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A Study on Path Categories in Motion Events

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ABSTRACT

This study addresses the ongoing debate regarding the categorization of the semantic component of Path, a core schema in motion events. Building on a review of previous proposals and considering the relationship between the motion of the Figure and the Ground (or the speaker), as well as typical patterns of directional motion observed in the physical world and conceptualized by languages, we propose a framework comprising four categories of Path: (1) "The Ground constitutes the origin, path, or destination of the Figure's motion," (2) "The Ground, located in the spatial orientation of the Figure, constitutes the direction of its motion," (3) "Place deixis," and (4) "Typical schemas of the Figure's motion in the physical world," encompassing at least 25 specific types. Furthermore, we compare how directional prepositions and satellites— the two primary direction markers—encode these Path types in Spanish and Chinese, with English as a reference. The findings show that these direction markers convey the four Path categories in complementary ways: directional prepositions primarily convey the first category, while satellites cover the remaining three. This supports the argument that directional prepositions, which also express a category of Path, should not be excluded from analyses of satellite-framed patterns. The study contributes to a deeper understanding of how languages encode Path and suggests that the interplay between prepositions and satellites in encoding Path categories can offer new insights into motion event semantics.

Keywords: Path Categories; Verb-Framed Language; Satellite-Framed Language; Chinese; Spanish

1. Introduction

Talmy's binary typology of motion events has garnered significant attention in the contrastive study of how different languages express motion. According to Talmy[1], the semantic component of Path in motion events remains constant across languages, which can be categorized into two types: satellite-framed languages and verb-framed languages. Satellite-framed languages, such as English and Chinese, typically encode Path through satellites—elements like verbal particles in English, separable and inseparable verb prefixes in German, and verbal complements in Chinese—, as exemplified by *into* in *The bottle floated into the cave*. In contrast, verb-framed languages, such as Spanish, tend to encode Path within the verb itself, as illustrated by *salió* 'exited' in *La botella salió de la cueva* 'The bottle exited the cave'.

As the core schema of motion events, Path has been a focal point in prior studies. Research exploring pragmatic contexts (in line with Slobin's work [2–8]) suggests that the encoding of Path—whether in the verb or satellite—reflects language-specific preferences, positioning languages on a continuum of Path salience [9, 10]. Other studies examine the relationship between a language's dominant pattern and its lexicon of Path verbs, proposing that verb-framed languages tend to possess a more extensive and granular lexicon of Path verbs [11–14]. However, some researchers contend that the lexicon of Path verbs is at least partially independent of the dominant verb-framed pattern [15, 16].

This study examines the categories of Path in motion events. As discussed in Section 2, while previous frameworks provide valuable references, they remain incomplete in certain respects. Moreover, Talmy's theory classifies the combination of Manner verbs and satellites as the satellite-framed pattern, excluding the combination of Manner verbs with directional prepositions. However, some scholars [17–21] argue that directional prepositions also encode Path in a manner akin to satellites, warranting their inclusion in the satellite-framed pattern when combined with Manner verbs. In response to these discussions, we propose a more comprehensive categorization of Path and analyze how prepositions and satellites encode Path in Spanish and Chinese, with English as a reference, to provide further insights into this issue.

The structure of the paper is as follows: Section 2 reviews the internal components and Path categories proposed in previous studies. Section 3 builds on these insights to present a revised framework for Path categories and their associated types. Section 4 examines how directional prepositions and satellites encode Path categories. Given that Spanish lacks satellites [2, 17], this analysis focuses on Chinese, with English as a reference. The findings in this section reinforce the argument that prepositions, which function as direction markers akin to satellites, should be included in the satellite-framed pattern. Finally, Section 5 provides the conclusion.

2. Path Categories in Previous Works

Previous studies on Path have predominantly focused on decomposing it from two perspectives. On one hand, researchers such as Talmy[1], Chu[23], and Slobin[24], view Path as a complex structure comprising multiple internal components. On the other hand, scholars like Wälchli[25], Berthele[26], and Cifuentes-Férez[12] propose various Path categories based on the directionality indicated in relation to the Figure (the moving entity) and/or the Ground (the reference entity associated with the Figure's movement).

2.1. Internal Components of Path

Talmy[1] identifies three internal components of Path: Vector, Configuration, and Deixis. The Vector "comprises the basic types of arrival, traversal, and departure," describing the movement of the Figure in relation to the Ground, as demonstrated in the following examples[1]:

(1) a. The napkin lay on the bed/in the box.
     b. The napkin blew onto the bed/into the box.

