitive patterns associated with the DTC ? Does this construction constrain event types? What kind of motion can be expressed by this construction? Is there any conflict between patient and landmark roles ? Are they exclusive roles, or do we need a structure of multi-layered representation to account for the coexistence of both interpretations ? From a lexicographic point of view, it is also worth asking whether these verbs are intrinsically spatial, and if not, what determines the interpretation of events they can describe as spatial events.

We begin with the description of the locative properties of verbs. To this purpose, we use the ontological definitions of the notions of "motion event" and "location" (section 2). We then present the hypothesis that led us to distinguish two strategies for expressing a motion event in the DTC (section 3). The resulting typology of verbs is laid out in section 4. In section 5, we draw conclusions concerning the correlation between localization aspect and transitivity.

2. Defining the Locative Properties of Verbs

Locative properties of verbs vary according to the relation with their object. It depends on the mode of

access to the spatial referent. Mechanisms underlying the establishment of such a relationship will be detailed here. We focus more specifically on the description of relations of dynamic localization.

2.1. *Ontology of Motion Event*

2.1.1. *Relational Description of Motion*

A motion event is conceptualized as a change in the relation of localization¹ of the entity to be located (the Trajector). Such a position allows us to avoid the systematic introduction of a reference location, at least it allows us to avoid the identification of the reference location (Landmark) with the referent of the direct object.

- (2) *Léon* *arpen* *le quartier*
 'Léon is pacing up and down the neighborhood '
- (3) *Léon* *suit* *un piéton/ la rivière*
 'Léon is following a pedestrian, the river '

In (2), the Trajector (*Léon*) sustains a relationship with the inside of the referent of *le quartier* "the neighborhood". The borders of this internal region correspond to the borders of the referent of *le quartier*. In this case, it is possible to assimilate the internal region to the referent of the direct object itself. However, this mapping of the space portion with the referent of the direct object is not systematic. In (3), we are dealing a relation of external localization. In this case, the referent of the direct object is not the reference location. This is indeed the conjunction of (i) the object referent configuration (its shape, its functional properties...) and (ii) the semantics of the verb which allows us to conceptualize the region which is the actual reference location.

Defining motion in relational terms amounts to not attributing the Landmark role in an automatic way to the direct object of the construction. Some verbs, such as verbs of distance (*suivre* "follow", *longer* "go along", *approcher* "approach", *fuir* "escape") can easily be described in terms of diminution, keeping or increasing the distance between two entities. There is no need to postulate artificial borders between, for instance, a zone of proximity and a zone faraway (cf. Asher & Sablayrolles 1995 describes a change of location from a zone "outer-halo" to a zone "outer-most"). The problem of this latter approach of the description of motion in terms of change of location (transition between spatial zones) is that it introduces discrete measurements in order to catch all phenomena, even scalar ones. In other words, it adds determinacy where languages remain underspecified. It extrapolates beyond the linguistic data introducing borders between zones that are not lexicalized and generates combinational anomalies between locative properties and aspectual properties². We therefore opt for a relational description of motion. That does not mean that we eliminate the notion of location, but instead of postulating it a priori, we will show (2.2) that this notion is partially built as the discourse is performed.

2.1.2. *Locative polarity of verbs*

The criterion of "locative polarity" is concerned with the identification of a phase of the event (initial (or source), median (or path), final (or goal) phases) during which we get some locative information.

We isolate the verbs introducing only one positive piece of information about the location of the Trajector. They are initial verbs (or source-verbs), median verbs (or path-verbs) or final verbs (goal-verbs).

¹ There is an additional case of motion event where there is no change of relation but a change of position inside a unique region, *i.e.* *arpen* *les rues* "to pace the streets", *parcourir les rues* "to wander (through) the streets", *parcourir les mers* "to sail the seas".

² Cf. Sarda 1999, (chap.3).

