Motion events in Swedish and French: a Holistic Spatial Semantics analysis

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Abstract

The present study investigates cross-linguistic differences in the description of motion events using Holistic Spatial Semantics (HSS) as a theoretical framework. In this study, six short video stimuli featuring various motion situations were used to elicit narratives from 35 speakers of French and 29 speakers of Swedish. The proportions of semantic category Path linguistically expressed did not vary significantly between the groups. However, the French narratives had significantly less Manner and Direction expression. Furthermore, they included significantly more unbounded non-translocative events compared to the Swedish narratives. Partly, this was due to the tendency within the Swedish group to construe situations as bounded events that were clearly shown as unbounded in the stimuli. There was also a tendency within the French group to distribute the information about the same situation over two clauses. These findings lend further support to the relevance of distinguishing between the Path and Direction categories, as well as other key features of the HSS framework, such as the distinction between non-verbal motion situations and their linguistic construals.

1. Introduction

We start experiencing motion before we acquire language. Even without any theoretical knowledge about the laws of physics constraining motion, the very fact of existing on this planet exposes us to a huge number of physical experiences that shape our intuitive knowledge of how motion works. These laws work in exactly the same way across the globe, so it would seem that we have the same physical (pre-linguistic) experiences of motion. If these experiences are universal, it is all the more interesting that their linguistic framing is not. This is not to say that one cannot find any linguistic universals. In fact, it has been suggested that a closed set of *general* semantic categories, such as Motion, Region, Direction, and Path, are universally present across languages (Zlatev et al., 2021). Rather, it is this balance between what is

universal and what varies from language to language that makes motion events such an excellent showcase for those who are interested in the relation between language and cognition. If, indeed, our experiences of motion are similar, but the linguistic accounts of them are not, this leads to some interesting questions about the relation between language and the cognitive processes that are connected to it.

Using the famous "bottle example" (1), Talmy (1985, p. 69) demonstrated that, while Spanish expresses the notion of spatial transition in the verb root (*entrar*), Swedish expresses it in a verbal associate – adverb – *in*. At the same time, the characteristics of motion itself are expressed in an optional gerund (*flotando*) in Spanish and in the verb root in Swedish (see Appendix A for the glossing notations).

(1) La   botella entró   a   la   cueva (flotando).
     DET.DEF.F bottle enter.PST to DET.DEF.F. cave (float-GER)

(2) Flaska-n   flöt   in i grotta-n.
     Bottle-DET.DEF float.PST in in cave-DET.DEF
     "The bottle floated into the cave."

This difference serves as the basis for the two possible approaches to *framing* a motion event: either in the verb root, as in Spanish, or in a so-called *satellite* – "the grammatical category of any constituent other than a nominal complement that is in the sister relation to the verb root" (Talmy, 1991, p. 486), as in Swedish.

Talmy was particularly interested in the fact that verbs of motion tend to bundle the notion of Motion together with some other semantic information. Using his terminology, they *conflate* the semantic category Motion with Path or Manner/ Cause.

He also claimed that Path is obligatory for an expression describing a motion event (hence its being a *core schema*) and its linguistic expressions exhibit certain constraints across languages. At the same time, Manner is a specific type of a co-event, which does not need to be expressed for us to interpret an event as containing motion.

This leads to two ways in which a motion event can be encoded: S-framed (as in Germanic languages) and V-framed (as in Romance languages). These patterns of framing are illustrated in Fig. 1 (adapted from Zlatev et al., 2010) with respect to English and Spanish.

The question of why this would be of interest at all would be best answered by Talmy himself:

By the operation of very general cognitive processes that can be termed conceptual partitioning and the ascription of entityhood, the human mind in perception or conception can extend a boundary around a portion of what would otherwise be a continuum, whether of space, time or other qualitative
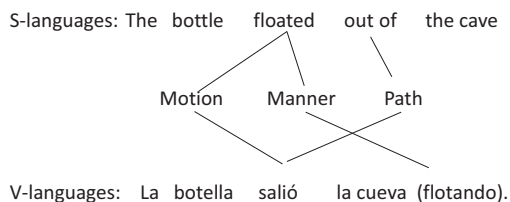

Figure 1. Conflation patterns in English and Spanish.

domain, and ascribe to the excerpted contents within the boundary the property of being a single entity (Talmy, 1991, p. 481).

In other words, for Talmy this was of particular interest insomuch as it connects patterns generally found in language with processes pertaining to cognition in general. As he noted with regard to conflation patterns, "The cognitive correlate of this linguistic phenomenon is that we apparently conceptualize, and perhaps perceive, certain complex motions as a composite of two abstractably distinct schematic patterns of simpler motion" (Talmy, 2000, p. 36). In this sense, the typology presented by Talmy (1991, 2000) was an attempt to ground the analysis of linguistic patterns within one specific semantic domain in a cognitive theory of conceptual organization.

This two-way typology has subsequently provoked numerous objections and reports of contrary patterns. Regarding Spanish as representative of Romance languages, Aske (1989, p. 6) proposed that the above-mentioned generalization only holds for constructions that include telic (following Vendler, 1967) Path[1] phrases that predicate, "besides path of motion, an end-of-path location/state of the Figure". This contrasts with phrases, which "add the 'location' in which an activity took place" (Aske, 1989, p. 6), such as *He ran in/through the park.*

These ideas have been further revised and elaborated by Slobin and Hoiting (1994), who proposed that, in verb-framed languages, situations involving movement across a boundary, such as entering, exiting, or crossing a Ground, are expressed through *boundary focus phrases* that require the main verb to be a Path verb rather than a Manner verb. In contrast, *ground focus phrases* predicate that the ground "is only approached, and therefore its particular locative features are neutral with regard to the verb: 'to the forest', 'toward the cliff', 'to the room'" (Slobin & Hoiting, 1994, p. 495). This principle has become known as *a boundary-crossing constraint* (Slobin & Hoiting, 1994).

Another topic surrounding linguistic expressions of Path concerns the status of deictic verbs as belonging to this category, which has been called into question by Matsumoto et al. (2017). In particular, it is argued that the use of deictic verbs "is not motivated purely in spatial terms, but involves functional properties, affected by the speaker's (potential) interaction with the moving person" (Matsumoto et al., 2017, p. 95). Furthermore, deictic paradigms and Path verb systems are argued to behave differently. First, deictic verbs often have their own morphosyntactic slot in some languages, distinct from the non-deictic Path slot. Second, the existence of deictic verbs in a particular language seems to be independent from the richness of its Path verbs arsenal (ibid). For instance, even languages that have rather impoverished systems of Path verbs (e.g., English, German) have deictic verbs, which tend to be rather frequent in use.

Furthermore, it has been observed that considerable intratypological variation is difficult to accommodate within the Talmian model (Berthele, 2013; Ibarretxe-Antuñano, 2009; Slobin, 2006 among others).

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[1]Note that Talmian definition of Path as "the course followed or site occupied by the Figure object with respect to the Ground object" (Talmy, 1985, pp. 60–61) is rather vague. This lack of precision that has been discussed extensively in the literature (see Blomberg, 2014; Imbert, 2012; Zlatev et al., 2010 among others) has led to a situation where additional distinctions needed to be made.

With regard to French, Kopecka (2004, 2006, 2009), for instance, reports on the diachronic shift of French language from satellite-framed patterns towards verb-framed patterns and suggests that French still has examples of patterns characteristic of the satellite-framed languages and could be considered a mixed pattern language, shown in verbs that co-express both Path and Manner, such as *s'envoler* 'fly from/out', *se déverser* (of liquids: to move out of a certain container), *s'encourir* (to run from, to escape), *s'enfuire* 'to escape from'. Kopecka (2006, 2009) presents them as a proof of S-framed patterns because *-en, -é* and other elements found in most of these verbs are remnants from Old French, which had Path prefixes freely attachable to verbs in a manner similar to Slavonic languages. This, of course, would mean they could be characterized as satellites in Talmy (2000) terms. However, these elements have lost their productivity and become fused with the root (which Kopecka, 2006 also admits). Therefore, from a synchronic point of view, they are no longer prefixes, but a part of the verb root, which makes it problematic to classify them as Talmian satellites (Anastasio, 2021; Fagard, 2019; Hijazo-Gascón, 2017).

This incongruence stems not only from the restrictive nature of the Talmian two-way typology, but also from controversy surrounding the structural category of *satellite*. Following Talmy (1985, p. 102), it should include verbal prefixes and post-verbal particles "in a sister relation to the verb root". However, Imbert (2012) observes that it has been extended to prepositions and other constituents (see also the discussion in Blomberg, 2014).

Another point of critique that has been brought up in the literature (Blomberg, 2014) has been provoked by the fact that Talmy seems to be focused primarily on one type of motion events – translocative uncaused motion events (see Section 2.2 for a detailed explanation).

Moreover, the exclusive focus on just two elements – the verb root and the satellite – hardly seems justified, as many other form classes participate in the expression of motion (Blomberg, 2014; Feist, 2010; Naidu et al., 2018; Zlatev, 1997).

To summarize the discussion so far, notwithstanding the valuable contribution made by Talmy (1985, 1991, 2000), the model he proposed suffers from some unfortunate drawbacks, which make it suboptimal for the purposes of linguistic analysis. In particular, the vagueness of key concepts makes it difficult to operationalize the notions of *satellite*, *Path*, *Manner*, etc. (Blomberg, 2014; Imbert, 2012; Zlatev et al., 2010). Furthermore, given the exclusive attention paid to just one specific type of motion events, it is questionable whether the conclusions drawn can generalize to the entire semantic domain of motion. Finally, the model puts into focus the verb root and the satellite at the expense of other elements that seem to be just as worthy of thorough analysis.

The discussions summarized above have stimulated many proposals of alternative theoretical frameworks and the ways the problems outlined above should be addressed.

The apparent diversity within each category (S-framed and V-framed) has motivated some researchers (Ibarretxe-Antuñano, 2009; Slobin, 2006 among others) to consider approaching motion typology not as a dichotomy, but as a cline of salience within which languages could be situated.

Another proposal came from Croft et al. (2010) who suggested redefining motion typology in terms of construction types rather than language types (see also Fortis & Vittrant, 2016).

Holistic Spatial Semantics (HSS), which has been chosen as an analytical tool for the present study, is another model suggested for the purposes of the motion events analysis (Blomberg, 2014; Naidu et al., 2018; Zlatev, 1997; Zlatev et al., 2021). As Blomberg (2014, p. 60) puts it, HSS "was born out of the need to overcome the conceptual problems in Talmy's typology and thus pave the way for future research in semantic typology of motion".

In contrast to the Talmian binary model, HSS makes no assumptions with regard to the number of language types. Instead, it is proposed that "languages like Spanish and French, on the one hand, and languages like Swedish and English, on the other, correspond to *clusters with distinctive porotypes*" (Naidu et al., 2018, p. 20) and the number of such clusters remains to be determined (if it needs to be determined at all).