In (1), the vectors AT and TO are represented, by the prepositions on/in and onto/into, respectively. Additional types of vectors include FROM, VIA, ALONG, TOWARD, AWAY-FROM, ALENGTH, FROM-TO, ALONG-TO, and FROM-ALONG, among others.

Configuration refers to a "geometric complex" that defines the spatial relationship with the Ground. This concept is exemplified by two types of Configurations in English: inside (2) and surface (3)[1]:

(2) a. The ball rolled into the box.
     b. The ball rolled out of the box.

(3) a. The napkin blew onto the bed.
     b. The napkin blew off of the bed.

The examples in (2a) and (2b) represent the Configurations of *into the enclosure 'box'* and *out of the enclosure 'box'*, respectively. Similarly, the examples in (3a) and (3b) illustrate the Configurations of *onto the volume 'bed'* and *off of the volume 'bed'*.

The coding of Configuration varies across languages. For instance, in English, Configuration is typically encoded through prepositions, whereas in Spanish, it is expressed through verbal forms. As observed in the Spanish structure: Figure *salir de* 'exit from' Ground, the verb *salir* means 'MOVE FROM a point of the inside (of an enclosure)', encoding both the Vector 'FROM' and the Configuration 'inside (of an enclosure)', while the preposition *de* represents only the Vector 'FROM'.

Regarding Deixis, Talmy notes that it generally encompasses two notions: 'toward the speaker' and 'in a direction other than toward the speaker', represented respectively by the verbs *ir* and *venir*. Spanish clearly distinguishes between these two deictic verbs, as well as verbs that simultaneously encode both Vector and Configuration, such as *salir*, as previously mentioned.

Building on Talmy's proposal, Slobin[24] introduces a fourth internal component of Path: Earth-grid Displacement, which "relates Path directedness to earth-based geometry, such as up-down, over, north-south-east-west, and other absolute, earth-based coordinates."

In addition to the three internal components proposed by Talmy, Chu[23] argues for the inclusion of three more components for Chinese: Direction, Dimension, and Perspective.

Direction, which "involves the tropism of the motion of the Figure in space," consists of four basic sub-categories: (i) Vertical, determined with reference to the horizon or the Earth's surface, with two variants: Up and Down; (ii) Facing, determined by the intrinsic direction of the face or head, also with two variants: Forward and Backward; (iii) Returning, indicating that "a motion takes place on the same route with the same Figure as an earlier motion, but the direction of the current motion is opposite to the earlier motion"; and finally, (iv) Verging, which describes "different figures moving divergently away from or convergently toward a common Ground."

Dimension refers to the spatial extent of the Ground,

with each language potentially encoding it differently. This component consists of four types based on the indicated spatial dimension: (i) Zero dimensional, represented by a point: *We depart from Madrid*; (ii) One-dimensional, represented by a line: *We walk along the river*; (iii) Two-dimensional, represented by a plane: *That group of people dispersed*; and (iv) Three-dimensional, represented by a volume: *He entered the classroom*.

Perspective not only addresses the spatial relationship between the Figure and the Ground but also the mental anchorage of the speaker in relation to these two semantic components and the speaker themselves. On one hand, the speaker selects the Ground as the anchor for conceptualization; on the other hand, they focus on another Ground, referring to the region where the Figure will be after the motion occurs.

Moreover, the author considers Deixis to be part of Perspective, which consists of two subcomponents: (i) Hither: the speaker is in the region of attention; (ii) Thither: the speaker is in the anchorage.

In summary, the internal components of Path proposed by Chu[23] are:

(4) a. Vector: Arrive, Departure, Traversal
     b. Conformation: Inside/Outside, Surface, Besides, Above/Beneath
     c. Direction: Vertical (Up/Down), Horizontal (Forward, Backward), Facing (Front/Back/Side), Returning, Verging (Divergent/Convergent)
     d. Dimension: Zero Dimension (Point), One Dimension (Line), Two Dimension (Plane), Three Dimension (Volume)
     e. Perspective: Basic (Anchorage, Region of Attention), Deictic (Hither/Thither).

