Naming motion events in Spanish and English

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Abstract

This research asked whether speakers are influenced by systematic semantic patterns in their language in forming new word meanings. We used the novel word mapping technique (Nagy and Gentner 1990) to test whether English and Spanish speakers would show effects of their differing semantic systems in inferring the meanings of novel motion verbs. We also tested for any language-specific effects in inferring novel nouns. Participants were given short passages containing either a novel noun or a novel motion verb, and were asked to infer the meaning of the novel word. The passages provided information about both the path and the manner of a novel motion event. Consistent with the semantic patterns in the respective languages, English speakers were more likely to infer a manner interpretation than a path interpretation and Spanish speakers showed the reverse pattern. Language-specific effects were not found for the meanings inferred for novel nouns.

Keywords: *cross-linguistic semantic patterns; motion verbs; novel word mapping; relational relativity.*

1. Introduction

This research asks whether speakers are influenced by systematic semantic patterns in their language in forming new word meaning. We focus on the domain of motion, for which there is abundant linguistic evidence that different languages code motion events in systematically different ways. As Talmy (2000: 25) defines it, "The basic Motion event consists of one object (the *Figure*) moving or located with respect to another object (the reference object or *Ground*)". Talmy's (1975, 1985, 2000) seminal work laid out several components of a motion event: the basic *change of*

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location of some figure (the defining feature of a motion event), the *path* of the moving figure with respect to some ground object; and the *manner* of motion of the figure. It further established the familiar typology of *path languages* (or *verb-framed languages*) (such as Spanish, French, Turkish, and Japanese) and *manner languages* (or *satellite-framed languages*) (such as English, German, Dutch, Russian, and Chinese).

The terms "verb-framed" and "satellite-framed" describe the way languages express the path component, generally considered to be the core of a motion event (Slobin 2003; Talmy 1985, 2000). In a verb-framed language, path is expressed by the main verb (e.g., *descend*, *traverse*), whereas in satellite-framed languages path is expressed by a satellite—a verb particle or preposition (e.g., *go down*, *go across*). In English (a satellite-framed language), the manner of motion is expressed in the verb, with the path expressed in a satellite. In Spanish (a verb-framed language), the path is expressed in the verb, with manner as an optional satellite. For example, English and Spanish speakers would describe the same event—a bottle moving on top of the water past a rock—as follows:

(1) a. Spanish
La botella pasó por la piedra, flotando
'The bottle passed by the rock floating'
b. English
The bottle floated past the rock

Over the last decade, there has been considerable research on different lexicalization patterns of motion events across spoken languages (e.g., Aske 1989; Berman and Slobin 1994; Ibarretxe 2004a, b; Naigles et al. 1998; Naigles and Terrazas 1998; Slobin 1991, 1996, 2003; Zlatev and Yangkang 2004) and in sign languages (e.g., Galvan and Taub 2003; Slobin and Hoiting 1994; Taub and Galvan 2000). Some of this research has asked whether these differences in semantic patterns lead to differences in non-linguistic cognition, with mixed results. For example, several studies have shown participants videotaped events and have tested for differential memory for aspects of the event based either on the language set given in the study (e.g., whether a manner or a path verb was used) or on biases in the participants' language: e.g., English speakers would be expected to remember manner information and Spanish speakers, path information. Some researchers using this paradigm have found evidence for Whorfian effects (Billman and Krych 1998; Oh 2003), while others have found no effect of language on participants' later memory (Gennari et al. 2002; Papafragou et al. 2002).

However, while the results are inconclusive as to whether language-specific semantic patterns lead to differential event memory, there is

abundant evidence for language-specific patterns in the way English and Spanish speakers *describe* a motion event (Malt et al. 2003; Slobin 1996). There is also evidence that these different lexical patterns give rise to different mental images, even when Spanish and English speakers are given the same text (Slobin 2000).

In this research, we ask whether there are psychologically real effects of language-specific semantic systems in influencing how speakers form new word meanings. If the semantic system of a language is truly generative, then it should influence speakers' patterns of deriving a meaning from context: in other words, how speakers map between word and world. We compare English and Spanish speakers and ask whether the different semantic patterns for motion verbs in these two languages will generate different patterns of interpretation when a new verb is encountered.