Furthermore, the practice of separating meaning in language from meaning in non-linguistic experiences promoted in HSS has proven to be useful for an in-depth analysis of motion events (Blomberg, 2014; Zlatev et al., 2021 among others). After all, "language and experience are best analyzed separately prior to calibrating the relation between the two" (Blomberg, 2014, p. 228). In particular, the taxonomy of motion situations first elaborated by Zlatev et al. (2010) paved the way for making some interesting observations (see, for instance, the analysis by motion situation type in Zlatev et al., 2021).

The study presented here continues this line of research, focusing on Swedish and French, two languages argued by HSS researchers to represent two distinct typological prototypes, only partially corresponding to the original Talmian types, others being serial-verb languages such as Thai, and languages where case-marking plays the key role in Path expressions such as Telugu (see Naidu et al., 2018). Using the narratives elicited from adult speakers of Swedish and French accordingly, the study aims at a systematic comparison of motion event descriptions in two languages (see Section 3).

The first research question motivating this study is how HSS can contribute to the depth of analysis of motion events when considering narrative data, as opposed to single event descriptions. First, it was hypothesized that the structural contrasts emerging as a result of the data analysis would allow to make more fine-grained distinctions, both on a clause level and on a discourse level, compared to previous analyses. Second, it was expected that the results would fall in line with the results previously presented in other studies that employed HSS as a theoretical framework (Blomberg, 2014; Zlatev et al., 2021).

The other research question grew out of some general observations that have been made before by Blomberg (2014), Zlatev (1997, 2007), and Zlatev et al. (2021), but never grew into a systematic investigation. In particular, a considerable contribution of HSS into the domain of motion events research was the notion of *covert expression* first introduced by Zlatev (1997) and referring to meanings that are not linguistically coded, but stem from the interlocutors' shared understanding of the situation described or knowledge of the world (see more in Sections 2.1 and 3.4). Even though general remarks regarding covert expression have been made in all the publications using HSS quoted above, the cross-linguistic patterns of covert expression have not been systematically investigated. Thus, the second research question is how the two languages differ in terms of (1) quantity of motion events that involve semantic categories of Path, Region, and Landmark covertly expressed; (2) the degree of context-dependency of the meanings in question; (3) the typical patterns of inter-action between covertly and overtly expressed semantic categories present in the respective languages.

The next sections are organized as follows: In Section 2, the main concepts of the theoretical framework of HSS are introduced. Section 3 presents the methodology of the study. Section 4 is dedicated to the description of the results obtained from quantitative and qualitative analyses. Finally, Section 5 discusses the results and Section 6 summarizes the key findings.

2. Holistic spatial semantics

2.1. General issues

HSS was first presented by Zlatev (1997), as a framework aiming to unify cross-linguistic research in the expression of space, including static spatial relations, deixis, and motion events. The name of theory stems from the claim that a spatial situation, either static or dynamic, is expressed by *a whole utterance*, and not by specific form classes like prepositions or verbs. Spatial situations, including motion events, are non-linguistic events, and should be analyzed accordingly (see Section 2.2). Since human knowledge of space and motion is "grounded in pre-linguistic bodily experience" (Zlatev et al., 2021, p. 5), there should be general similarities in how this is expressed in human languages. This provides the basis for a set of general semantic categories, like Path and Manner, which are presumably universally present, but "conventionalized in language specific ways" (ibid) both in terms of how they are expressed and in terms of what values they assume (see Section 2.3). These are mapped onto form classes in three different ways: (1) one-to-one, in a compositional matter, (2) several-to-one, resulting in patterns of conflation, as noted by Talmy (1991), and (3) one-to-several or distributed, as noted by Sinha and Kuteva (1995).

The many-to-many relation between form classes and semantic categories results from the "*relative* meaning-holism predicted by the theory" (Zlatev et al., 2021, p. 8). In line with Goldberg (1995, 2006), Slobin (2000), and Feist (2010), it is assumed that the meaning of individual motion verbs contributes to the meaning of an utterance, but does not predetermine it. For instance, even though most researchers would agree that there is a certain degree of directionality included in the semantics of the verbs corresponding to the English verb *run* (e.g., Cifuentes Férez, 2010; Pedersen, 2016), it does not follow that every construction having such a verb as a predicate would express the idea of change of location. For example, one can run on a treadmill.

One aspect of such constraining is the phenomenon of *covert expression* (Blomberg, 2014; Zlatev, 1997; Zlatev et al., 2021). It relates to meanings that are not explicitly coded, but stem from the interlocutors' shared understanding of the situation described or knowledge of the world (see more in Section 3.4). The inclusion of covert expression in the analysis helps to overcome the notorious Pragmatics–Semantics divide. It also facilitates the analysis of how meanings are shared across languages regardless of whether they are linguistically coded or not.

2.2. Taxonomy of motion situations

Three parameters allow us to distinguish between different types of motion situations,[2] irrespective of how they are expressed or construed in language: (1) translocative versus

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[2]Note that in this paper the term *situation* is reserved for an experience of motion – lived or observed – while the term *event* is used specifically for its linguistic construal).

non-translocative, (2) bounded versus unbounded, and (3) uncaused versus caused (Zlatev et al., 2010).

Translocation is "the continuous change of an object's average position according to a spatial frame of reference" (Zlatev et al., 2010, p. 394), while in non-translocative motion there is no change in this position, with respect to the spatial frame in question.

Three assumptions follow from this definition. First, translocation by default involves the whole Figure and, therefore, motion of some parts of it is not considered as instances of translocation. Consider, for instance, an act of waving in *She waved* as a situation of motion that only involves the Figure's hand, or an act of the change of posture, such as sitting down or standing up. Second, motion is considered translocative only if it is continuous. Therefore, instances of full stasis or appearing out of thin air or disappearing exemplified in sci-fi fiction would not be considered as translocative motion and, in fact, lack motion altogether. Third, translocation can only be attested if an explicit frame of reference is given. If one, for instance, is seated on a plane that is taking off, one moves up in reference to the core of the earth and yet remains still in reference to the plane. Thus, depending on the frame of reference invoked, the speaker can construe an event as translocative or non-translocative.

Boundedness involves the presence vs. absence of a definitive state transition involved in the motion situation. For instance, while going to a store has such a point, going upward does not.

Causation concerns whether the figure is perceived to be moving under the influence of an external cause or not. Since the present study focuses on uncaused motion events only, this parameter will not be relevant.

The parameters presented above give grounds to identify four types of uncaused motion situations: bounded translocative, unbounded translocative, bounded non-translocative, and unbounded non-translocative, which are exemplified in Table 1.

It is important to note that these parameters have been elaborated on the basis of an analysis of motion as pre-linguistic experience. However, when they need to be expressed in language, there is necessarily the effect of linguistic construal, which could, for example, present an unbounded event using the category Path, and thus as *linguistically* bounded.

2.3. Semantic categories

In its most recent versions, HSS claims the existence of the following universal semantic categories, hypothesized to be necessary and jointly sufficient for the expression of space in all human languages (e.g., Zlatev et al., 2021).

Table 1. Taxonomy of motion situations and English sentences (in past tense) that can be seen as expressing them

Situation type	Examples
Bounded translocative	*He ran out of the house*
	They crossed the parking lot
	She walked into the room
Unbounded translocative	*The balloon flew up*
	He came this way
	They moved forward
Unbounded non-translocative	*They ran in the park*
	She waved
Bounded non-translocative	*He jumped*
	She sat down

1. Figure (F): The focal entity that is presented as located or as undergoing the process of translocation.
2. Landmark (LM): One or more physical entities (typically expressed by nominal phrases), in relation to which the translocation of the Figure can be specified.
3. Region (R): An area of space usually defined in relation to a Landmark. This category can take values like INSIDE, OUTSIDE, ABOVE, BELOW, and BESIDE. These values are quite often defined by the characteristics of the LM.[3]

Consider the following examples (3) and (4). In (3) R acquires the value INSIDE since the LM is "container-like" (e.g., there is a potential for the F to be inside it at the end of translocation). In a similar way, in (4) R profiles not only the proximity of F to LM, but also an additional property of the LM: that it has a side easily identifiable as front.

(3) French
     *Elle entre **dans** le supermarché*
     she enter.PRS.SG in DET.DEF.M supermarket
     'She goes into the supermarket'

(4) French
     *Elle arrive **devant** le supermarché*
     she arrive.PRS.SG in front of DET.DEF.M supermarket
     'She arrives to the front side of the supermarket'

It should be kept in mind, however, that the ways in which this category carves up space are somewhat language specific, with different languages profiling its values more or less frequently. Fig. 2 schematically represents some properties of the LM that can be profiled by **Region**.

The ways the concepts schematically portrayed in Fig. 2 are profiled in a specific linguistic expression are somewhat language specific. For instance, Becker et al. (1997) observe that even the concept of *interior subspace* (corresponding to Region:INSIDE in HSS terminology) is rather flexible since it can be applicable to LMs of different shapes. Compare, for instance, *walking into the forest* vs. *walking into a building* or *swimming out of the harbor* vs. *getting out of a pool*. The LM in question can be profiled as two- or three-dimensional as is the case with French and
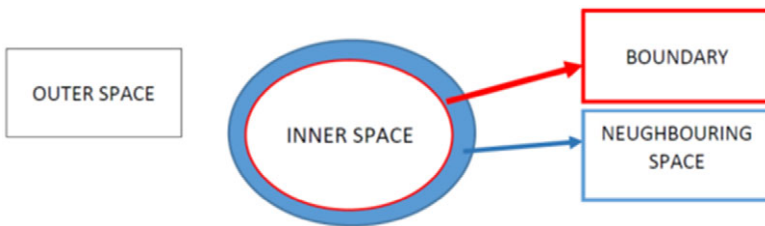

Figure 2. Topological subspaces (adopted from Becker et al., 1997).

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[3]This corresponds to Talmy's (2000, pp. 54–55) notion of **Conformation** as one of three constituents of Path (along with **Vector** and **Deixis**).

Swedish translations of an English sentence *He walks in the street.* While the French expression in (5) profiles the LM as three-dimensional and **Region** assumes the value INSIDE (i.e., included in the interior space of a bounded LM) accordingly, the Swedish expression in (6) profiles the same LM as two-dimensional and the value Region assumes is ON (i.e., in contact with the surface of the LM).

(5) French
     Il   marche   dans   la   rue
     He walk.PRS.SG inside DET.DEF.F street

(6) Swedish
     Han går   på   gatan
     He   walk.PRS on   street.DET.DEF

Moreover, the actual boundary, as construed linguistically, may not refer to anything boundary-like in the real world (as is the case with *swimming out of the harbor*).

In a similar way, the concept of proximity (values NEAR and FAR that **Region** can assume) relies on the speaker's understanding of what Becker et al. (1997, p. 23) call *neighboring subspace* – "a sort of 'sphere of influence'" within which interaction with the LM is possible. They also note that the attribution of a neighboring subspace to a LM presupposes its boundedness since it is conceptualized essentially as the space that adjoins the boundary but does not include it (Becker et al., 1997, p. 23).