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|-----|-------------|-------------------|-------------------------------|
| (4) | <i>Léon</i> | <i>a atteint</i> | <i>le sommet</i> |
| | 'Léon | reached | the top' |
| (5) | <i>Léon</i> | <i>a quitté</i> | <i>la ville</i> |
| | 'Léon | left | the city' (he is out of town) |
| (6) | <i>Léon</i> | <i>a arpenté</i> | <i>la ville</i> |
| | 'Léon | paced up and down | the city' |

From (4), we infer only one piece of locative information, that *Léon* is at the top at the end of the event ; from (5), we only infer that *Léon* was in the city at the beginning of the event, and from (6) that he was in the city during the all event. Verbs like in (4) are then considered final verbs, those like in (5) initial verbs, and those like in (6) median verbs.

Besides this kind of verb (final, initial and median verbs), we isolated an other type, illustrated in (7), which introduces more than one piece of information about the location of the Trajector. *Traverser* 'cross' says something like "*go from one side to an other side of x*".

- (7) *Léon traverse la rivière (à la nage)*
'Léon is swimming across the river'

This type of verb has traditionally been classified as median, as it describes a process³ (cf. Guillet & Leclère 1992, Laur 1991, Asher & Sablayrolles 1995). However, from a locative point of view, such verbs have properties different from those of the classical median-type (ex. 5 above) : they imply a change of relationship with respect to two different regions (the two sides of the river in (6)). The following analysis aims to clarify the distinction between the latter kind of verb and the classical median-type. We present in section 2.2 an ontological classification of spatial entities. This will allow us to observe the selectional restrictions that each type of verb imposes on its direct object.

2.2. Ontology of spatial entities

Our analysis is based on the description of the relationship between the verb and its direct object (the V-O relation). The properties of the referent of the direct object play an important role in the interpretation of this relationship. As we will see in 2.3 below, the observation of the type of restrictions on the direct object will allow us to better understand the mechanisms of different relations of localization.

We used the ontological distinctions made, on the basis of a cross-linguistic study (French/Basque), between object-entities and location-entities (cf. Aurnague 1998). Two remarks are in order. First, this ontology is linguistically-based, it gives an account of the mode of being of entities in discourse. Unlike many works using the notion of location in a non linguistic and intuitive way, the studies by Aurnague (following Vandeloise 1988 and Svorou 1994) offer a linguistic definition of the notion of location. He has defined two levels of characterization of the type of entity :

- *The referential level*, which has to do with the properties of referents. At this level, object-entities are distinguished from location-entities⁴ :

- Type location : a material entity, fixed in a well-known frame of reference and with respect to which portions of space are defined (*Budapest, the sea, the river, the field, the city, Downtown...*).

- Type Object : a material entity, but no fixity and/or no portion of space are necessarily implied (*a tree, a paper, John, a lamp...*).

- *The discourse level*, which is based on the notion of specification : this notion has to do with the

³ That classification illustrates the confusion between aspectual and locative properties.

⁴ This characterization comes from a study of the genitive construction in Basque, expressing part-whole relations. Basque makes use of two different genitives *en* and *ko*. The former, called possessive genitive, expresses a relation of belonging, and the latter, called locative genitive, expresses the mere location of the part in the whole. These two genitives present a complex distribution which reveals the existence of an underlying categorization of entities (cf. Aurnague 1995, Aurnague 1998).

definiteness of NPs denoting the localizing entities and is crucial for the *function of localization* to apply. The function of localization is defined as follow by Vandeloise (1988) : it says that any entity can fulfill a function of localization when it determines A SPACE PORTION (REGION) WHOSE POSITION IS WELL-KNOWN IN A GIVEN FRAME OF REFERENCE. This definition rests on the notions of (i) fixity in a given frame of reference, and (ii) determination of a space portion within which the Trajector can be located. Vandeloise suggests the test of *être à* "be at" to decide whether an entity fulfills this function. If in the string NP0 *est à* NP1 (i.e. *nous sommes à Budapest* 'we are in Budapest') NP1 localizes NP0, then the function of localization is satisfied by NP1. The referential properties of the referent of NP1 are important but not sufficient for the function to apply. Indeed, there is no problem with NPs denoting entities of the type location like geographical proper nouns (8), but the test may not work with other location-type entities when appearing as indefinite or plural NPs (9). And it theoretically doesn't work when the NPs denote an object-type entity (10).