Our method is based on previous studies by Nagy and Gentner (1990). They investigated the role of conceptual and linguistic knowledge in the way adult speakers of English infer the meanings of novel nouns and verbs from a rich context. Nagy and Gentner proposed two kinds of implicit constraints or biases that guide this process: (1) language-general knowledge such as a *durative assumption* for nouns—i.e., that nouns are usually differentiated in terms of long-term rather than short-term properties (with some exceptions, such as *lightening*); and (2) language-specific knowledge such as the English pattern of manner incorporation in motion verbs. To test whether these biases operate when inferring new word meanings, Nagy and Gentner used a *novel word mapping* technique, whereby participants read a passage containing a novel word (either a noun or a verb) and had to infer its meaning. The passages described novel situations (such as a planet inhabited by Darsts) and presented the novel noun/verb in a rich context:

[. . .]*She slipped them into the peashooter and, with an accuracy that amazed me, she saptyned the unsuspecting animal* (verb version) / *she ensnared the unsuspecting saptyn*, (noun version)

After reading the passage, participants were asked questions that revealed what they had inferred as the meaning of the word: for example, "How did the head of the hunting party snare the animal?" (verb version) and "What sort of animal did the young Darst try to catch?" (noun version). Participants showed systematic differences in which elements they mapped from context based on whether the new word was a noun or a verb. Nagy and Gentner (1990: 188) illustrated the phenomenon with an analogy: nouns and verbs are like two different kinds of magnets each of which, like a magnet dipped into a mixture of iron fillings and sand, attracts different specific components of the context.

In the present study, we use this novel word mapping technique to address whether there are cross-linguistic differences in inferring word meanings based on the kinds of semantic differences described above. We ask whether English and Spanish speakers will show effects of their differing semantic systems in inferring the meanings of novel motion verbs. We also investigated patterns of inferring novel noun meaning, to test whether language-specific effects are present to a greater degree for verbs than for nouns.

If the semantic patterns described in the literature are truly generative, then speakers' mappings for verbs should reflect language-specific lexicalization patterns: English speakers should assume that the verb's meaning includes manner information and Spanish speakers should assume that the verb's meaning includes the path information. A second prediction stems from the claim discussed above, that path is the core of a motion event. This claim predicts an asymmetry in the use of satellites and/or further elements outside the main verb in the English and Spanish interpretations: namely, English speakers should be more likely than Spanish speakers to use satellites. This is because when Spanish speakers state the meaning of the new verb, they should use a path verb as their main verb, adding an optional manner satellite[1]—e.g., a gerund (*arrastrando los pies* 'by shuffling the feet') or an adverb (*rápidamente* 'quickly')—if they wish to include manner information. In contrast, English speakers should use a manner verb as the main verb. But this choice leaves them without an expression of path information. Thus, if the Talmy-Slobin claim is correct, and path is perceived as the core of a motion event, then English participants should be highly likely to add a satellite expressing path information (typically, a particle or preposition—e.g., *shuffle across*, *climb down*). Thus we predict that English speakers are far more likely to provide a satellite (which will typically express path) than are Spanish speakers to provide a satellite (which will typically express manner).

A third prediction is that nouns and verbs should show different patterns. Whereas verbs should show language-specific semantic interpretations, nouns (at least concrete nouns) should be interpreted in roughly the same way across languages. This prediction follows from the Relational Relativity hypothesis (Gentner 1982; Gentner and Boroditsky 2001):

> [W]hen we lexicalize the perceptual world, the assignment of relational terms is more variable crosslinguistically than that of nominal terms [...] Predicates show a more variable mapping from concepts to words. A language has more degrees of freedom in lexicalizing relations between coherent objects than in lexicalizing the objects themselves. (Gentner 1982: 323–325)

According to this view, novel nouns will governed by language-general patterns; they will be interpreted as object-reference terms by speakers of both languages.[2] In contrast, novel verbs will display language-specific semantic patterns. This predicts that noun interpretations will match better across the two languages than will verb interpretations.