4. Motion (M): Perceivable actual, as opposed to fictive, or non-action motion (Blomberg, 2014). This is neutral with respect to the parameters described in Section 2.2, so any of the sentences in Table 1 would have a positive value for M.

5. Frame of Reference (FoR): This generalizes the well-known proposal of linguistic frames of references by Levinson (2003) to dynamic situations in a three-dimensional plane (Zlatev, 2007). There are three different kinds of FoRs:

(a) Object-centered (OC): Defined by means of one or more Landmarks as in (7), (8):

(7) He walks out of *the building*

(8) She goes from *the supermarket* to *the bus stop*

(b) Geocentric (GC): Involving relatively fixed ("absolute") reference points or axes (such as UP, DOWN, WEST, EAST, etc.), for example, (9) and (10):

(9) The balloon moves *up*

(10) The ship sails to the *west*

(c) Viewpoint-centered (VC), which covers motion situations anchored at a viewpoint that could be a deictic center, for example, (11):

(11) She is *coming this way,*

but not necessarily, as in: *When you reach the crossing, turn to your right.*

6. Direction (D): Motion along a vector specified by an axis provided by one of the three kinds of FoR, given above. Direction is involved where the motion is linguistically construed as *unbounded*, meaning that it could, in principle, (though not practically) unfold forever (as in (12) and (13)). Consider (12) which occurs as the first utterance of the first narrative produced by a participant. There can be no transition point or change of state since the relationship between the F and the LM does not change and any other LM is absent. What is expressed here is not a case of translocation in purely topographic terms, but rather that the motion of the F is directed towards the functional space of the speaker. The situation is, therefore, construed as translocative and unbounded, due to the use of the deictic verb. The construal is from the speaker's viewpoint, which is very different from the previous examples (3) and (4), where LM was functioning as the reference point and where one can see not just an average change of location within a given FoR, but also a definite transition (from *outside* to *inside*, or from *far* to *near*). We may, of course, infer that, at some point, the motion will come to an end, but this is our knowledge of the world informing the inference, while the semantics of the verb does not allow to imply this.

(12)   Swedish
Det   är   en   kvinna som kommer   lite småspringande
DET.DEF be.SG DET.INDEF woman who come.PRS a little jog.GER
längs   en   gata
along DET.INDEF street
'It is a woman who comes rushing a bit along the street'

(13)   French
Il   monte
He move.up.SG.PRS
'He goes up'

Note that prepositions *vers* (French: 'towards') and *mot* (Swedish: 'towards') have been considered to be expressions of Direction in the version of HSS in Blomberg (2014), but as expressions of Path in Zlatev et al. (2021). The decision was made by the authors based on these expressions being temporarily bound (in terms of Croft, 2012) and on the grounds of the state transition "strongly implied" (Zlatev, personal communication). However, the coding adopted for the present study follows Blomberg (2014) rather than Zlatev et al. (2021). To demonstrate this point with an example, it seems reasonable to suggest that there is indeed a difference between such expressions as *to* (instantiating Path) and *towards* (instantiating Direction). For instance, when giving the driver instructions, one can say "Drive towards B, but turn left one block before you reach it". The same sentence would no longer be acceptable were we to substitute *towards* with *to,* since it would contain two contradictory propositions – one cannot reach B and not reach it at the same time. The same logic seems to hold for the distinctions between *vers* 'towards' and *jusqu'à* 'all the way until' in French and *mot* 'towards' and *till* 'to' in Swedish.

7. Path: this is limited to linguistic construals of *bounded translocation*, where a Landmark and Region are recruited to specify the BEGINNING, MIDDLE

(movement of the F towards and then past the LM), and/or END of the translocation, as in (14). Note the change of the FoR (and, therefore, the perspective on the situation) from Viewpoint-centered to Object-centered, where the LM (grocery store) is recruited to specify the location of the F at the end of the translocation.

(14)   Swedish

Så   kommer   hon   fram   till   en   livsmedelsaffär
So   come.PRS   she   forward   to   DET.INDEF   grocery.store
'Then she comes to a grocery store'

The Path:END along with the Region change from FAR to NEAR LM is expressed through the preposition *till* ('*to*').

The final three categories are not strictly speaking necessary, as (trans)location can be fully expressed only using the first seven. They do, however, add to the "color" of the motion event and are very often included.

8. Manner: specifications of various aspects in the way motion is conducted, including (a) bodily locomotion (*jump*); (b) vehicle (*ride*); (c) medium (*sink*); (d) velocity (*rush*); (e) attitude (*mindfully*); and possibly other kinds.
9. Shape: the geometrical form of the trajectory followed by the F (e.g., *to zigzag*). In some of the motion event literature, this is included under Manner, but as the latter is already a very broad category, it is best to distinguish it.
10. Cause: the initiator of the movement and the nature of the causal force (e.g., *push* vs. *slide*).

3. Methodology

3.1. Participants

Two groups of participants – native speakers of French and native speakers of Swedish – took part in the study (see Table 2 for information about the participants).

The participants were recruited through their respective universities (Lille University for the French participants and Lund University, Stockholm University, Uppsala University for the Swedish participants) as well as via social media (e.g., Facebook groups).

It should be noted that, with the exception of two participants in the Swedish group and two participants in the French group, the speakers recruited for the study spoke English fluently in addition to their native language. Some participants in the Swedish group also spoke German and a few reported knowledge of Spanish at the beginner level. In the French group, some participants also spoke Spanish or Italian. While knowledge of foreign languages, especially on advanced levels, could have influenced the produced description, there was no way to assess the strength of such

Table 2. Information about the participants

Group	Number of participants	Age	Sex
Swedish	29	19–82 (mean: 35)	15 females; 14 males
French	35	18–73 (mean: 31)	25 females; 10 males

effects in a principled way. Thus, the topic was left outside the purview of the investigation.

All participants signed (digitally) an informed consent form and were compensated for their participation.

3.2. Materials

The data for the present study has been collected using an elicitation tool developed by the author, based on the considerations described below. The stimuli used were six short (between 0.37 and 0.54 min) cartoons each having a plot and presenting various types of motion situations (see Appendices B and C).

Previous studies that used HSS as a theoretical framework tended to use sets of video clips each presenting one situation. In particular, Blomberg (2014) and Fagard et al. (2013) used the Trajectoire tool (Ishibashi et al., 2006), while Zlatev et al. (2021) have used a novel elicitation tool based on the same principles (a set of individual video clips) but developed in accordance with the taxonomy of motion situations put forward in Zlatev et al. (2010) (see Section 2.2). In contrast, Naidu et al. (2018) used narratives elicited with the help of a picture book "Frog, where are you?" (Mayer, 1969), otherwise known as *frog stories*. Both techniques allow to control for the topics covered, but have additional advantages and limitations. Sets of individual clips allow more control over the number of utterances produced and the types of descriptions so that each situation is described by all the participants, with some degree of variation on how it is linguistically construed (Zlatev et al., 2021). Pictorial support allows for more creativity and flexibility in verbal descriptions. Further, presenting a narrative is arguably a more natural mode of language use in contrast with verbal descriptions of individual video clips. The resulting samples are narratives, which are the type of data that differs from sets of individual utterances.

The tradition of using frog stories in motion events research goes back to Slobin (1991, 2000, 2004)) who suggested that typological differences in event framing "have consequences for the connected discourse" (Slobin, 2000, p. 107). He further noted that "languages differ systematically in rhetorical style – that is, in ways in which events are analyzed and described *in the discourse*" (Slobin, 2004, p. 5, emphasis added). Moreover, using the narratives accords with the ideas laid out by Fauconnier and Turner (2002, p. 97), who suggest that a study of language and cognition should be based on methods that "extend to contextual aspects of language use and non-linguistic cognition. This means studying full discourse, language in context, inferences actually drawn by participants in an exchange, applicable frames, implicit assumptions and construal, to name just a few." Analyzing narratives allows to do just that.

At the same time, static images are not the best medium to convey dynamicity of motion. In addition, "Frog, where are you?" has a limited number of motion situations that does not allow to thoroughly investigate linguistic descriptions of all situation types (see Section 2.2).

These considerations have paved the way to the development of a novel elicitation tool that would allow to elicit narratives that are rich in different types of motion events. In addition, video stimuli are more suitable for depicting situations of motion than static pictures.

Moreover, special care was taken to ensure that the stimuli were interesting and engaging to motivate the participants to form detailed narratives. Hopefully, this

allows to collect data that are as close as possible to the situated and spontaneous character of everyday oral speech production.

The exact description of situations depicted in the video stimuli can be found in Appendix C. Note that, even though sometimes the situations depicted are static rather than dynamic, at least 102 situations are potentially interpretable as motion events. The bulk of the situations were designed to elicit translocative event descriptions. This is because this type of motion events is inherently diverse and adding more scenes of this type allowed to manipulate a few factors that might have had an impact on the type of linguistic construction chosen. In particular, the stimuli were designed to portray different ways of motion (walking, running, crawling, tip-toeing, swimming, hopscotching, etc.), different types of Figures (humanoids, animals, liquids, etc.), different types of Landmarks (vehicles: a car, a boat, a spaceship; buildings: a house, a supermarket; elements of natural landscape: a hill, a cliff, a tree, etc.), different directions of movement (up, down, etc.), different types boundary crossing (entering, exiting, crossing, etc.).

Still, it should be noted, that eliciting free narratives is not without its limitations. This method allows very little control over what situations forming the plot canvas of each story would be described in the narrative, which resulted in some situations being more frequently described than others.

3.3. Procedure

The data were collected between spring 2020 and fall 2021. For the reasons connected to the epidemiologic situation, the elicitations were performed via Zoom.

First, a participant was asked to provide information about their sex, age, and possible knowledge of foreign languages by means of filling out a short survey. This was followed by an instruction to watch a video carefully to be able to present it later. Each video was shown twice. Finally, the participant was given the instruction (in their native language): *Please, tell me what you have seen in this video and try to be as precise and detailed as possible.*

After the procedure, the participant had an opportunity to ask questions and obtain detailed information about the study. It was also an opportunity for the researcher to ask questions of clarification (see, for instance, the discussion of the Swedish *hoppa/gå i* 'jump/go inside' construction in Section 4.2.3). The comments left by the participants were used to inform further research.

3.4. Analysis parameters

The narratives produced by participants were video recorded. The recordings were transcribed using Elan 6.0 software (Sloetjes & Wittenburg, 2008) by transcribers native in the respective language and annotated using NVivo qualitative data analysis software (QSR International Pty Ltd. Version 12, 2018). The narratives produced by the participants constitute two corpora – the French corpus and the Swedish corpus (see Table 3 for detailed information).[4]

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[4]Note that throughout the paper the term *corpus* refers to a total compilation of narratives in the respective language while the term *data set* refers exclusively to a set of clauses containing motion events.

Table 3. Information about the corpora[1]

Corpus	Length in words		Number of clauses		Number of motion events	
	Total	Mean	Total	Mean	Total	Mean
Swedish	36,540	1,044	5,670	162	1,524	53
French	26,274	906	4,205	145	1,793	52

[1]Note that throughout the paper the term *corpus* refers to a total compilation of narratives in the respective language while the term *data set* refers exclusively to a set of clauses containing motion events.