(8) *Léon est Toulouse/ à Budapest*
 'Léon is in Toulouse/ in Budapest'

(9) ??*Léon est à une ville/ ?Les enfants sont à une plage*
 'Léon is in a city' / 'The children are at a beach'

(10) **Léon est à un arbre/ *Léon est à l'arbre*
 'Léon is at a tree' / 'Léon is at the tree'

The notion of specification comes in at the discourse level, as an entity may switch from its initial type to another type (of specified location) according to the amount of information that is specified, according to a point of view. If it is possible to rebuild a frame of reference within which the position of the Trajector can be identified, then we are dealing with a new kind of complex entity functioning as "a specified location". In fact, any type of entity can become a specified location as long as it is sufficiently determined in discourse. Many tools are available to specify an NP (definite determiners, adjectives, relative clauses, noun complements). The type of the needed specification depends on the initial category of the entity. Even an object-type entity can function as a specified location when it appears in a definite description as in (11) which should be compared to (10) above.

(11) *Léon est à l'arbre où il retrouve son amie tous les soirs*
 'Léon is at the tree where he meets his girlfriend every night'.

Beside this kind of classical mechanism of specification, we pay special attention to an other type of marker of specification, namely Localization Nouns like *le haut* 'the top', *le côté* 'the side', which were studied in detail by Borillo (1988, 1992) and Aurnague (1991, 1996). We first focus on the fact that this type of marker makes any entity into a specified location when it combines with it (12)

(12) **Léon est à la table* vs. *Léon est au bord de la table*
 'Léon is at the table' vs. 'Léon is at the edge of the table'

 **Léon est à l'arbre* vs. *Léon est au pied de l'arbre*
 'Léon is at the tree' vs. 'Léon is at the foot of the tree'

NPs such *le bord de la table*, *le pied de l'arbre* can always fulfill a function of localization because they denote a portion of space whose position is always identifiable with respect to the entity as a whole. They belong to the specified location type.

2.3. Properties of Localization Nouns (LNs)

Aurnague (1996, 1998) claims that LNs undergo a systematic transformation consisting in the derivation from component-nouns (from an anthropomorphic, a zoomorphic or environmental source (cf. Svorou 1994)) : they pass from referential markers (*his foot is hurt*) to relational markers (*the ball is at the foot of*

the tree). As referential marker, the noun "foot" refers to a body part. As relational marker, it refers to a fuzzy region defined with respect to an entity of reference. In the exempla below, we can see that many words, which originally denote a body part, are grammaticalized in such a way that they can ultimately behave as a preposition (which can no longer be modified).

ex. *La côte > le côté > à côté de*
 Le pied > au pied de "the foot > at the foot of"
 Le dos > au dos de "the back > at the back of"

This process goes with the emergence of a space portion associated with the whole-entity, which allow us to explain the behavior of NP like [det + LN + of NP] as specified location type entity (cf. ex. *Il est au pied de l'arbre*).

We list here the main properties of the LNs defined with reference to the properties of the Component-nouns by Aurnague

- weak referential autonomy (compare *the front* to *the nose*)
- denoting portions of space which have :
 - no delimited border (compare *the top of the house* to *the roof of the house*)
 - no precise functionality (compare *the bottom* to *the handle of the basket*)
- reference to a variety of entities (*at the foot of the chair/ the tree/ the bed/ the lamp/ John* but **at the roof of the chair/ the tree/ the bed/ the lamp/ John*)
- organization in pairs of opposed localizations : i.e. they determine gradual (scalar) antonymies: *top* vs. *bottom*, *front* vs. *back*...

All these properties will be useful in order to better understand the mechanisms underlying the establishment of a relation of localization by the verbs we consider here (cf. 3.3).