2. Experiment

We presented English and Spanish monolingual speakers with eight short passages containing either a novel noun or a novel verb. After each such passage they were asked "What does X mean?" or "What is an X?" In order to prevent people from simply translating the novel words into existing words, the passages described unusual events—e.g., rolling a device designed to remove burrs over one's clothes; moving across a hall by using cleaning-rags underneath one's shoes, etc. The descriptions of the events always included both a path and a manner, so that participants could lexicalize either or both. The passages were designed so that either a novel noun or a novel verb could appear in roughly the same context. For example:

Noun version

So she decided to keep walking up the river and look for a bridge. After a while she noticed the river had become shallow and not so dangerous. So she took off her shoes and socks, rolled up her jeans and crossed at the ***ransin****. That night she was very happy to be back among friends again*. [The boldface highlighting the novel word did not appear in the participants' version].

Verb version

So she decided to keep walking up the river and look for a bridge. After a while she noticed the river had become shallow and not so dangerous. So she took off her shoes and socks, rolled up her jeans and ***ransined*** *the river. That night she was very happy to be back among friends again*.

In designing the passages, one question we faced was whether to use a simple transitive frame or to add a preposition to the novel verb (see examples below). The use of a preposition encourages the inference that the verb depicts manner, whereas the use of a simple transitive frame leaves speakers more free to infer that the verb depicts path. In order to ensure that the syntactic frame was biased *against* our predicted patterns, we used frames that should bias for path verbs in English and for manner verbs in Spanish. Thus, for the English passages, we used verb + NP (article, noun). For example: *He bordeured the tree; He truffeted his clothes; and managed to blick The Rock*.

Likewise, we used intransitive frame plus preposition verb + preposition + NP (definite article, noun) for the Spanish passages: for example: *Así que bordeuró al árbol; Lo truffeteaba por la ropa; y logró blicker a La Roca*.

To review, the predictions are that (1) English and Spanish participants will differ in their interpretations of novel verbs, with Spanish speakers using a path verb as the main verb in their interpretations and English speakers using a manner verb; (2) English participants will use satellites more often than Spanish speakers; this is because satellites should convey essential path information in English and optional manner information in Spanish; and (3) novel noun interpretations should match better across the two languages than novel verb interpretations.

2.1. *Method*

2.1.1. *Participants* The participants were 46 English speakers from Northwestern University, Evanston, Illinois and 45 Spanish speakers (12 from Durango, Mexico, and 33 from Murcia, Spain) ranging in age from 16 to 35 years old.

2.1.2. *Materials* The stimuli were eight short passages (see Appendix). Each passage had two versions: noun and verb. Each one depicted in great detail the background for the motion event, so that participants had enough information to infer the meaning of either a noun or a verb. As noted above, we used a simple transitive frame for the novel verb sentence in the English version and an intransitive frame plus preposition in the Spanish version.

Apart from these differences in syntactic frames, the English and Spanish versions were the same. For the noun versions, we used a novel nominal form in the same key sentence. Thus, the noun and verb versions differed only in the part of speech of the novel word and not in the information provided by the context. Novel verbs were given in the past tense morphology in both English and Spanish. Novel nouns in Spanish were preceded by both the masculine and feminine indefinite article (e.g., *había un/una monse; There was a monse*) so as not to bias participants in their interpretation of the referent (Boroditsky et al. 2003).

2.1.3. *Procedure* Participants were given a three-page booklet containing the eight short passages. They were run individually in a quiet room. They were told to read eight short stories at their own pace and to take the time they needed to answer every question after each story. Instructions were given in the participants' native language. No time limit was given.

2.1.4. *Design* A 2×2 design was used, with Language (English vs. Spanish) as a between-subjects factor and Word class (noun or verb) as a within-subject factor. Each participant received eight passages, four containing a novel noun and four containing a novel verb. Noun and verb passages were presented in alternating order. Across participants, each passage was presented half the time in the noun version and half the time in the verb version. Also, to forestall carryover effects, the passages were shown in two different orders, one the reverse of the other.