The annotation was performed by the author. Each specific expression was cross-referenced with the expressions in the coding scheme used in Zlatev et al. (2021) in order to ensure homogeneity of the analyses performed, with the exception of prepositions *mot* and *vers* 'toward', coded as Path rather than as Direction, as mentioned in Section 2.3.

The unit of analysis was a clause, defined as "any unit that contains a unified predicate" (Berman & Slobin, 1994, p. 660) describing a single situation. As a rule, each unit included a single verbal element, with the exception of infinitives and participles functioning as complements of modal or aspectual verbs (e.g., *commencer à voler* 'to start flying').

The three levels of annotation for linguistic data included:

1. The type of motion situation (with regard to the parameters of boundedness and translocation as described in Section 2.2).
2. A semantic category (based on the ones outlined in Section 2.3.: Path, Manner, Direction, etc.) and the mapping onto one or more form classes. Expressions conflating more than one semantic category were annotated respective to each of the categories and additionally put into a list corresponding to the categories conflated (e.g., Path and Region, Manner and Direction, etc.). The only exception was made for Motion. Since Manner and, in the present data (though not in general, see Blomberg, 2014), Path and Direction always co-occur with Motion, this would have been redundant. In contrast, verbs that express Motion without conflating it with other semantic categories were coded.
3. Value a specific category acquires, for instance, BEGINNING, MIDDLE, or END with regard to Path (see a full coding scheme in Appendix D).

An example of coding is presented in Fig. 3[5].

Systematic coding for covert expression was, as mentioned in Section 2, one of the novel aspects of the analysis. In order to be coded as including a covert expression, a clause had to satisfy two criteria: (1) the covertly expressed meaning clearly is not expressed by any of the clause constituents; (2) the meaning nonetheless is present since its absence would result in inconsistency and contradiction when considered within the context of the narrative. Consider (15), for example:

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[5]Note that the Swedish verb *gå* 'go/walk' is coded as expressing Manner since in Swedish it expresses the default way of moving around (walking) when the Figure is human or human-like (see Viberg 1999, 2008; Blomberg 2014).
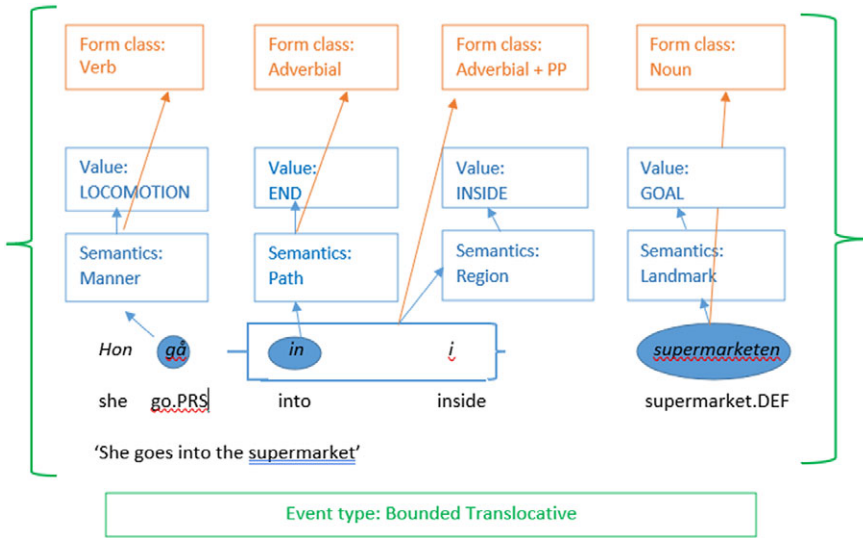
Figure 3. An example of coding.

(15) French

> *Le*   *chat*   *saute*   *dans*   *son*   *cadit*
> DET.DEF.M   cat   jump.PRS.SG   in   her.SG   trolley
> 'The cat jumps into her trolley'

Neither the verb *sauter* 'jump' nor the preposition *dans* 'inside' express the idea of change of location. The narrow semantic meaning that stems from the semantics of individual lexical units would be the cat jumping while already being inside the trolley. However, this gives inconsistency when checked against the previous utterance ('The cat approached the woman and her trolley'). Since we assume that the speaker intends to be informative, consistent, and cooperative (following Grice, 1975),[6] we can therefore also assume that the meaning conveyed is referring to an instance of translocation (movement from outside into the trolley) and thus the clause is coded as containing a covert expression of Path.

    The number of clauses in general, clauses presenting the events of each of four types (translocative bounded, non-translocative unbounded, translocative unbounded, and non-translocative bounded, see Section 2.2) as well as linguistic expressions instantiating each semantic category (e.g., Path) and the form class (e.g., Path – verb) were calculated.

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[6]Note that this is a reasonable assumption rooted not only in the works of HSS researchers, but also, thanks to groundbreaking work of Grice (1975), has become one of foundational concepts in the field of Pragmatics. Indeed, assuming the opposite – that the speaker intends to say something that they believe to be false or to be intentionally obscure or incoherent in their oral presentation – would lead to an assumption that any verbal interaction at any point may plausibly be an exchange of oral statements that are intentionally puzzling or irrelevant to the situation discussed. Such a state of affairs would make human communication highly inefficient and linguistic analysis – extremely difficult, if possible at all.

Table 4. Numbers and proportions of clauses expressing translocative bounded, translocative unbounded, non-translocative bounded, and non-translocative unbounded events

Group	Translocative bounded	Translocative unbounded	Non-translocative bounded	Non-translocative unbounded
Swedish	869 (57%)	394 (26%)	64 (4%)	197 (13%)
French	1,096 (61%)	274 (15%)	81 (5%)	342 (19%)

The statistical tests were performed in JASP software (version 0.16.4) and included (for each set) normality tests and Mann–Whitney U test (since the data was not normally distributed).

The full corpus for each language as well as the lists of expressions for each semantic category and the results of statistical tests can be accessed at OSF | Motion events in Swedish and French.

4. Results

4.1. Event construal comparisons

Table 4 shows the distribution of the number of clauses that construe motion situations as translocative bounded, translocative unbounded, non-translocative bounded events, and non-translocative unbounded.

As can be seen, the smallest number of clauses present non-translocative bounded events, which is hardly surprising, considering that the corresponding situations were few and apart in the stimuli (10 situations overall). Moreover, some of them were not crucial for the storyline and tended to be omitted by speakers in both groups. This was especially true where a change of posture was involved, for example, 1.14, 4.11, 4.15 (see Appendix C).

The proportions of translocative bounded events produced by the French and the Swedish participants were similar.

What is more interesting is that participants in the French group included significantly more non-translocative unbounded events ($p = 0.007$) and significantly less translocative unbounded events ($p < 0.001$). This difference can be explained by several factors.

First, French participants showed a strong tendency to distribute information pertaining to the same situation over two clauses, as in (16), where the speaker focuses on the Manner of motion (crawling) in the main clause and produces the information related to the Path (moving out of the bushes) in the subordinate clause, or (17), where the same distribution of information is achieved through the usage of two coordinated clauses.

(16)   French
    Le   bandit va   ramper   au sol
    DET.DEF bandit AUX.FUT crawl.INF on ground

    pour sortir   discrètement d'un   buisson
    for   exit.INF discreetly   of=DET.INDEF bush
    'The bandit will crawl on the ground in order to discreetly move out of the bush'

(17) French
      Il   rampe   et   il   arrive   derrière   la   dame
      He   crawl.PRS and he arrive.PRS behind   DET.DEF lady
      'He crawls and he arrives to the spot behind the lady'

This is consistent with observations made by other researchers in the field, for example, Blomberg (2014), Zlatev and David (2003) among others (see also Vesnina, in press).

    Second, participants in two groups seemed to approach the description of some situations in different ways. The situations in question were designed to elicit non-translocative unbounded events. To that end, they were fixated on for an average of 4 s and specific care was taken to include the figure and background, but nothing that could look like the goal or the source of translocation (see 1–2 in Appendix B for screenshots from the videos corresponding to situations 1–2 in Fig. 3). The video stimuli included 12 such situations although some of them (e.g., 6.5 and 6.13) tended to be omitted by the speakers in both groups. For those situations that were consistently mentioned in the speakers' narratives, the French participants produced more non-translocative unbounded events while the Swedish participants produced more translocative (both bounded and unbounded) events, even though the difference was statistically significant only in half of the situation descriptions (1.1, 1.5, 2.1, 3.1, 4.9). Due to space constraints, only two examples will be presented (see Vesnina, in press, for more comprehensive analyses of all the descriptions in question).

    Compare (18) – a prototypical Swedish description of the first scene from the first video, and (19) – a prototypical French description of the same scene:

(18) Swedish
      Det   är   en   kvinna som kommer   lite
      DET.DEF be.SG DET.INDEF woman   who come.PRS a little
      småspringande längs en   gata
      jog.GER   along DET.INDEF street
      'It is a woman who comes rushing a bit along the street'

(19) French
      Alors il y a   une   damme qui   marche   dans
      So   there.is DET.INDEF.F lady   that walk.PRS.SG inside
      la   rue
      DET.DEF.F street
      'So, there is a lady who walks on the street'

Fig. 4 provides an illustration of how two different situations (1.1, exemplified by the two utterances above, and 1.5) were construed by participants of the two groups.[7]

    Note that in case of two or (very occasionally) three clause descriptions, as was often the case of situation 1.1, the French participants had a strong tendency to use a non-translocative unbounded event as an opening element, including Manner information (e.g., (19)).