3. Two strategies for expressing a motion event in the DTC

We now present the hypotheses that led us to distinguish two strategies for expressing a motion event in the DTC. In 3.1, we convey selectional restriction of verbs. In 3.2, we present the resulting distinction between two main categories of verbs. In 3.3, we state the hypotheses explaining this partition between these two categories of verbs.

3.1. Selectional restrictions

On the basis of the ontological distinctions introduced in section 2.2, we observed the selectional restrictions that the verbs impose on their objects. The restrictions taken into account are associated with the interpretation of the event as a motion event. Initial, median and final verbs seems to describe a motion event only when their objects denote an entity of type location :

- (13) a) *quitter* [_{location} *la ville,* *la maison...*
 'leave [_{location} *the city,* *the house⁵' .]*
- b) *quitter* [_{object} *son mari,* *son travail...*

⁵ Entities like *house* have actually been classified as 'mixed entities' by Aurnague, on the basis of the distribution of the two genitives in Basque. Indeed, such entities can take the possessive genitive and the locative genitive. They then behave as location-types as well as object-types. This property could be captured with the notion of facets (Cruse 1986), or the notion of complex types described in the system of qualia (Pustejovsky 1995), or by the pointed types (the dots) (Asher and Pustejovsky to appear). Vandeloise (1988) distinguished the spatial uses of the preposition *à* "at" from the routine uses which describe the activity performed in a place more than the mere localization in/at that place i.e. *être au piano*, *être à l'Université* can express a spatial localization but also the fact that we are playing the piano, or working at the University. This is the functional use of the preposition *à*.

'leave [object ones husband, ones job' ...]

In (13a), the spatial interpretation of the event is due to the presence of the location-type entity denoted by the direct object. We can indeed see that in (13b), where the NP object does not denote a location-type but an object-type entity, the event is not of a spatial kind. Properties of the object are crucial in determining the interpretation of the verb.

As for the other verbs, they seem to be insensitive to the type of entity denoted by their objects (14). They keep describing the same type of relation that can be conceptualized in the same way in many semantic fields, spatial, temporal or abstract :

- (14) a) *traverser* [location *la ville, la maison, la rivière, la rue...*]
cross [location the city, the house, the river, the street...]
- b) *traverser* [object *la fenêtre, la vitre, la paroi, la feuille...*]
go through/ across [object the window, the glass, the wall, the paper sheet]
- c) *traverser* [abstract entity *des difficultés, des problèmes, une période...*]
go through [abstract entity difficulties, problems, a happy period...]

Notice that this type of verb is insensitive to the type of entity denoted by its object, but it is also insensitive to the notion of specification. *Traverser une ville* ('pass through, cross a city') is as interpretable as *traverser la ville* ('pass through/ cross the city'), compared to *quitter une ville* which sounds odd and needs a specification, something like *quitter une ville déserte, une ville où rien ne se passe après 5h* ('leave a desert city, a city where nothing happens after 5pm').

3.2. Two main categories of verbs : referential vs. relational

From the preceding observations on selectional restrictions, we draw two categories of verbs that we call Referential vs. Relational verbs.

Referential verbs describe a motion event only when their object denotes a location-type entity. In other cases, they describe a different type of event depending on the type of entity denoted by their objects. The event denoted by *quitter son mari* 'leave ones husband' is not a spatial event to the extent that we have no configurational information concerning the location of the involved entities. The semantics of these verbs is underspecified from the spatial point of view, the interpretation of the process strongly depends on the type of entity denoted by the direct object.

Relational verbs are not constrained by selectional restrictions. They describe a kinetic relation between two landmarks first defined in relation to each other, that is, in the case of (14, cf. above), the two "sides" of the crossed entity (of course, the "sides" of an abstract entity like *difficulties* must be understood in an abstract way. But note that no metaphorical sense extension is needed here to explain such examples). Their lexical semantics implies spatial properties which can apply indifferently to different fields. From one use to another, the same relation of localization can apply.