2.2. Path Categories Based on the Direction Indicated in Relation to the Figure and/or the Ground

Based on the direction indicated in relation to the Figure and/or the Ground, Wälchli[25] proposes six fundamental Path categories for intransitive motion, each named with corresponding Latin prepositions:

(5) a. AD: 'the Figure goes to the Ground'
     b. IN: 'the Figure goes into the Ground'

c. SUPER: 'the Figure goes onto the Ground'

d. AB: 'the Figure comes away from the Ground'

e. EX: 'the Figure come out of the Ground'

f. DE: 'the Figure comes down from the Ground'

The author categorizes the first three types as goal-oriented paths and the last three as source-oriented paths. Berthele[26] adopts Wälchli's classification but introduces two slight modifications. First, the author argues that the vertical Path types, SUPER and DE (types c and f), can be regarded as special cases of motion either away from or toward a ground, as illustrated by the following examples from French:

(6) a. *Le garçon tombe de l'arbre.*
   'The boy falls from the tree'

b. *Le garçon tombe sur le sol.*
   'The boy falls onto the ground'

The verb *tombe*, which encodes the Path 'downward,' can combine with both a source (6a) and a goal (6b). Consequently, the author dismisses the need to specify source and goal along the vertical axis. Additionally, since the verbs *go* and *come* can be associated with deixis, the author replaces them with the more generic term *displace* to avoid unnecessary confusion. The reformulated Path categories are as follows[26]:

(7) a. AD: 'the Figure displaces to the Ground'

b. IN: 'the Figure displaces into the Ground'

c. SUPER: 'the Figure displaces up'

d. AB: 'the Figure displaces away from the Ground'

e. EX: 'the Figure displaces out of the Ground'

f. DE: 'the Figure displaces down'

Building on the works of Wälchli[25] and Berthele[26], Cifuentes-Férez[12] proposes thirteen Path categories:

(8) a. To/toward Ground (arrival, endpoint): *reach*, *arrive*

b. Away from Ground (departure, source): *abandon*, *depart*

c. Into Ground (container): *enter*, *immigrate*

d. Out of Ground (container): *exit*

e. Up/onto Ground - Upwards: *embark*, *mount*, *scale*

f. Down/down from Ground - Downwards: *descend*, *sink*, *fall*

g. Pass/cross Ground (traversal, milestone): *traverse*,

pass, *cross*

h. Closer to Ground: *approach*

i. Forwards: *advance*

j. Back to Ground/Backwards: *back*

k. Change direction: *swerve*

l. Multiple directions from a unique start: *scatter*

m. After Ground: *follow*

In this section, we have examined the key proposals concerning the internal components and categories of Path. It is important to note that studies from both perspectives are not mutually exclusive; rather, they represent an evolutionary progression based on the framework established by Talmy[1].

3. Path Categories in Our Proposal

Based on previous studies, we suggest that, regardless of the specific grammatical form used to encode Path (such as verb, preposition, or satellite), there are four categories of Path of motion. The first and second categories are determined by the spatial relationship between the motion of the Figure and the Ground, the third category is defined by the spatial relationship between the Figure's motion and the speaker, and the fourth refers to the typical directional motion forms of the Figure as conceptualized in natural languages.

1) Category I: The Ground as the origin, path, or destination of the Figure's motion

When the Figure moves, the Ground can constitute the origin (*from*), the path (*via*, *along*, *through*) or the destination (*toward*, *up to*, *to*). This category includes the following three basic types of Path:

- Origin: the Figure moves from the Ground
- Path: the Figure moves via the Ground
- Destination: the Figure moves toward/to the Ground

These types of Paths exhibit partial overlap with the internal component of the Vector as delineated by Talmy. However, the present study does not focus on complex Paths, as the number of such Paths, composed of simpler components, could be extensive. The primary objective here is to identify and categorize the most fundamental and elementary Path types. With respect to the 'away' Path, which corresponds to the 'away from' Vector, we deem it more appropriate to classify it under the fourth category of Path: "Typical schemas

of the Figure's motion in the physical world."

2) Category II: The Ground located in the spatial orientation of the Figure constitutes the direction of its motion

Spatial orientations refer to the spatial relations of the Figure within the physical world, encompassing a range of concepts that define its position relative to the Ground. These orientations typically include the following 14 categories:

- Vertical axis: *above* and *below*
- Horizontal axis: *front*, *behind*, *inside*, *outside*, *side*, *opposite*, *left*, *right*, etc.
- Cardinal directions: *east*, *west*, *south*, *north*, etc.