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[7]Note that some speakers would describe a given situation in more than one clause. Where this is the case, the total number of descriptions per situation exceeds the number of participants in the group.
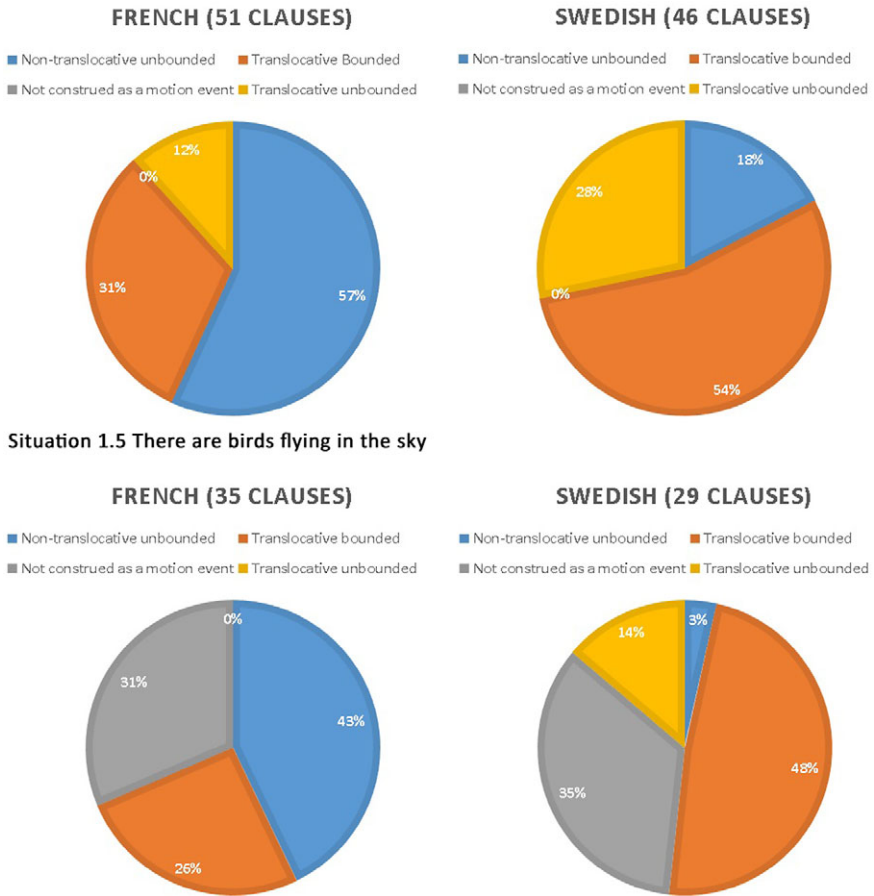
FRENCH (51 CLAUSES)

■ Non-translocative unbounded ■ Translocative Bounded
■ Not construed as a motion event ■ Translocative unbounded

SWEDISH (46 CLAUSES)

■ Non-translocative unbounded ■ Translocative bounded
■ Not construed as a motion event ■ Translocative unbounded

Situation 1.5 There are birds flying in the sky

FRENCH (35 CLAUSES)

■ Non-translocative unbounded ■ Translocative bounded
■ Not construed as a motion event ■ Translocative unbounded

SWEDISH (29 CLAUSES)

■ Non-translocative unbounded ■ Translocative bounded
■ Not construed as a motion event ■ Translocative unbounded

Figure 4. Linguistic construal of two situations by the French and Swedish participants.

For the Swedish group, there was no obvious pattern that a combination of event types would follow. However, there was a strong tendency to construe an event as translocative unbounded within Viewpoint-centered FoR (specifically using a venitive deictic verb *komma* 'come') even when the situation described involved an appearance of a new protagonist and/or a new location (as in (18)). The French narratives contained this type of construal only in situations like 2.11–2.12 or 3.6, where the protagonist and/or location where the scene is set had already been previously introduced (see also the discussion in Vesnina, in press).

4.2. Semantic categories comparisons

Fig. 5 displays proportions of seven semantic categories expressed linguistically in French and Swedish data sets.

As can be seen, expressions of Motion lacking Path or Manner were infrequent in both data sets. Shape was also very infrequent since it was limited to the descriptions of one specific situation (performing a U-turn).
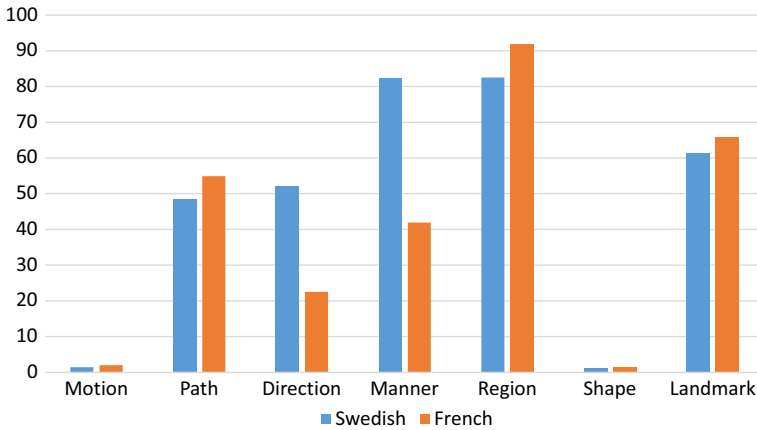
Figure 5. Proportions of categories Motion, Path, Direction, Manner, Region, Shape, and Landmark.

Importantly, there was no significant difference with respect to the categories Path ($p = 0.209$), Landmark ($p = 0.839$), and Region ($p = 0.617$), while both Manner ($p < 0.001$) and Direction ($p < 0.001$) were significantly more frequent in the Swedish than in the French data set. Note that this difference would be diluted if Path and Direction were not distinguished, as emphasized by the present framework, in contrast to most other approaches (Slobin, 2004, 2006; Talmy, 2000).

4.2.1. Direction

The higher proportion of Direction expressions in the Swedish narratives was partially due to the Swedish participants using a deictic verb *komma* 'to come' more frequently than the French participants the verbs *(re)venir* 'come/come back', and *retourner* 'return'. With a normalized frequency of 8.65 per 1,000 words, the verb *komma* was the most frequent motion verb in the Swedish corpus. This is in contrast with the French verbs *(re)venir* – 1.9 per 1,000 words and *retourner* – only 6 tokens in total.

Zlatev and David (2003) also note that deictic verbs in Swedish and French exhibit different properties. In particular, the authors observe that French deictic verbs cannot be used to describe *boundary-crossing* (see Section 1) situations, such as *He came out of the room.* These differences also could have contributed to the lower frequency of deictic verbs in the French data set.

On the other hand, Swedish data was rich in constructions incorporating Direction and Path or Direction and Region, as in (20):

(20) Swedish
    Katten   hoppar   upp   i   kundvagnen
    cat.DEF   jump.PRS   up   in   trolley.DET.DEF
    'The cat jumps up into the trolley'

Directional adverbs *upp* 'up' and *ner* 'down' are very frequent in all the clauses construing the event as translocative in the Swedish data set (see also Section 4.2.3).

Another reason that could contribute, however marginally, to the higher proportion of Direction in the Swedish data was the decision to code the Swedish preposition *mot* 'towards' and the French preposition *vers* 'towards' as Direction in line with the version of HSS in Blomberg (2014) and not Zlatev et al. (2021). Indeed, the Swedish preposition *mot* 'towards' was slightly more frequent (61 tokens or an average of 2.3 per 1,000 words) than the French preposition *vers* (38 tokens or 1.04 per 1,000 words).

4.2.2. Path

For Path, the proportion of expressions in the French data was slightly higher than in Swedish (54.88% compared to 48.43%).

This is in contrast with Zlatev et al. (2021), where it was found to be slightly more frequent in Swedish than in French. This could be due to the differences in the elicitation method (more controlled in the case of Zlatev et al., 2021) and the stimuli (in particular, a different number and proportion of translocative bounded situations coupled with a bigger variety of situations described).

Another possible source of this difference is the presence of verbs that were coded as co-expressing Path and Manner in the French data set. Previously, it has been proposed in the literature (see, for instance, Beavers et al., 2010; Levin & Hovav, 1992) that a motion verb can lexicalize Path or Manner but not both. This, however, has been disputed by Pourcel and Kopecka (2005), as well as Kopecka (2006). In line with their arguments, it seems perfectly reasonable to consider such verbs as French *plonger* (to plunge) to be examples of such conflation. It inevitably expresses Path (the value of Region changes from OUTSIDE the Landmark (water) to INSIDE). In addition, the motion described implies certain velocity (high), medium (first air, then – water), orientation of the body, etc., in other words – Manner. Some other examples include *s'envoler* 'fly from/out', *se déverser* (of liquids: to move out of a certain space), *s'encourir* (to run from, to escape), *s'enfuire* 'to escape from'.
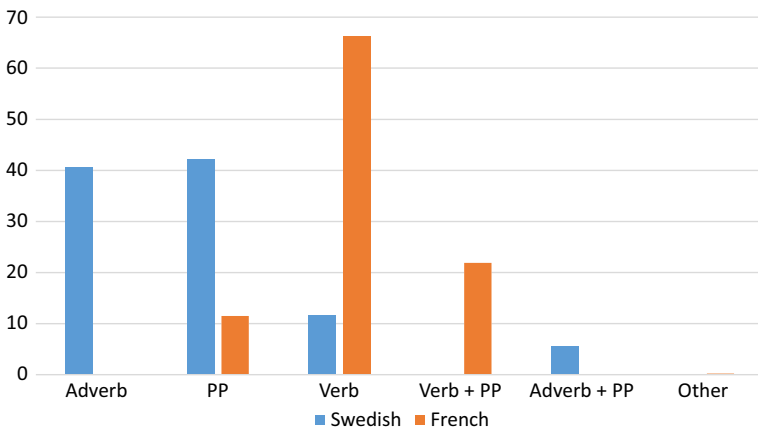

Figure 6. Lexical expression of Path in Swedish and French.

Fig. 6 graphically presents the mappings between semantic category of Path and form classes through which it is expressed in both languages.

For situations involving Region change between INSIDE and OUTSIDE of a container-like Landmark and Path:BEGINNING or Path:END, a typical expression of Path in Swedish was through adverbs or combinations of an adverb and a preposition, as in (21) and (22).

(21) Swedish
      Fågeln   flygger   ut
      bird.DEF fly.PRS out
      'The bird flies out'

(22) Swedish
      Fågeln   flygger ut   ur   burren
      bird.DEF fly.PRS out out cage.DEF
      'The bird flies out of the cage'

With regard to the most frequent expressions of Path, the French participants, in line with previous studies (see, for instance, Blomberg, 2014), frequently used the verbs *entrer* 'enter' and *sortir* 'exit' alone or in combination with a preposition, such as *de* 'from', followed by a noun phrase, to express Path.

Path:MIDDLE in French was expressed through verbs *traverser* 'to cross', *(de) passer* 'to (by)pass', *(re)doubler* 'to bypass a moving LM'. It is interesting to note that it is possible to use similar constructions in Swedish, which has the verbs *korsa* 'to cross' and *pasera* 'to pass'. However, the Swedish participants rarely did so, preferring to use the adverbs *förbi* 'past' and *över* 'over' as in (23) and (24):

(23) Swedish
      fåglar   som   åkte   över   mataffären
      bird.PL   that go.PST over grocery=store.DEF
      'birds that flew over the grocery store'

(24) Swedish
      Hon tittar   på några fåglar som   flyger förbi
      She look.PRS at some bird.PL which fly.PRS past
      'She is looking at some birds which are flying by'

A specific feature of French was the usage of verbs *monter* 'ascend' and *descendre* 'descend' to indicate Path in and out when Landmark is a vehicle. These verbs, which normally denote motion along the vertical axis (and are, therefore, verbs of Direction), as it seems from these specific cases, have acquired a second sense and are used as Path verbs in this specific context.

The decision to code these verbs as Path has been taken based on the fact that their usage in translocative events has been systematically observed where the protagonist was moving in or out of a vehicle (a car in Video 2, a boat in Video 5 and a spaceship in Video 6) and not any other type of container-like LM (a building, a house, a shopping cart, a cage, etc.).

Note that, even though in the present study a decision has been made to code the verbs *monter* 'ascend' and *descendre* 'descend' as expressions of Path

conventionalized in a language-specific way, this decision is admittedly not uncontroversial. Another way to treat this data would be to code these verbs as always expressing Direction and as a covert expression of Path when used in translocative bounded event descriptions.