2.1.5. *Scoring* To evaluate predictions (1) and (2) we coded the way the two groups of participants interpreted the novel words. When coding verb[3] interpretations we first coded the main verbs as *path*, *manner* or *neutral*. Some examples of path verbs are *levantar* 'lift', *salir* 'go out', *descender* 'descend', *subir* 'go up' in Spanish, and *traverse, descend, enter, cross* in English. Some manner verbs are *zarandear* 'shake, sieve', *saltar* 'jump', *cepillar* 'brush' and in English, *shuffle*, *roll*, and *climb*. We coded verbs that do not specify either path or manner of motion as *neutral verbs*. Examples are *go, gather, explore, clean* (English) and *separar* 'separate', *atrapar* 'catch' and *abrir* 'open' in Spanish. There were also three verbs that were coded as containing both path and manner information: *overrun* in English, and *trepar* 'climb up' and *escalar* 'climb up by using a rope' in Spanish. We also coded for the presence of satellites: prepositions, adverbs, and gerunds/participles.

For nouns, we coded the main noun and noted the presence of further descriptive detail. For example, *stick* and *stick with a soft net at the end* would be grouped, as they have the same main noun.

2.1.6. *Matching* To evaluate prediction (3)—that novel noun interpretations would match better across the two languages than novel verb interpretations—we needed to compare the degree of semantic match between the two languages for nouns and for verbs. To make this determination, we used both strict and liberal criteria. For verbs, the strict scoring required that the main verbs used in the English and Spanish interpretations be translationally equivalent: e.g., *descend* and *descender*. The liberal criterion allowed close but not perfect translational equivalents to count as matches. For example, Spanish *trepar* 'climb up' and *escalar* 'climb up by using a rope' counted as matches for the English verb *climb*. As another example, English *ford* (as in *ford the river*) was scored as a loose match for Spanish *cruzar* 'to cross'.

For nouns, as for verbs, the strict coding required matches those were translationally equivalent: e.g., *brush* as a match for *cepillo* 'brush'. The liberal coding allowed matches that were close in meaning but not

equivalent: e.g., *slippers* and *sandals* for Spanish *zapatos* 'shoes'; *invento* 'invention' as a match for English *device*.

2.2. *Results*

The results were as predicted. First, we found evidence for language-specific semantic mapping for verbs. Figure 1 shows the results across passages. As predicted, Spanish speakers produced a significantly higher number of path verbs ($m = 0.33$) than English speakers ($m = 0.13$); $F(1, 89) = 83.39$, $p < 0.01$). Conversely, English speakers produced more manner verbs ($m = 0.20$) than Spanish speakers ($m = 0.06$); $F(1, 89) = 52.613$, $p < 0.01$. These results are all the more striking in that we used syntactic frames that biased *against* the predicted patterns. Spanish speakers were given frames that included a preposition, thus encouraging interpretation in terms of a manner verb. English speakers were given bare transitive frames—which would normally be likely to invoke a path interpretation—yet the English speakers still preferred manner verbs. However, as we discuss below, English speakers did often provide path information—but not in the verb.

To further illustrate these patterns, Table 1 shows all responses (the main verb and noun only) for one passage for both the noun and verb versions in English and Spanish. It can be seen that there is preponderance of path verbs in Spanish and of manner verbs in English. It can also be seen that among the non-matching verbs, there is a subset for which the Spanish verb has the same meaning as a verb-plus-satellite used in English. We show these separately from the simple mismatches.