The spatial orientations of the Figure, along with the Ground positioned within them, together determine the possible directions of the Figure's motion:

(9)   a. John has gone south.
       b. John climbed to the bridge.

As illustrated in (9a), the spatial orientation 'south' of the Figure serves as the Ground, constituting the destination of the motion, thereby indicating that the Path is 'to the south.' In (9b), the Ground 'bridge,' situated within the spatial orientation 'above' of the Figure, represents the destination to which the Figure moves, thus the path is 'up.'

Consequently, this category of Path can encompass at least the following 14 basic types:

- The Figure moves toward/to the Ground located in its spatial orientation (where the spatial orientation of the Figure may include: - above, - below, - front, - behind, - inside, - outside, - side, - opposite, - left, - right, - east, - west, - south, - north, etc.)

It should be noted that the spatial orientations of the Figure may vary across languages, as they depend on how each language conceptualizes spatial notions. For example, in Chinese, there are variants of certain notions related to vertical and horizontal axes that are absent in both Spanish and English:

(10)   a. 斜上方 *xié shàngfāng* [oblique-above] '(oblique) above'
        b. 斜下方 *xié xiàfāng* [oblique-below] '(oblique) below'
        c. 斜前方 *xié qiánfāng* [oblique-in front] '(oblique) front'
        d. 斜后方 *xié hòufāng* [oblique-behind] '(oblique) behind'
        e. 斜对面 *xié duìmiàn* [oblique-opposite] '(oblique) opposite'
        f. 左/右上方 *zuǒ/yòu shàngfāng* [left/right-above] '(left/right) above'
        g. 左/右下方 *zuǒ/yòu xiàfāng* [left/right-below] '(left/right) below'
        h. 左/右前方 *zuǒ/yòu qiánfāng* [left/right-in front] '(left/right) front'
        i. 左/右后方 *zuǒ/yòu hòufāng* [left/right-behind] '(left/right) behind'

Although the motion in the direction toward/to/from these spatial orientations is not explicitly encoded in the verb, preposition, or satellite, it nonetheless constitutes a valid path for the Figure's motion, as illustrated in the following example: 他去斜对面了 *tā qù xié duìmiàn le* 'He went to the oblique front (not straight)'. Moreover, languages may vary in terms of how the motion toward/to these spatial orientations is encoded in grammatical forms. For instance, with respect to cardinal directions, Spanish lacks verbs or satellites to encode them, while English employs satellites (e.g., *north*, *northward*) and Chinese uses verbs (北上 *běishàng* 'go north', 南下 *nánxià* 'go soutt') to encode such directions[16]. In contrast, to express the direction 'toward/to the side', Spanish uses the verb *ladearse*, English employs the satellite *aside*, whereas Chinese lacks a verb or satellite to lexicalize it.

3) Category III: Place Deixis

Place deixis specifies the relationship between the speaker and the Figur's motion, represented by the demonstrative adverbs in Spanish: *aquí* 'here', *acá* 'here', *ahí* 'there', *allí* 'there', *allá* 'over there' ; in English: *here* and *there*; and in Chinese: 这里 *zhèlǐ* 'here' and 那里 *nàlǐ* 'there'. These deictic expressions, along with the Ground associated with these deictic relationships, can also indicate possible directions of motion for the Figure. This category of Path fundamentally includes the following two basic types (noting that Spanish has additional variants of deixis):

- The Figure moves in a direction away from the speaker.
- The Figure moves in a direction toward/to the speaker.

4) Category IV: Typical schemas of the Figure's motion in the physical world

This category encompasses at least the following six

schemas of motion, which are represented in space and encoded in natural languages. The first three schemas also relate to the Figure's motion in relation to the Ground, similar to the first two Path categories:

- Approaching the Ground
- Moving away from the Ground
- Displacing behind the Ground, which also moves
- Multiple directions from a single starting point
- Several Figures displacing toward/to the same destination
- Changing direction

It is important to note that this category does not include motion types referred to as *Path Contour* (path shape), such as zigzag, curve, circular motion. This is considered controversial since some researchers regard it as a type of Manner that does not specify the direction of motion [12, 27, 28], while others classify it as Path [1, 29–31]. This study concurs with Zhang [28], who considers *Path Contour* (path shape) to be a specific type of Path, termed Non-Directional Path, which is distinct from the Path considered in this work, as the latter always entails a specific direction of motion.