For situations where the value of Region was changing between NEAR and FAR from the Landmark, both languages used prepositions, such as Swedish *till* 'to' and French *jusqu'à* 'to'. Unlike the French speakers, the Swedish speakers tended to include Direction in the construction (see Section 4.2.3).

With regards to the inclusion of more than one Path element, it has been noted that one factor presumably making Path more salient in Germanic languages is availability of 'complex paths' (Ibarretxe-Antuñano, 2009). It is noticeable that, though one can express two Path elements in French, as in (25), where the verb *entrer* 'enter' expressing Path:END is followed by the preposition *par* 'via, through' expressing Path:MIDDLE, in order to include more than two, one is forced to insert another verb.

(25)   French
    Il   *entre*   *la*   *maison* *par*   *la*
    He   enter.PRES DET.DEF.FEM house via   DET.DEF
    Figure Path:END Landmark   Path:MIDDLE
    porte   *principale*
    door   main.ADJ
    'He goes into the house through the main entrance'

Even though it is possible to produce a construction including a verb + Path:BEGINNING + Path:END or verb + Path:BEGINNING + Path:MIDDLE, as in (25), provided they relate to the same situation, one cannot include more Path elements or another combination of them within a single clause. In contrast, a Swedish speaker can produce (26), where the verb is followed by Path:BEGINNING, Path:END, and Path:END, in other words, condensing the information about two separate situations (the motion from the wardrobe into the bed and from the bed onto the floor) into one event:

(26)   Swedish
    Den   *hoppade* *ner* *från* *byrån*   *på spjälsängen*
    DET.DEF jump.PAST down from cupboard.DEF on baby=cot.DEF
    och *ner*   *på golvet*[8]
    and down on floor.DEF
    'It jumped down from the cupboard onto a baby cot and down to the floor'

It should be noted, however, that such instances of two situations expressed as one event were rare in the data (a total of 3 occurrences) and, therefore, did not make a difference for quantitative analyses.

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[8]Note that this sentence can, in principle, be analyzed as two clauses with an elliptic verb in the second clause, which could then be classified as a case of verb omission, that is one of the factors that Ibarretxe-Antuñano (2009) links to higher levels of Path salience in a language. However, omitting *och* 'and' in this case would not lead to a sentence being ungrammatical since Swedish allows for more than two Path components following a verb.

4.2.3. *Covert expressions of Path*

The role of inference in Romance languages in general and French in particular has been discussed in the literature. Pourcel and Kopecka (2005, p. 12), for instance, proposed that "French relies heavily on inference in linguistic expression and comprehension". Much less has been said about Swedish on the matter. In fact, the Swedish data set contained significantly more clauses where Path was implied though not overtly expressed (p = 0.009). However, the difference in covert expression of Path between the two groups is not only quantitative. A closer look at the clauses with covertly expressed Path reveals a far more nuanced picture.

The first group of cases where Path was found to be covertly expressed includes constructions encoding Region, but no Path. The notion of Path in these constructions is implicitly understood by the hearer due to shared knowledge of the situation, even though with no contextual information such utterances would be ambiguous. Both (27) and (28) feature locative prepositions (*dans* 'inside' in French and *i* 'inside' in Swedish), which by themselves do not imply translocation. Neither do the Manner verbs *marcher* 'walk' and *springa* 'run'. In fact, there are two alternative interpretations: the protagonist is walking while being in water (perhaps, only ankle or knee deep) or the protagonist is moving into the water from outside. The specific interpretation of the event as translocative is triggered by the speaker's and hearer's shared understanding of the situation embedded in the narrative (two protagonists are standing on the beach and, at some point, want to go for a swim) and, perhaps, also the typicality of the situation. Accepting an alternative interpretation would mean the speaker was confused about the events in the story and did not understand what was going on. However, this seems unlikely, especially since the continuation of the narrative was consistent with the interpretation of the event as translocative.

(27) French
 L'autre va marcher dans la mer
 DET.DEF other   AUX.FUT walk.INF in DET.DEF sea
 'The other will walk into the sea'

(28) Swedish
 Den   andra springer i   vattnet
 DET.DEF other   run.PRS in   water
 'The other runs into the water'

The grammaticality of such constructions in French has long been debated. While Hickmann et al. (2017) suggested they are ambiguous and, therefore, much less natural, Pourcel and Kopecka (2005) argued that they are perfectly acceptable when pragmatically licensed.

This study shows that covertly expressed Path is a common phenomenon in French. Similar constructions (as (28), for instance) have also been occasionally produced by the speakers of Swedish, even though they are generally considered ungrammatical. A simple explanation would be to consider them accidental errors made by the speakers. However, this construction appears 8 times in the corpus, which seems to suggest it is not accidental. When asked about their opinion on the matter, the speakers that produced the <+REGION –PATH> construction with the verb *hoppa* (jump) and preposition *på* 'on' or *i* 'inside'

expressed a belief that it is acceptable in spoken language. One speaker that produced the construction with the verb *gå* 'walk' and preposition *i* 'inside' was not sure about the motivation behind it and hypothesized that she might have been influenced by her knowledge of Danish. Another participant who produced the same construction explained that "it is a shorter version" and then added, "but yes, actually you are supposed to say *gå in i*". It is possible then that this is an early stage of language change and, in time, this construction might become fully acceptable. Perhaps, what is most interesting here is this <+REGION –PATH> pattern that is very present in French now making its appearance in a typologically different language – Swedish.

The constructions featuring covertly expressed Path that were frequent in Swedish data included instances where Path can be understood in a non-ambiguous way when considering the values of Direction and Region. For instance, consider (29):

(29)   Swedish
Han   hoppar   ner   i   havet
He   jump.PRS down in   sea.DEF
'He jumps down into the sea'

Here the covert expression of Path can be seen as a kind of "filling in the blank" between the Direction of the movement of Figure (down) and the Region in the final position (inclusion in the Landmark – the sea). Since we all experience the linearity of temporal unfolding of motion events, it brings us to infer Path as the connection between the two. This type of construction that one could schematically sketch as <MANNER – DIRECTION – (PATH) – REGION> only appeared in the Swedish data.

In (29), the movement down towards the sea and the final relation of inclusion between the Figure and the Landmark (sea) allow Path to be understood without being explicitly expressed. This is not the case, however, for (27), where two interpretations are possible and the only means of disambiguation is the shared understanding of the context.

4.2.4. *Region and Landmark*

Region and Landmark both tended to be slightly more frequent in French than in Swedish (though the difference was not statistically significant). In Zlatev et al. (2021) French participants tended to produce slightly more expressions of Landmark (in line with the present results), but slightly fewer expressions of Region in contrast with the data presented here. At the same time, as was shown in the previous section, in the context of the free narratives production French-speaking participants tended to produce more non-translocative unbounded events, most of which tended to include at least one Landmark and one expression of Region, as in (30):

(30)   French
*Alors il y a   une   damme   qui marche   **dans***
So   there.is DET.INDEF.F. lady   that walk   inside
                           FIGURE   MANNER REGION

la   ***rue***
DET.DEF.F.   street
LANDMARK
'So, there is a lady who is walking on the street'

Note that the French data set also included 30 clauses containing Region covertly expressed, as in (31), where the Region value (ON) is deduced based on the knowledge of the topological properties of the LM:

(31)   French
       Il   monte   la   colline
       He   ascend.PRS   DET.DEF   hill
       'He goes up the hill'

This is in contrast with the Swedish data set, which did not contain any instances of Region covertly expressed. However, the difference in the expression of Region remains insignificant even if the covert expression of Region is added to the general count ($p = 0.294$).

   Additionally, there were no significant differences in numbers of clauses featuring LM covertly expressed between the groups ($p = 0.130$).

4.2.5. Manner

Fig. 7 summarizes information on lexical expression of Manner in French and Swedish.

   One can observe a very strong tendency of the Swedish participants to condense all the Manner information in verbs and to make little or no use of other form classes. The French participants distributed Manner information between different form classes more often. A typical distribution pattern was between a verb and an adverb in line with Zlatev et al. (2021). However, the French speakers also made use of gerunds and prepositional phrases, which is different from the results reported in Zlatev et al. (2021). Overall, the proportion of clauses in which Manner information is distributed across different form classes is significantly higher for French and lower for Swedish, when compared to the results presented in Zlatev et al. (2021).

   As generally assumed, unlike in Germanic languages, in Romance languages Manner expressions are subject to construction-specific constraints. The constructions in question are the ones that are used to construe an event as translocative
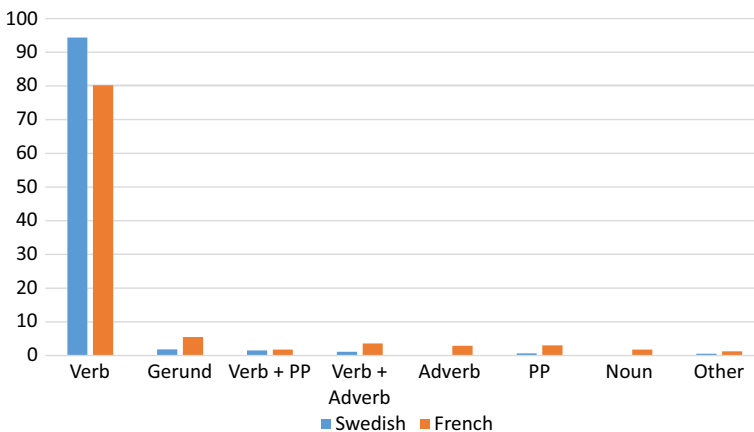

Figure 7. Linguistic expression of Manner in Swedish and French.

bounded. The exact nature of these constraints has been discussed by Aske (1989), Blomberg (2014), Pedersen (2016), Slobin and Hoiting (1994) among others (see Section 1). With regards to French, it seems to be unproblematic to combine most Manner verbs with some Path expressions, for instance, the preposition *jusqu'à* (until, all the way to) for events that imply a Region change between FAR and NEAR.

Blomberg (2014) and Naigles et al. (1998) note that the verb *sauter* (jump) seems to behave in a different way and can be used in any context. Blomberg (2014) suggests that the boundary crossing constraint in French is lifted when the motion described occurs along vertical rather than horizontal axis.

In light of this discussion, it is all the more interesting that, while some situations in the stimuli were expressed in ways compatible with the assumed difference between Romance and Germanic languages, for others the patterns of linguistic expression in the two languages were converging to some extent. This is what motivated an analysis of most typical situations in the stimuli and the ways they were construed in the narratives. On the one hand, descriptions of the scene depicting the protagonist walking into a supermarket (situation 1.8 in Appendix C), in line with Slobin (2004, 2006), met every expectation of 'no Manner' construals by the French participants, as in (32), and 'Manner + Path' construals by the Swedish participants, as in (33):

(32)   French
    Elle entre   dans le   supermarché
    she enter.PRS in   DET.DEF supermarket
    'She goes into the supermarket'

(33)   Swedish
    Hon gå   in   i supermarketen
    she go.PRS into in supermarket.DEF
    'She goes into the supermarket'

In all cases where a human (or, at least, anthropomorphic) Figure moved INSIDE or OUTSIDE of a container-like Landmark the Swedish participants would use *gå* to express Motion + Manner.