3.3. Hypotheses

To explain the different behavior of these two types of verbs, we suggest the following hypotheses :

1. To express a spatial event, the verb has to establish a relation with respect to an entity capable of fulfilling the function of localization (i.e. an entity which defines a region fixed in a well-known frame of reference).

2. Relational verbs have incorporated semantic features of markers such as the Localization Nouns : When they apparently do not constrain the properties of the referent of the NP object, we suggest, on the basis of studies on grammaticalization, that this is due to the fact that these verbs incorporate the semantics of Localization Nouns. For example, the verb *monter* "climb (up)" seems to involve the semantics of a marker like *le haut* "the top". This would explain the fact that these verbs can combine with any entity because they actually establish a relationship not directly with the referent of the NP

object (i.e. *l'escalier* "the stairs" in *monter l'escalier* / "climb (up) the stairs"), but with part of it (or with an adjacent part of it), such as the one denoted by "*the top of NP object*" (i.e. *le haut de l'escalier* "the top of the stairs"). This new entity (denoted by the NP *the top of the stairs*), which is not lexicalized but can be inferred, does have properties of a location-type entity (i.e. it is a portion of space, well-situated in the frame of reference defined by the whole-entity, namely, the referent of the NP object).

3. The intrinsic kinetic properties of relational verbs are determined by the specific incorporated properties of the Localization Nouns : as we saw above (2.3), Localization Nouns are relational markers defined by pairs of opposed localizations : *the top* is defined with respect to *the bottom*, *the right* with respect to *the left*, *the inside* with respect to *the outside*, *the front* with respect to *the back*...

This entails that, at a basic level of description (the more abstract one), it is possible to describe motion only in relational terms by using the semantic features of the Localization Nouns which form part of the semantics of this kind of verb (see Muller & Sarda 1999 for a formalization).

4. Typology of verbs

On the basis of a descriptive study of more than 90 French verbs, we put forward two verb categories which define general expression patterns of motion in the DTC. The first category contains referential verbs such as *arpenter* "pace", *quitter* "leave", *atteindre* "reach", *heurter* "hit". The second category contains relational verbs such as *traverser* "cross", *monter* "climb", *suivre* "follow", *longer* "go along"... The table below sums up these distinctions and introduces several refinements in the typology, according to the type of relationship involved by the semantics of the verbs.

Relational verbs				Referential verbs		
distance verbs	orientation verbs	passage verbs	path or median verbs	neutral Verbs		Contact verbs
				Source or initial verbs	Goal or final verbs	
approcher <i>approach</i> fuir <i>flee</i> suivre <i>follow</i> distancer <i>distance</i> poursuivre <i>chase</i>	monter grimper escalader <i>climb</i> gravir <i>? ascend</i> descendre <i>go down</i>	traverser <i>cross</i> sauter <i>jump</i> franchir passer <i>pass</i>	arpenter <i>pace</i> sillonner <i>?</i> parcourir <i>?</i> explorer <i>explore</i> balayer <i>sweep</i>	quitter <i>leave</i> abandonner <i>abandon</i> deserter desert évacuer evacuate	atteindre <i>reach</i> rejoindre rallier <i>join</i> regagner <i>go back</i> envahir <i>invade</i>	heurter cogner frapper taper <i>hit</i> toucher <i>touch</i>

Table 1 : Typology of verbs

The left hand side of the table contains relational verbs, classified into three different categories depending on whether they involve relations of distance, of orientation, or of passage. The semantics of these three types of relational verbs is based on the hypothesis that they incorporate the semantics of relational markers, the grammaticalized LN. The right hand side of the table contains the referential verbs, which are classified according to the type of relationship they establish with respect to the referent of the direct object. *Median verbs* generally describe a relationship with respect to the inside of the referent of the direct object (internal relation of localization). Most of them originally denote a concrete physical action which involves a specific motion : *arpenter* 'pace', *balayer* 'sweep', *sillonner*... come from the activities *poser des arpent* 'measure land in unit of arpents', *passer le balai* 'clean by sweeping' and *creuser des sillons* 'furrow', respectively. It seems that the use of these verbs evolves from the description of a specific action to the description of the shape originally implied by the performance of this action. They are not all at the same stage of evolution ; some of them no longer describe an action but only the shape of a motion. *Neutral verbs* are specific to the extent that their semantics remains undetermined (underspecified) from a spatial point of view : they do not indicate the spatial configuration of the referents involved in the process. That is that they do not intrinsically describe a relation of localization. It simply says that a certain relation is true at a particular time of the event (initial or final phases), and that no specific configuration which may be associated with this relation is specified by the verb at the lexical level. The interpretation of this relation depends on the ontological, geometrical and functional properties of the related entities. These verbs are not considered motion verbs.