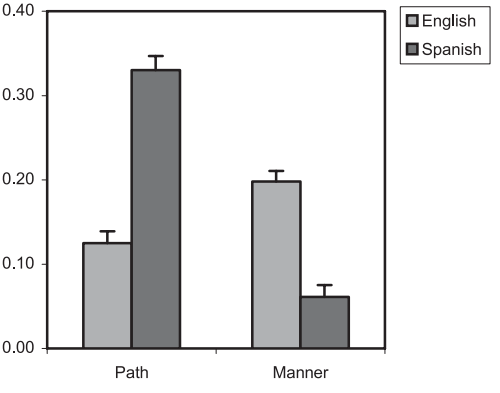

Figure 1. *Proportions of manner and path main verbs in participants' interpretations of novel verbs.*

Table 1. *Results for sample passage (the Fragel passage), showing matches and mismatches of the main verb or noun*

VERB		
	Spanish (22 verbs)	English (25 verbs)
Matching	*descender* (4)	*descend* (5)
Non-matching	*bajar* 'go down' (1)	*go down* (1)
		crawl down (1)
		scale down (2)
		rapel down (1)
	pasar 'to go through[4]' (1)	*go through* (3)
		climb through (1)
		travel through (1)
		walk into/through (1)
	salir 'to go out' (2)	
	deslizarse 'to slide oneself' (2)	
	descolgar 'to hang down' (1)	
	escapar 'to escape' (1)	
		traverse (3)
		go into/traverse (1)
		enter (1)
		explore (1)
		scale (1)
		bounce off (1)
NOUN		
	Spanish (23 nouns)	English (21 nouns)
Matching	*agujero* (6)	*hole* (6)
	barranco (1)	*ravine* (1)
	caverna (1), cueva (1)	*cave* (1)
Non-matching	*borde* (3)	
	abertura (2)	
	frontera (2)	
	sima (2)	
	cuerda (1)	
	hueco (1)	
	pasadizo (1)	
	persona (1)	
	pozo (1)	
		tunnel (5)
		chute (1)
		cliff (1)
		ladder (1)
		pathway (1)
		pipe (1)
		trunk (1)
		slide (1)
		way out (1)

Table 2. *Total numbers of path, manner, manner + path, and neutral verbs and of satellites for English and Spanish participants across all eight passages*

	Path	Manner	Manner + Path	Neutral	Satellites
English	48	73	1	58	71
Spanish	119	22	8	31	0

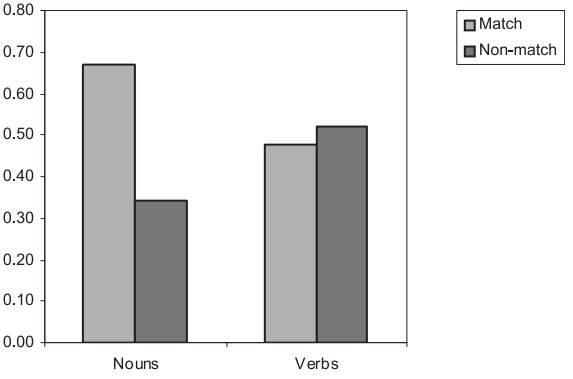

Figure 2. *Proportions for matching and nonmatching verbs and nouns. (Note that the nonmatches and matches add to 1; however, we provide both in order to highlight the reverse patterns found for nouns and verbs).*

The second prediction is that English satellites will be more likely to appear than Spanish satellites, because English leaves the responsibility for encoding the path component to its satellites, whereas Spanish encodes path in the main verb (as verified above). As predicted, (1) many more satellites were used in English than in Spanish (see Table 2); and (2) most of the English satellites encoded path information. The English satellites consisted of 64 prepositions that encoded path information, plus seven satellites that encoded manner information—two gerunds (*scooping, sliding*) and five adverbs (*carefully*, *swiftly*, *clumsily*, and *slowly* (twice)). In sharp contrast, satellites (even gerunds and adverbs) were entirely absent from Spanish speakers' interpretations.

Finally, the results also support the prediction that novel verb interpretations are more likely to be language-specific than are noun interpretations, consistent with the Relational Relativity hypothesis. Figure 2 shows the overall proportion of matches and nonmatches (using the strict count) for nouns and verbs across passages.