As for the French, many participants started the narrative by stating that the protagonist was walking on the street and one possible explanation for *no Manner* expressions in this case would be the fact that is it implied and can be inferred. It is unmarked, corresponding to the default manner in this type of situation.

For some situations, however, participants in both groups were consistently choosing to express Manner as the main verb. For the situation depicting a cat jumping into a trolley (situation 1.7 in Appendix C), participants of both groups used Manner verbs signifying 'to jump', as can be seen in (34) and (35):

(34)   French
    Le   chat saute   dans son cadit
    DET.DEF cat jump.PRS in   her trolley
    'The can jumps into her trolley'

(35) Swedish
    Katten   hoppar   upp i   kundvagnen
    cat.DEF jump.PRS up   in trolley.DEF
    'The cat jumps up into the trolley'

Finally, there were situations in which Manner descriptions of the French partici-
pants differed from the ones produced by the Swedish participants. It is most salient
in the descriptions of situation 4.10 (see Appendix C), featuring a bird flying out of a
cage. All the Swedish participants used the verb *flyga* 'fly' to describe the Manner of
motion exhibited by the bird, as in (36):

(36) Swedish
    Fågeln   flygger   ut
    bird.DEF   fly.PRS   out
    'The bird flies out'

For the French participants, most of whom also chose to express Manner information
in the verb, the descriptions were much more diverse. While some preferred to focus
on the fact that the bird flew and used the verb *s'envoler* (to fly off/from), thus
conveying BODILY LOCOMOTION and/or MEDIUM components of Manner, as
in (37), others used the Manner verbs that conveys ATTITUDE instead: *(s')échapper*,
s'enfuire 'escape', as in (38):

(37) French
    l'oiseau   qui s'envole   de   sa cage
    DET.DEF=bird that fly=from.PRS from its cage
    'The bird that flies out of its cage'

(38) French
    un   oiseau de compagnie qui s'échappe de   la   cage
    DET.INDEF bird   of company   that escape.PRS from DET.DEF cage
    'A pet bird that escapes from its cage'

Note that the three situations are translocative bounded and feature the same value of
Region change between INSIDE and OUTSIDE, in other words, they bear schematic
similarity, yet the strategies for describing them linguistically seem to differ.

5. Discussion

This paper has examined uncaused motion events in Swedish and French using HSS
as a theoretical framework. The main goals (see Section 1) were to compare patterns
of overt and covert linguistic expression both on the clause level and the discourse
level, and to explore the validity of HSS using a different elicitation method than the
ones employed in previous HSS studies.

    The findings reported in the previous section shed some light on cross-linguistic
differences in motion events descriptions not only on the clause level, but also on the
discourse level.

On the clause level, the analyses of overtly expressed categories of Path, Direction, Manner, Region, and Landmark mostly fall in line with the analyses reported by Zlatev et al. (2021).

As it was expected, making a distinction between the categories of Path and Direction has proven to be particularly useful for grasping the cross-linguistic differences between Swedish and French. Clearly, it is specifically Direction that is significantly more salient in Swedish than in French (see also Zlatev et al., 2021). This concerns the differences in the usage of deictic verbs, but also the dense presence of the expressions within GC FoR, such as *ner* 'down' and *upp* 'up'.

As for Path, Landmark and Region expressions, their proportion in French was not significantly different from Swedish, which differs only slightly from the previous findings. These marginal differences could be attributed to the nature of the stimuli.

Moreover, the present study yielded a number of interesting findings with regard to Manner expressions in French and Swedish.

Based on the findings reported above, one can observe that the *boundary-crossing constraint* formulated in Slobin and Hoiting (1994) seems to have limited explanatory power with regard to French. Indeed, some Manner verbs in French are freely usable in the descriptions of situations that one would consider *boundary-crossing*. An alternative explanation was proposed by Blomberg (2014), who used the verb *sauter* 'to jump' as an example, suggesting that this constraint can be lifted for verbs describing motion along the vertical axis (see also Naigles et al., 1998). This, again, does not explain the behavior of verbs like *se jeter* 'to throw oneself', for instance, which seem to also be freely used in the constructions of this type. Finally, Slobin (2006, p. 9) discusses Manner verbs in Romance languages and proposes that "Manner verbs are used when manner is foregrounded <…> The only exception seems to be the verbs that encode particular force dynamics – high energy motor patterns that are more like punctual acts than activities, such as equivalents of 'throw oneself' and 'plunge'". The present study contributes to this discussion by demonstrating that, indeed, in line with Slobin's (2006) suggestion, both semantic properties of the verb (force dynamics) and its aspectual properties (punctual acts rather than activities) play a role in determining the likelihood of a given verb to be employed in the construction in question. However, it also suggests that other factors might account for the emergence of such constructional patterns, as will become clear in the subsequent discussion of covert expressions of Path.

With respect to the patterns of covert expressions, our French data analyzed here had a number of clauses lacking overt expression of Region, due to the existence of constructions that allow the speakers to omit prepositions that normally express Region (e.g. *sur* 'on'), which is also consistent with the previous findings reported by Blomberg (2014) among others.

At the same time, there were significantly more covert expressions of Path in the Swedish than in the French group. However, an even more nuanced picture emerges after a qualitative analysis of the data. Indeed, the nature of the most frequent constructions and the relation between overtly and covertly expressed categories vary between the languages. This concerns, in particular, constructions featuring Manner expressed in a verb and Region expressed in a preposition, leaving Path to be inferred. It is notable that manner verbs in question include activity verbs, such as *marcher* 'to walk' and *courir* 'to run', used in combination with a preposition *dans* 'inside' in translocative bounded events. One might say

these constructions are not the most frequent in the data, however, one cannot ignore their existence. This, as demonstrated in Section 4.2.3., is where French and Swedish differ. Indeed, French seems to rely heavily on pragmatic inference. Admittedly, in constructions featuring verbs like *sauter* 'jump' or *se jeter* 'throw oneself' the semantics of the verb (high amount of effort put to initiate the motion) and its aspectual properties (a punctual event), perhaps, help the hearer to interpret the event as translocative. Still, for other verbs (such as *marcher* 'walk' or *courir* 'run' for instance) this interpretation will be prompted only within a specific context that rules out the alternative.

Swedish does not have an equivalent to the above-mentioned construction. At the same time, the Swedish data abounds in constructions that co-express Direction and Region rather than Path through a combination of an adverb and a preposition, for instance, *ner i* 'down inside', while leaving the notion of Path to be inferred. Such an interpretation, however, does not seem to be context dependent.

So far, a number of observations made concerned cross-linguistic differences on a clause level. However, using HSS to analyze narratives as a specific type of data resulted in interesting observations regarding cross-linguistic differences on a discourse level as well.

The taxonomy of motion situations presented in Section 2.2 and the notions of boundedness and translocation as parameters along which motion events would differ proved particularly useful.

Indeed, as shown in Section 4.1, French speakers tended to produce significantly more non-translocative bounded events and significantly less translocative unbounded events. This shows once more that "the *linguistic* construal of a situation is never determined by its *perceptual* properties" (Zlatev et al., 2021, p. 18). Furthermore, this could constitute grounds to hypothesize that the structure of the language one speaks might bias one's description towards construing some situations as translocative or non-translocative.

For instance, French disposes of a set of verbs that co-express the Path and Manner information (such as *plonger* 'to plunge'), yet they are limited in number and so are applicable only to some situations. Other verbs expressing Manner might be subject to construction specific constraints.

As a result, when describing a translocative situation in French one might have to make a choice between expressing Manner and construing the event as non-translocative (1) or expressing Path, thus construing the event as translocative (2). Additionally, one might add Manner information in a gerund or prepositional phrase to (2) clause or use two clauses thus combining (1) and (2). In practice, as can be seen from Section 4, the speakers of French employ all of these strategies to some extent. Still, two out of four strategies presented above (and illustrated with examples from the data in Section 4) would result in larger use of non-translocative events, which may mean the corresponding linguistic structures could be more readily available due to more frequent use. Obviously, more research would be needed in order to validate the point made here, since, for the time being, this aspect of motion events typology seems to be under researched. However, the results reported here might pave the way for more research on the matter.

These overall quantitative and qualitative differences confirm the view that languages should be treated as "conglomerates of more or less variable social norms and usage patterns" rather than "monolithic, reified systems" (Naidu et al., 2018, p. 20).

Without any doubt, structures pervasive in the language play an important role in shaping the rhetorical style typical for that language within a certain semantic domain. Yet, not everything can be explained by a look at the inventory of expressions each language disposes of. Thus, the mere presence of a Path verb *korsa* 'cross' in Swedish does not prompt the speakers to use it automatically as default means of expressing Path:MIDDLE. As was shown in Section 4.2.1., the speakers prefer to generalize the pattern typical for expressions featuring Path:BEGINNING/END (Manner in the verb + Path in the adverb) onto Path:MIDDLE.

One should also consider that, for most typical situations, an average language user will find a multitude of strategies to express certain aspects of the situation while striving to be economical and clear and the same time. This process can take different paths and give rise to a wide range of phenomena – be that a bias towards certain types of linguistic construal (Section 4.1), appearance of certain constructions (e.-g. Direction + Region constructions in Swedish as described in Section 4.2), semantic extension of some verbs (such as French verbs *monter* and *descendre* conventionalized for expressing Path INTO and OUT OF a vehicle as demonstrated in Section 4.2.3), general extension of the lexicon in some domains and frequency with which certain semantic categories are overtly (linguistically) or covertly expressed as well as the values they assume (Section 4.2.).

6. Conclusions

To conclude, the main objectives set for the study have been fulfilled by demonstrating that Swedish and French as representatives of two distinct typological clusters of languages indeed differ both in terms of the frequency with which some semantic categories are expressed linguistically and in terms of how motion events are construed linguistically within a narrative. Further, some possible explanations have been offered with special emphasis on the structural properties of the languages under investigation that the outlined differences might depend on.

Apart from some specific empirical findings, the present study demonstrates how attention to the definitional issues (see Section 2) accorded within HSS contributes to the thoroughness of cross-linguistic analyses of motion events and paves the way for new research questions that can potentially be addressed. In particular, the observations that have been made thanks to theoretical distinctions between Path, Direction and Region drawn within HSS overall fall in line with the previous analyses by Blomberg (2014), Naidu et al. (2018), Zlatev (1997), and Zlatev et al. (2021). More importantly, a distinction between overt and covert expression drawn in HSS has become a basis for a first attempt at a systematic analysis of cross-linguistic differences in the patterns of covert expression within HSS and the relations between overtly and covertly expressed semantic categories. Hopefully, this phenomenon will be further investigated in future research endeavors.