Their capacity to express a motion event is context-dependent. Finally, *contact verbs* describe a contact relationship between the Trajector and a portion of surface of the reference entity. As for the verbs of distance or orientation, this relation does not necessary imply a portion of space (or a region), but unlike these verbs, it does not introduce an axis which would allow us to get a representation of a motion from one side to the other. Only world knowledge and context allow us to mentally rebuild the state preceding the state of the contact relation. The motion is not implied by the semantics of the verbs. Direct transitive contact verbs can actually combine with the verb *aller* "go", which in a construction such as (15) appears as a motion verb rather than an aspectual auxiliary. Example (16) illustrates how the kinetic interpretation of *aller* is ruled out in the abstract uses of contact verbs.

- (15) *il est allé heurter un arbre*
 'he went and hit a tree'
- il est allé toucher la voiture qui s'arrêtait*
 'he went and touched the car which was stopping'
- (16) **il est allé toucher son cœur*
 'he went and touched her heart'
- **il est allé heurter sa sensibilité*
 'he went and hit her sensitivity'

Examples in (16) sound odd because the verb *aller* can be interpreted neither as a motion verb nor as an aspectual auxiliary, because the process denotes an achievement. We therefore conclude that the contact verbs found in the list considered here are not motion verbs.

5. Correlation between localization, aspect and transitivity

In this last section, we draw several conclusions concerning the relationships between the locative properties of verbs, their aspectual properties and their degree of transitivity.

The typology exposed in section 4 is actually organized according to the degree a transitivity of the verbs (cf. Hopper & Thompson 1980). The verbs are classified according to the type of relation they establish with respect to their objects. We show that the construction of the *mode of access to the reference* is as important as the referential properties of the denoted entities. According to the type of this access to the reference, the process is more or less transitive. We consider that verbs which incorporate semantics of LN (i.e. relational verbs) define an indirect access to the reference, whereas the other verbs (i.e. referential verbs) define a direct access. The referential verbs thus occupy a higher position on the scale of transitivity.

Before summing up different consequences that follow from this analysis, we give a schematic description of the fundamental distinction that we drew between relational and referential verbs :

Relational verbs imply a **relational anchoring** towards a LN which is bound to the referent of the NP object. (For instance, *climb*, in a clause such as *John climbed up the stair*, establishes a relation not directly with *the stair*, but with *the top of the stair*). Moreover, this relation is a **kinetic relation**, the movement being intrinsically part of the lexical semantics of verbs to the extent that the LN introduced (*the top* in the previous example) functions in opposition to one another and define a spatial axis along which motion can be represented. (In the same example *John climbed up the stair*, the created entity *the top of the stair* is itself defined with respect to *the bottom of the stair*). This relation is also a **continuous relation** because there are no clear-cut borders between the regions denoted by the pair of the involved LN. If we consider *the stair*, it is impossible to decide exactly where *the bottom of the stairs* ends and where *the top* begins. This fuzziness is particularly pronounced for the LN describing the vertical orientation. It is somewhat less significant for the LN describing the frontal or the lateral orientation. Owing to these properties, relational verbs are capable of providing a global description of a motion, from one region to another.