Table 3 shows the matching vs. nonmatching results for individual passages. It can be seen that the proportion of nouns that match between

Table 3. *Matching vs. non-matching results for individual passages (strict count), pooled across subjects*

Passage	*VERBS*		*NOUNS*	
	Match	Non-match	Match	Non-match
Helene	31	14	39	5
Walter	17	26	29	19
Fragel	14	33	17	26
Yogui	0	44	40	7
Luci	35	11	16	28
Soccer game	21	23	29	18
Royal Palace	26	21	32	12
Iron doors	28	16	39	8
TOTAL	172	188	241	123

English and Spanish (241 matching vs. 123 non-matching) is considerably greater than the proportion of matching verbs (172 matching vs. 188 non-matching). Thus, there was a strong effect of form class (*Chi-square* = 25.09, $p < 0.01$). (The same strong effect was found when scoring liberal matches for both nouns and verb (*Chi-square* = 12.5, $p < 0.01$).) As predicted, concrete verbs differ semantically across languages to a greater degree than concrete nouns.

3. Discussion and conclusions

Overall, our results suggest that language-general and language-specific constraints influence the way people map from world to word for novel words. We tested three claims concerning the relation between words and the world: (1) that there would be language-specific mapping patterns for verbs; (2) that satellites accompanying the verb would be more frequent in a manner language (English) than in a path language (Spanish): more precisely, that English prepositions would occur more often than Spanish gerunds and adverbs; and (3) that novel noun interpretations would differ much less between the two languages than the novel verb interpretations. All three predictions were borne out.

With respect to the first prediction, that verb interpretations for English and Spanish speakers would reflect language-specific constraints on motion verbs, we found that English speakers produced a higher proportion of manner verbs than of path verbs. These results were obtained despite our use of syntactic frames that biased against this difference, as noted above. In contrast, Spanish speakers used a higher proportion of path verbs when naming novel verbs. The second prediction is that the use of

satellites would differ across the two languages. Indeed, English participants included a high number of prepositions in their productions, whereas Spanish participants (who mostly used path verbs) almost never added manner information either in gerunds or in adverbs. Spanish participants treated manner as a purely optional element, while English participants treated path information as an important aspect of the novel verb's meaning. This striking difference in satellite usage supports the claim of path as the core component of motion events.

The third prediction was that noun mappings should show less cross-linguistic variability than verbs, based on Gentner's Relational Relativity hypothesis. We tested the degree of matching between English and Spanish nouns and verbs and found a significantly higher number of matching (translationally equivalent) nouns than verbs. This is consistent with our prediction that the interpretations of novel object terms is guided chiefly by language-independent knowledge about objects. Object nouns (*river, stick, rags, iron bars*, etc.) are more likely to be given by the world, that is, they can be easily individuated from the external world (Gentner 1982; Gentner and Boroditsky 2001). In contrast, in order to infer the meaning of relational words (motion verbs in this case), speakers must use knowledge of the language-specific semantic patterns for the expression of motion events. To return to the magnet analogy, we suggest that English and Spanish verb magnets attract different kind of semantic components, whereas (concrete) noun magnets universally attract individuated objects in the real world.

A potential concern with this paper is that even though there is a clear language-specific influence on the interpretation of novel verbs, it could be argued that this difference occurs only at the response stage and that it simply reflects the effect of the verbal response format, rather than a difference in the inferred verb meanings. In other words, it could be that Spanish and English participants inferred the same meanings for the new verbs, but that their languages required them to filter those meanings through different linguistic forms when writing their interpretations. To put it bluntly, would it really matter if Spanish speakers write *subir* while English speakers write *crawl down* if they both have the same event in mind and are simply distributing it differently across the construction?

Although such effects of response mode are important to consider, the differences we found cannot be explained simply by differences in phrasing[5]. First, our findings are consistent with patterns obtained using non-verbal responses, as discussed below. More importantly, in our study, the two language groups often did *not* provide the same meanings for the novel verbs: Spanish speakers were far more likely to omit manner from their descriptions than were English speakers.