4. The Encoding of Path in Direction Markers in Spanish and Chinese

In this section, we examine the types of Path encoded by direction markers (i.e., directional prepositions and satellites) in Spanish and Chinese. In Section 4.1, we contrast the directional prepositions used in both languages. In Section 4.2, considering that Spanish lacks satellites [2, 17, 22], we discuss the types of Path encoded by Chinese directional complements, with references to English particles. Finally, in Section 4.3, we argue that the combination of Manner verb and directional preposition forms a satellite-framed pattern, which should not be overlooked when analyzing the encoding of motion events.

4.1. Directional Prepositions in Spanish and Chinese

Directional prepositions specify the spatial relationship between the Figure's motion and the Ground, and they correspond to the first category of Path (The Ground as the origin, path, or destination of the Figure's motion), as shown in the following four subsections.

4.1.1. Origin Preposition

The origin preposition indicates that the Ground serves as the starting point for the Figure's motion. In Spanish, two prepositions denote origin: *de* and *desde*. According to the DLE [32], *de* refers to "the source or departure point of someone or something" while *desde* indicates "the point, in time or place, from which something, an event, or a distance originates or is to be counted." In the context of motion events, *desde* differs from *de* by emphasizing the continuation of an action over time, with an initial limit [33–36].

In Chinese, four primary prepositions convey the meaning of 'from': 从 *cóng*, 由 *yóu*, 自 *zì*, and 于 *yú* [37, 38]. Among these, 从 *cóng* is the most used in both spoken and written language. 由 *yóu* is more frequently found in written contexts. Syntactically, both prepositions can only appear before the predicate. 自 *zì* typically follows the verb and is often lexicalized when combined with other morphemes to form compound words, such as 来自 *láizì* 'come from', 出自 *chūzì* 'derive from', 选自 *xuǎnzì* 'selected from', and 发自 *fāzì* 'emanate from'. 于 *yú* is a highly lexicalized morpheme, predominantly used in written language. To convey the meaning of *desde* 'from', the adverb 一直 *yìzhí*, meaning 'straightly; continuously' is often inserted between the prepositional phrase (PP) headed by any of the first three prepositions and the verb (PP + 一直 *yìzhí* + V), or it can precede the PP (一直 *yìzhí* + PP + V).

4.1.2. Path Preposition

In Spanish, Path prepositions can convey two distinct types of spatial relationships:

i) Transit: This refers to a relationship where the object or reference location is part of the internal space of the Path [36]. The path may either include the Ground, as in **ir a Madrid por la carretera* 'to go to Madrid by the road', or not include it, as in *el tour de Francia pasa por su casa* 'the Tour de France passes by your house' [36]. The prepositions *por* and *vía*, as well as by the prepositional phrase *a través de* 'through', are used to express this type of spatial relationship.

ii) Extension: In this case, the Ground serves as the spatial frame of the Figure's path: *pasear por Madrid* 'to stroll through Madrid', or as distributed points: *viajar por las capitales europeas* 'to travel through European capitals' [36]. The prepositional phrases *a lo largo de*

(along) and *a lo ancho de* (across) also express this type of relationship, where the Ground serves as a spatial framework for the Figure's motion.

In Chinese, there are numerous path prepositions, with the primary ones being: 经 *jīng* 'by', 经过 *jīngguò* 'by', 从 *cóng* 'by', 沿 *yán* 'along', 沿着 *yánzhe* 'along', and 顺着 *shùnzhe* 'along'[37]. The first two prepositions imply that the Ground traversed during movement is a point along the path, while the latter two suggest that the path itself is linear, denoting an extended route.

4.1.3. Direction Preposition

Direction prepositions indicate that the Ground is the destination toward which the Figure moves, without specifying whether arrival at the Ground has occurred. In Spanish, the primary direction prepositions are *hacia* 'toward' and *para* 'for'. These two prepositions differ in their nuances: para expresses the intention or purpose of the object-theme in motion[36], while *hacia* does not carry this implication. Additionally, prepositional phrases like *en dirección a* 'in the direction of', *camino de* 'on the way to', and *con rumbo a* 'heading for' can convey the meanings of these directional prepositions.