Referential verbs involve a **referential anchoring** towards the referent of the NP object as a whole or its inside region whose border coincides with its own borders. They describe a **static relation**,

because there is only one piece of locative information, defined at the initial, the median or the final phase of the event. And this relation is a **discrete relation** (internal, external, or contact relation), since it is usually defined with respect to entities that have clear-cut borders (i.e. the referent of the direct object). Because of all these properties, referential verbs give little locative information and provide only a partial description of the motion.

Table 2 below, sums up these two sets of properties :

Relational verbs	Referential verbs
relational (indirect) anchoring /object	referential (direct) anchoring/ object
kinetic relation	static relation
continuous (= durative) relation	discrete (= punctual) relation
global representation of motion	partial representation of motion

Table 2 : Two patterns for expressing motion in the DTC

The following subsections detail a set of oppositions resulting from these two patterns.

5.1. *Kinetic vs. static opposition*

Relational verbs intrinsically define kinetic relationships (since they do not necessarily imply referential anchoring) : from a syntactic point of view; this means that the object can easily be omitted as we can see in (17) below :

- (17) *Ils montent (les marches)*
 `they climbed the stairs`
- Ils approchent (la côte)*
 `they are approaching the coast`
- Ils suivent (la voiture)*
 `They are following the car`
- Ils grimpent (la paroi)*
 `they are climbing rocks`

Referential verbs define a static localization relation with respect to the referent denoted by the direct object. From a syntactic point of view, this implies that the object cannot be omitted (when there is no specific context):

- (18) *Ils quittent (* la route)*
 `they are leaving the road`
- Ils atteignent (*le sommet)*
 `they reached the summit`
- Il heurte (*un piéton)*
 `he hit a pedestrian`

These observations on the different possibilities to omit the object seem to argue for the correlation established between, on one hand, relational verbs and a low degree of transitivity, and on the other hand, referential verbs and a higher degree of transitivity.

5.2. *Locative / aspectual opposition*

Aspectual properties of relational verbs hinge on their locative properties, and consequently on the spatial

properties of the referent denoted by their object. We use the notion of homomorphism (Krifka 1987) to calculate the aspect of the process. The spatial extent of the referent determines the temporal extent of the process. The object of relational verbs can then be defined as an incremental or holistic theme (cf Ladusaw and Dowty 1987, Dowty 1991).

- (19) *Léon traverse un champ (accomplishment)*
 'Léon is going across (crossing) a field'
- (20) *Léon traverse une vitre (achievement)*
 'Léon is passing through the window'

When there is no distance between the two sides of the crossed entity (as in 20), there is a shift leading to an achievement interpretation.

Locative properties of referential verbs depend on their aspectual properties : for instance *quitter* "leave" is an achievement, since it describes a change of a relation over time. It is then possible to derive the change of a relation in space. When the direct object denotes an entity capable of fulfilling a function of localization, then we have a spatial interpretation of the process which denotes change of location, as in (21) ; in the opposite case, when the object cannot fulfill a function of localization, we only have a change of state, see (22)

- (21) *Léon a quitté la ville*
 'Léon left the city'
- (22) *Léon a quitté sa femme*
 'Léon left his wife'

5.3. *Opposition Motion vs. Action*

Because they intrinsically imply a kinetic relation, relational verbs are considered real motion verbs. They describe continuous relationships between the two extremes of a continuum defined by a pair of LN. The object is not affected by the action : it only serves to measure the event (cf; Tenny 1995) ; it introduces telicity. The subject bears Agent and Patient roles, and the object is a Locative. The central idea is that there is a self-motion of the subject's referent, as in the intransitive pattern.

Referential verbs are considered action verbs which may express a motion event depending on the context (when the object NP denotes an entity capable of fulfilling a function of localization). There are two different frame roles that can occur at the same time: (i) on one hand the subject is Agent of an action which affects the Patient, (ii) on the other hand, the subject is Agent and Patient of the motion performed with respect to the referent of the object which is then considered a Locative.

We propose a representation in which the action frame role and the motion frame role are not mutually exclusive, but are alternately foregrounded or backgrounded, depending on the lexical semantics of verbs, the types of the arguments and the context in which they appear.