Relation to other findings. Our results are consistent with those of Nagy and Gentner (1990). We found the same kind of form-class effects on mapping novel words. In addition, we found evidence for a further effect conjectured (but not tested) by Nagy and Gentner: namely, language-specific semantic patterns of mapping for novel verbs, but not for novel nouns. Our findings are also consistent with research using a different methodology by Naigles and Terrazas (1998). They showed English and Spanish subjects a videotape of a motion event—e.g., a woman skipping towards a tree—and gave a single sentence containing a novel verb: e.g., (*She's kradding the tree!* or *She's kradding towards the tree!*). They used two kinds of frames: *path frames* containing a verb plus a noun phrase, and *manner frames* containing a verb plus a preposition plus a noun phrase. Then participants were shown two further videos, one preserving the manner of the event but changing the path (e.g., a woman skipping away from the tree) and one preserving the path of the event but changing the manner (e.g., a woman marching towards the tree). Adult speakers of English chose the video that preserved the manner rather than the one that preserved path, and the reverse was true for Spanish.

Naigles and Terrazas also found effects of syntactic frame on the interpretation of the novel verbs. Participants were more likely to choose a manner screen if they had heard the novel verb in a manner frame, and more likely to choose the path screen if they had heard the verb in a path frame. These findings make it all the more noteworthy that the Spanish and English participants in our study showed the predicted preferences for path and manner interpretations despite having syntactic frames that biased against these predicted patterns.

Overall, the findings of Naigles and her colleagues are in accord with our results in finding cross-language differences in semantic interpretation of verbs. Our results together with the related research discussed here suggest that the semantic patterns identified by Talmy do indeed play a generative role in verb understanding and in inferring new verb meanings.

4. Further directions

Learning verb semantics. One issue that arises from this research is how these patterns are acquired. There is evidence that by seven years of age, children show language specific patterns in extending novel verbs to other motion events (Hohenstein and Naigles 2000). What learning processes might be operating here? Studies of children's verb learning suggest that comparison across exemplars can help children to derive semantic regularities (Childers in preparation). For example, Havasi et al. (2004) taught

English-speaking 5-year-olds a new verb and, after obtaining their initial interpretation, showed them five further instances of the verb. Half the children saw exemplars with the same manner but varying paths, and the other half saw exemplars with the same path but varying manner. Children were then asked to extend a new verb that was ambiguous as to path/manner. Children were highly like to extend the new verb according to the common semantic pattern they had experienced across the five exemplars. Adults were also sensitive to this manipulation; they developed either a manner bias or a path bias in their novel word interpretations based on which series they had received. This suggests that the semantic patterns of a language act as default biases, not as rules; they can be overridden by experience.

A semantic continuum? The methodology used here could also be used to shed light on some linguistic controversies. Although Talmy's typology has proven useful and has inspired a good deal of research in the literature on motion events, some complexities have emerged. The first is that not all languages fit perfectly in the *verb-framed* or *satellite-framed* typology. There have been proposals to establish a third category for serial verb languages.[6] Secondly, intra-typological variability has been observed, for example, Slobin (2003) proposed a continuum for degrees of manner salience (Russian > English > German > Dutch). Along the same lines, Ibarretxe-Antuñano (2004b) proposed a continuum for richness of path expression (Basque > Turkish > Spanish). The method of interpreting novel words in rich contexts might be used to reveal whether speakers of these languages show a continuum of degree of manner vs. path focus in their construals of motion verbs in these different languages.

Language and cognition. Our results may have implications for research on whether and how language influences cognition (e.g., Gentner and Goldin-Meadow 2003; Gumperz and Levinson 1996): specifically, whether the semantic systems used in motion verbs in English and Spanish influence speakers' perception and memory for events. As discussed above, at present the results are inconclusive. Many studies of memory for events have failed to show the predicted pattern of superior encoding of path in verb-framed languages and of manner in satellite-framed languages.

However, our results suggest a different perspective. Our findings suggest that the difference in semantic encoding of motion events between verb-framed and satellite-framed languages may reside chiefly in the manner component, and not in the path component. In our study, all participants in both languages included path information in their interpretations of the new verb's meaning. They differed only in where they put this information: in the verb (for Spanish speakers) or in the preposition

(for English speakers). In contrast, manner information was included by English speakers (in the verb) and omitted altogether by Spanish speakers. Suppose the linguistic facts are that *path* is linguistically encoded in both verb-framed and satellite-framed languages (although in difference places); but that *manner* is habitually encoded only in satellite-framed languages. If so, then to the extent that people's conceptual encoding of events is influenced by their linguistic encoding, the prediction should be for a difference in sensitivity to manner. If this reasoning is correct, then some of the negative findings on Whorfian issues may stem from testing the wrong prediction: namely, symmetric differences between path and manner. It is possible that cross-linguistic differences in the encoding of motion exist, but only in the manner component.