In Chinese, the common directional prepositions are: 向 *xiàng*, 朝 *cháo*, 往 *wǎng*, and 冲 *chòng*, all of which can be translated as 'toward'. Among these, 向 *xiàng* and 朝 *cháo* are the two most used prepositions, appearing in both spoken and written language without significant restrictions. These prepositions can combine with nearly any type of place name or object. In contrast, 往 *wǎng* is typically used with a more specific Ground, often acquiring a stronger spatial connotation when referring to physical locations or demonstrative adverbs, rather than institutional names or pronouns[38]:

(11) a. *他往我走来。
     tā wǎng wǒ zǒu lái.
     He toward I walk come
     (Intended) 'He comes toward me'
   b. 他往我这儿走来。
     tā wǎng wǒ zhèèr zǒu lái.
     He toward I here walk come.
     'He comes toward me'

As demonstrated in the examples, 往 *wǎng* cannot combine with the pronoun 我 *wǒ* 'I' (11a), as this usage implies a weaker spatial meaning, but must be followed by the demon-strative adverb 这儿 *zhèèr* 'here' (11b) to reinforce the spatial meaning and make the sentence grammatically correct.

Finally, the preposition 冲 *chòng* is more commonly found in spoken language. According to Fan[38], unlike the previous three prepositions, 冲 *chòng* is often used with motion verbs that imply strong directionality, such as 砸 *zá* 'to hit', 撞 *zhuàng* 'to crash', 踢 *tī* 'to kick', 扔 *rēng* 'to throw', 投 *tóu* 'to launch', 射 *shè* 'to shoot', and 喷 *pēn* 'to spray under pressure'. This preference arises because the prepositional use of 冲 *chòng* still retains the verbal meaning of 'to throw oneself'.

4.1.4. Goal Preposition

Goal prepositions indicate that the Ground constitutes the destination of the Figure's motion.

In Spanish, there are two goal prepositions: *a* and *hasta*, which contrast with the two source prepositions *de* and *desde*. The preposition *a* has been debated in terms of its directional vs. locative use. Some scholars argue that *a* functions as a directional preposition, similar to *to* in English[39, 40], while others contend that it serves a locative function, akin to *at*[41, 42]. On the other hand, *hasta* denotes the continuation of an action toward the destination, and it is this extensive value that prevents verbs expressing only the projection of movement from accepting *hasta*. Instead, these verbs require *a*[35, 36], which specifies a direct destination without implying continuation.

In Chinese, the word 到 *dào* marks the goal of the Figure's movement, indicating a destination. The preposition 于 *yú* 'to' can also serve this function, but its use is restricted to written language and is highly formal. To convey the meaning of *hasta*, Chinese combines the adverb "一直 *yìzhí* 'straight; continuously' with a verb and 到 *dào*" to indicate motion extending to the goal[27], as in the expression 一直 走到 *yìzhí zǒu dào*, meaning "to walk straight to (a place)."

4.2. Satellites in Chinese and English

In **Table 1**, we present the types of Paths encoded in Chinese satellites, comparing them with the corresponding English satellites as outlined by Talmy[1]. The table is organized into five columns: the first column indicates the category of Path to which the Path encoded by the satellite belongs; the second column lists the numbering of the specific types of Paths; the third column describes the types of

Paths; and the fourth and fifth columns list the respective satellites in Chinese and English.

Table 1. Types of Paths Encoded by Chinese and English Satellites.

Path Category	No.	Type of Path	Satellite (Chinese)	Satellite (English)
Category I: Origin, Path, and Destination	1	through	过 *guò*	across, through, past, by
Category II: The Ground located in the spatial orientation of the Figure constitutes the direction of its motion	2	into	进 *jìn*	in
	3	out	出 *chū*	out
	4	up	上 *shàng*, 起 *qǐ*	up1, on, above
	5	down	下 *xià*	below, off1
	6	(Toward) forward	-	ahead, forth, up2, along
	7	(Toward) backward	回 *huí* 'regresar', 退 *tuì* 'retroceder'	back
	8	Toward/to + side	-	aside
	9	Toward/to + south	-	south(ward)
	10	Toward/to + north	-	north(ward)
	11	Toward/to + east	-	east(ward)
	12	Toward/to + west	-	west(ward)
Category III: Place deixis	13	In the direction away from the speaker	去 *qù*	-
	14	In the direction toward the speaker	来 *lái*	-
Category IV: Typical schemas of the Figure' motion in the physical world	15	Moving away from the Ground	开 *kāi*, 走 *zǒu*, 跑 *pǎo*, 飞 *fēi*, 掉 *diào* 'alejar'	away, off2
	16	Following the Ground	-	after
	17	Multiple directions from a single starting point	散 *sàn*	-
	18	Several Figures displacing toward/to the same destination	-	together