Another crucial point that can be said to constitute a meaningful contribution to the field of motion events is the analysis of situation types and their linguistic construal in a narrative in Swedish and French accordingly. This has become possible as a result of the use of a novel elicitation tool developed for the purposes of analysis of cross-linguistic differences on a discourse level. The influence of the speakers' L1 on the linguistic construal of motion events in a narrative seems to be a promising ground for future studies and might have implications for linguistic relativity research.

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Appendix A. Abbreviations

AUX	auxiliary verb
DET	determiner
DEF	definite
F	feminine
FUT	future
GER	gerund
INDEF	indefinite
INF	infinitive
M	masculine
PL	plural
PST	past
PRS	present
SG	singular

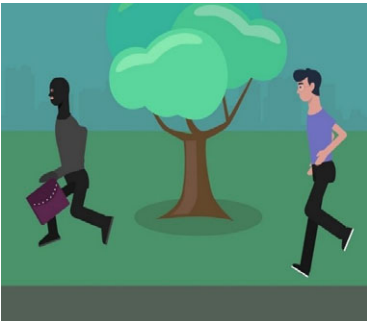## Appendix B. Examples from the video stimuli

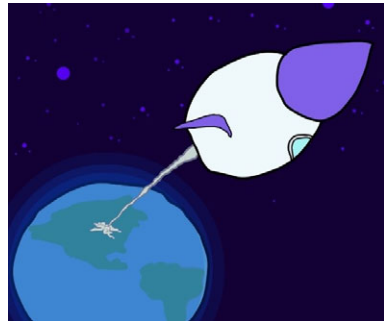1. A woman is walking along the street

2. Birds are flying in the sky

3. A man is running after a thief

4. A space ship is leaving Earth

Appendix C. Stimuli description

Number	Description	Time stamps
	Video 1 (0:46 min)	
1.1	A woman is walking along the street	0:00–0:05
1.2	A supermarket with trolleys around it. The woman approaches it from the right	0:05–0:08
1.3	The woman takes a trolley and keeps walking	0:08–0:12
1.4	The woman takes a few steps towards the entrance, and looks up	0:12–0:13
1.5	Birds are flying in the sky, from left to right	0:13–0:14
1.6	A cat approaches the woman and the trolley	0:15–0:17
1.7	The cat jumps into the trolley while the woman is looking up	0:18–0:21
1.8	The woman walks into the supermarket	0:22–0:23
1.9	The woman walks past shelves with various products on them	0:24–0:25
1.10	The woman stops in front of a shelf with meat products on it	0:26–0:26
1.11	The woman takes a ham and throws it into the trolley	0:27–0:29
1.12	The cat looks at the ham and licks its lips	0:30–0:32
1.13	The woman walks to the cash register and stops	0:33–0:38
1.14	The woman's hand reaches into the trolley but the ham is gone	0:39–0:41
1.15	The woman looks into the trolley, and her facial expression changes from happy to unhappy	0:42–0:43
1.16	The cat (which now looks bigger) jumps out of the trolley	0:43–0:44
1.17	The cat walks away	0:44–0:46
	Video 2 (0.37 min)	
2.1	A man is walking along a street	0:00–0:04
2.2	The man stops and looks across the street	0:04–0:05
2.3	A woman is standing next to a tree and waving	0:05–0:06
2.4	The man stops and crosses the street	0:07–0:10
2.5	The man and the woman stand next to the tree. The woman points up to the tree	0:11–0:12
2.6	A cat is sitting on a branch	0.12–0.14
2.7	The man turns his head to the right	0.15–0.16
2.8	A ladder is standing further away on the street (zoom in)	0:16–0:17
2.9	The man runs along the street	0:17–0:19
2.10	The man approaches the ladder and takes it	0:20–0:21
2.11	The man runs, carrying the ladder	0:22–0:25
2.12	The man runs to the tree with the ladder, and places it in front of it	0:26–0:27
2.13	The man goes up the ladder	0:28–0:30
2.14	The man grabs the cat in his arms	0:30–0:32
2.15	The man goes down the ladder, carrying the cat	0:33–0:34
2.16	The man puts the cat on the ground	0:34–0:34
2.17	The woman kisses the man on the cheek	0:35–0:37
	Video 3 (0.46 min)	
3.1	A man and a woman are walking in a park and holding hands	0:00–0:04
3.2	The woman points forward to a flower on the top of the hill	0:05–0:06
3.3	A blue flower on the top of a hill	0:07–0:08
3.4	The man runs to the top of the hill	0:08–0:11
3.5	The man's hand plucks the flower	0:12–0:13
3.6	The man runs back to the woman	0:14–0:17
3.7	The man gives the flower to the woman. A robber's head is visible above the top of a bush behind the couple	0:18–0:20
3.8	The robber crawls out of the bush, and forward	0:20–0:24
3.9	The robber stops behind the couple, stands up, takes the woman's handbag and runs away	0:25–0:27
3.10	The man runs after the robber	0:28–0:31
3.11	The robber trips over a big stone in front of a hole in the ground	0:32–0:33

(Continued)

(*Continued*)

Number	Description	Time stamps
3.12	The robber falls down the hole	0:32–0:33
3.13	The man jumps over the stone	0:33–0:33
3.14	The man jumps into the hole	0:34–0:35
3.15	The man jumps back up, carrying the handbag	0:36–0:38
3.16	The man runs forward	0:39–0:42
3.17	The man runs back to the woman gives her the handbag back	0:43–0:46
	Video 4 (0.38 min)	
4.1	A frontal view of a house.	0:00–0:02
4.2	A car appears from the left, approaches a house and stops in front of it	0:02–0:03
4.3	A man gets out of the car and walks to the entrance	0:03–0:04
4.4	The man opens the door to the house	0:04–0:05
4.5	Inside the house: the man steps in and closes the door	0:06–0:08
4.6	A woman sitting in an armchair puts her finger to her lips and points to a crib to the right	0:08–0:14
4.7	A baby is sleeping in the crib	0:55–0:16
4.8	The man nods	0:17–0:18
4.9	The man slowly walks on tiptoe	0:18–0:21
4.10	A bird flies out of its cage	0:22–0:24
4.11	A cat lying on the wardrobe stands up	0:24–0:25
4.12	The cat sees the bird flying past him	0:26–0:27
4.13	The cat jumps down from the wardrobe after the bird	0:28–0:31
4.14	The cat lands in the crib next to the baby	0:32–0:33
4.15	The baby sits up	0:34–0:35
4.16	The cat jumps down onto the floor and moves to the left	0:35–0:36
4.17	The man and the woman are standing with angry expressions on their faces. The man looks at the cat and points to the door	0:36–0:37
4.18	The cat runs to the door	0:37–0:38
	Video 5 (0.44 min)	
5.1	Two characters – a green one and a yellow one – are standing on a beach. A red warning buoy is floating in the water in front of them	0:00–0:04
5.2	The yellow character looks to his left	0:04–0:06
5.3	The view zooms in on a rock next to the waterfront	0:07–0:10
5.4	The yellow character is climbing the rock	0:11–0:12
5.5	The yellow character stands at the top of the rock and jumps down into the water	0:13–0:14
5.6	The green character's gaze follows the yellow character as he jumps down The yellow character reaches the water and plunges in	0:14–0:15
5.7	The green character walks into the water	0:15–0:16
5.8	Both character swim in the water	0:17–0:18
5.9	They swim past the red warning buoy floating in the center of screen	0:19–0:29
5.10	A shark's fin appears to the right and moves towards them	0:30–0:33
5.11	Both characters scream	0:33–0:35
5.12	Both characters swim, followed by the shark	0:36–0:38
5.13	A boat appears to the left. Both characters swim towards it from the right	0:39–0:42
5.14	Both characters climb into the boat	0:42–0:43
5.15		0:43–0:44
	Video 6 (0.54 min)	
6.1	Two men (one in a red t-shirt and one in a blue one) are standing on the top of a green hill in front of a spaceship	0:00–0:02
6.2	The men step into the spaceship	0:02–0:03
6.3	The door closes	0:03–0:04
6.4	The spaceship leaves the Earth	0:04–0:05
6.5	The rocket is flying in space	0:05–0:08

(*Continued*)

(*Continued*)

Number	Description	Time stamps
6.6	(Inside the spaceship) The man in the red shirt is holding two wine glasses, and approaching the man in the blue shirt	0:08–0:10
6.7	The one in blue pulls out a bottle of Champagne and opens it	0:10–0:12
6.8	Champagne splashes out	
6.9	The man's hand, with a glass in it, moves from left to right	0:12–0:13
6.10	Another man's hand pours Champagne into the glass	0:13–0:14
6.11	The men, standing and facing each other, start to float into the air	0:14–0:15
6.12	The Champagne floats out of the glasses	0:16–0:17
6.13	The doors of a cupboard open, and six plates float out	0:18–0:19
6.14	The two men and the plates are floating about	0:19–0:22
6.15	The rocket lands on the surface of a blue planet	0:22–0:24
6.16	The door opens	0:24–0:25
6.17	The man in red steps out of the spaceship	0:26–0:27
6.18	The man's foot slips on the icy surface	0:27–0:28
6.19	The man in red falls down and slides forward on his back	0:28–0:29
6.20	The man in blue pulls ice skates from behind his back	0:30–0:32
6.21	The two men skate away from the ship	0:32–0:37
6.22	A green alien is hopscotching on the icy surface	0:37–0:39
6.23	The alien moves towards the spaceship	0:39–0:40
6.24	The alien looks to the left and to the right	0:40–0:41
6.25	The alien hops into the spaceship	0:41–0:42
6.26	The men return to the spaceship and step in	0:43–0:47
6.27	The ship takes off	0:48–0:50
6.28	The alien jumps out of a cupboard and greets the men	0:50–0:54

Appendix D. Coding scheme for Semantic categories and the values they assume

Category	Values	Examples
Landmark	**GOAL** **MEDIUM** **SOURCE**	A woman walks into **a store** A woman goes to **a store** A man crosses **the street** A bird flies out of **a cage** A spaceship leaves **Earth**
Region	**INSIDE/OUTSIDE** **NEAR/FAR** **FRONT/BACK**	A woman goes **in/out of** the room A woman goes **from** the entrance **to** the register The bird passes **in front of** the cat The robber crawls **behind** the bushes
Frame of Reference	**Geocentric** **Viewpoint-centric** **Object-centric**	The ship goes **down** The balloon goes **up** A young couple **comes this way** The man runs **towards** the flower
Path	**BEGINNING** **MIDDLE** **END**	A bird flies **out of** a cage A spaceship **leaves** Earth A man **crosses** the street A woman walks **into** a store A woman goes **to** a store
Direction	**GC FoR: UP/DOWN** **VC FoR: TOWARDS/AWAY from DC** **OC: TOWARDS/AWAY from LM**	The cat jumps **down** The man climbs **up** A young couple **comes** The man runs **towards** the flower
Manner	**BODILY** **LOCOMOTION** **VEHICLE** **MEDIUM** **VELOCITY** **ATTITUDE**	He **jumps** down He **drives** home The ship **sinks** They **rush** back They **stroll** in the park
Shape	–	They **turn** around