- (23) *Longer 'go along' (Léon, la rivière 'the river')*
MO Ag/Pa Lo
*ACT**
- (24) *Heurter 'hit' (Léon un piéton 'a pedestrian')*
ACT Ag Pa
MO Ag/Pa Lo

In this representation, we operate a lexical decomposition of the predicate in order to isolate predicative schemata to which different frame roles are associated. In (23), the process expresses a mere motion, and therefore, any role is attributed at the action level (ACT), which we denoted by a star (*). In (24), the motion is subordinate to the action, which is expressed by its position at the second level. Without going into the detail, we just note here that a same argument can hold various roles at the same time, either with

respect to only one predicative schema (see e.g. the self-motion of the Trajector in the subject position, which is simultaneously Agent and Patient of the motion), or with respect to distinct predicative schemata (ACTion schema / MOTion schema).

This representation accounts for the lexical semantics of verbs. It provides a frame able to capture the fact that a same verb can present frames role ordered differently according to its type of complementation.

6. Conclusion

We first introduced the ontology of motion event and argued for a relational description of motion. We redefined the criteria of locative polarity to better grasp the distinction between locative and aspectual properties. We isolated a fourth type of verbs which imply two pieces of locative information and has to be distinguished from the median verbs even though both types of verbs focus on the path of a motion event. We then presented ontological distinctions between object-type and location-type, and described the mechanisms of type shifting according to the degree of specification that NPs can acquire in discourse. We introduced the properties of LNs, which are crucial for understanding the mechanisms that establish a relation of localization.

We then established the main distinction between (i) referential verbs, which involve a referential or direct anchoring in the referent of their direct objects as a whole, and (ii) relational verbs, which involve relational or indirect anchoring in the referent of the direct object. The main hypothesis behind this distinction is that the verbs of the second category have incorporated semantic features of localization nouns which act as elements of mediation in the V-O relation and create a new specified location-type entity when they combine with the direct object.

We proposed a typology of verbs with seven categories. Only relational verbs are considered motion verbs. Referential verbs (at least, most of the median verbs, the neutral initial and final verbs, and the contact verbs) are not considered motion verbs. We showed that their interpretation is context-dependent and can vary according to the type of entities denoted by the arguments.

Finally, we put forward two clusters of properties characterizing referential and relational verbs. Our analysis revealed two patterns for the expression of a motion event. On the one hand, referential verbs entail a static and discrete relation and provide a partial representation of the motion. On the other hand, relational verbs establish a kinetic and continuous relation and provide a global representation of motion.

We showed that referential verbs are more transitive than relational verbs. They are also more polysemic and can present different frame roles of Action or Motion, depending on the properties of their participants. We suggested a representation which allows us to keep the two possible meanings available at the same time, because the two notions of action and motion are so closely linked that it would be wrong to ignore their relationship.

This study enabled us to clarify the organization of the class of verbs originally considered median verbs. We isolated the homogeneous subclass of relational verbs. Their specificity is that they are capable of expressing real continuous and kinetic processes owing to a mechanism of indirect anchoring. Therefore, it is not surprising that they represent the majority of the verbs that can express a motion event in the DTC.

In French, motion is usually expressed by intransitive verbs combined with spatial prepositions (i.e. *aller à* "go to", *sortir de* "go/come out"...). Most of these intransitive verbs are initial or final and involve relationships based on the opposition inside/outside.

Motion events described by relational verbs in the DTC express motion at a finer granularity. They involve a set of micro-relationships between regions defined in relation with the referent of the direct object. The DTC provides a special frame to express this type of event, where the object is not an affected object as in the prototypical transitivity, but a kind of holistic theme (Dowty 1991) that must be entirely covered.

Finally, we note that languages provide us with a large number of tools to describe spatial and spatio-temporal relations at different levels of granularity. The precision of these relations is poor, but this by no means harms communication. We are capable of reasoning on partial data, because we possess a set of relational markers (prep + LN) which provides a spatial grid construable independently of the entities on which it is applied.

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