According to **Table 1**, Chinese has 10 types of Path satellites, while English has 15. In the first category of Path, although both languages have a satellite that encodes 'through' (type 1), as previously noted, most of the remaining types within this category are primarily encoded by prepositions. The second category of Path is the most extensively represented by satellites: out of the 14 types of Paths in this category, Chinese encodes 6 types, while English encodes 11. Both languages feature satellites that encode 'into (type 2), 'out' (type 3), 'up' (type 4), 'down' (type 5), and '(toward) backward' (type 7), which are among the most frequently used in spatial motion. In the third and fourth categories, both languages include a satellite that encodes 'moving away from the Ground' (type 15). However, for the remaining categories, only one of the two languages encodes the relevant Path.

4.3. The Preposition Should Not Be Excluded from the Satellite-Framed Pattern

In Talmy' s binary typology of verb-framed and satellite-framed languages, only the satellite is typically considered in encoding Path, while prepositions that also encode Path are excluded. Talmy proposes a test to differentiate the preposition from the Path in English, asserting that when the Ground is omitted, only the preposition disappears, while the satellite remains[1].

However, Talmy[1] acknowledges that prepositions can also convey Path. First, the internal component of the Vector, as outlined by Talmy, includes nearly all directional prepositions in English, as discussed in Section 2.1. Second, as noted by some researchers[43, 44], Talmy himself uses examples where prepositions like *into*, *to*, and *toward* encode Path to illustrate the satellite-framed pattern. In fact, numerous studies incorporate the preposition into Talmy' s binary typology, such as those examining *hacia*, *a*, and *hasta* in Spanish[18, 41].

On the other hand, Beavers et al.[18] argue that "it seems semantically unmotivated to distinguish obligatory vs. optional ground elements." For instance, in the sentence *John ran in*, although the Ground is unexpressed, it is implied that *in (the house)* (12a) represents 'satellite + Ground,' which can be explicitly stated as *to the store* in (12b), representing 'preposition + Ground.' Both constructions indicate a destination of movement and can be used interchangeably to convey the same semantic concept, encoding the same motion event:

(12)   a. John ran in (the house).
       b. John ran to the store.

As discussed in Sections 4.1 and 4.2, prepositions encode the first category of Path, while satellites primarily represent the last three categories. Together, prepositions and satellites function complementarily, covering all four Path categories that can occur in the physical world. Consequently, we argue that, based on the points outlined above, prepositions should not be excluded from the satellite-framed pattern.

5. Conclusions

Considering the variety of proposals on the categories of Path—which Talmy regards as the core schema of motion events—and building upon previous studies, we propose four Path categories encompassing at least 25 types. These categories account for the relationship between the Figure's motion and the Ground/speaker (categories I, II, and III), as well as typical types of directional motion observed in the real world and conceptualized by languages (category IV).

1) Category I: The Ground constitutes the origin, path, or destination of the Figure's motion

   - The Figure moves from the Ground (Origin)
   - The Figure moves via the Ground (Path)
   - The Figure moves toward/to the Ground (Destination)

2) Category II: The Ground, located in the spatial orientation of the Figure, constitutes the direction of its motion (Spatial orientations include: - above, - below, - front, - behind, - inside, - outside, - side, - opposite, - left, - right, - east, - west, - south, - north, etc.)

3) Category III: Place deixis

   - The Figure moves in a direction away from the speaker.
   - The Figure moves in a direction toward/to the speaker.

4) Category IV: Typical schemas of the Figure's motion in the physical world

   - Approaching the Ground
   - Moving away from the Ground
   - Moving behind the Ground, which is also moving
   - Multiple directions from a single starting point
   - Several Figures move toward/to the same destination
   - Changing direction

Regarding the encoding of these Path categories (and their types) in direction markers, our analysis demonstrates that prepositions primarily encode the first category of Path, while satellites lexicalize the remaining three categories, particularly the types 'into,' 'out,' 'up,' 'down,' and '(toward) backward' from the second category. Since these two types of direction markers function complementarily to encode the four categories of Path, we argue that the combination of "Manner verb + directional preposition" should be recognized as part of the satellite-framed pattern.

Author Contributions

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