Conclusions. Our goal in this research was to test whether speakers are influenced by systematic semantic patterns in their language when forming new word meanings. Indeed, our results showed that English and Spanish speakers were guided by their differing semantic systems in inferring the meanings of novel motion verbs from context. Their semantic knowledge influenced which features they extracted from context as semantic components of the novel verbs. As predicted, the differences between Spanish and English word interpretation were specific to verb meanings; the two groups did not differ systematically in inferring the meanings of novel nouns. These results are important in demonstrating that the semantic systems that characterize motion verb meaning within a language are *generative*: they are not merely a description of existing words, but a guide to deriving new word meanings.

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Appendix

Note: Novel words are italicized and bolded here for the purposes of illustration; they were given to the participants in ordinary type.

1. Sample story in English: verb version
Fragel in a strange world

Fragel lived a quiet live. Every time Fragel read the letters from his uncle's book ''The Adventurer'', he was completely impressed. His uncle had spent 10 years exploring the far places of the earth. Every night, Fragel started a new adventure in his dreams. But one day, he woke up in a strange world. Fragel was baffled. He was on a mountain next to a green trunk tree with red flowers. The mountain seemed to be ten times his

height. He had to get home somehow. Fragel tried to think what to do. He knew he could not jump, because it was too high, and he could not climb down because there was nothing to grab.

Suddenly, he noticed a hole. It looked like a perpendicular tunnel. Then, he had a brilliant idea!. He took his unbreakable rope, tied it firmly around the tree, threw the rope down the tunnel and then, Fragel started to ***monse*** the tunnel.

What do you think "monse" means?

2. Sample story in English: noun version

Fragel in a strange world

Fragel lived a quiet live. Every time Fragel read the letters from his uncle's book "The Adventurer", he was completely impressed. His uncle had spent 10 years exploring the far places of the earth. Every night, Fragel started a new adventure in his dreams. But one day, he woke up in a strange world. Fragel was baffled. He was on a mountain next to a green trunk tree with red flowers. The mountain seemed to be ten times his height. He had to get home somehow. Fragel tried to think what to do. He knew he could not jump, because it was too high, and he could not climb down because there was nothing to grab.

Suddenly, he noticed a ***monse***. It looked like a perpendicular tunnel. Then, he had a brilliant idea! He took his unbreakable rope, tied it firmly around the tree, threw the rope down the tunnel and then Fragel started to climb down the tunnel.

What is a "monse"?

3. Sample story in Spanish: verb version

Fragel en el mundo extraño

Fragel vivía una vida muy tranquila. Así que cada vez que leía las cartas del libro de su tío El Aventurero, se quedaba impresionado. Su tío había pasado 10 años explorando lugares lejanos de la tierra. Cada noche, Fragel empezaba una nueva aventura mientras dormía. Pero un día Fragel despertó en el mundo extraño. Fragel se quedó atónito, estaba en lo alto de un montículo con un árbol de tronco verde y flores rojas. El montículo parecía tener al menos diez veces su altura. Tenía que regresar a casa como fuera. Fragel empezó a pensar que hacer, sabía que no podía saltar pues era demasiado alto, ni escalar porque no tenía nada a que agarrarse.

De repente, se dio cuenta de que había un agujero en el montículo, parecía un túnel perpendicular. Entonces, se le ocurrió una idea. Sacó su cuerda irrompible, la ató al árbol y dejó caer el resto de la cuerda por el túnel, entonces Fragel empezó a ***monser*** por el túnel.

¿Qué crees que significa "monser"?

4. Sample story in Spanish: noun version
Fragel en el mundo extraño

Fragel vivía una vida muy tranquila. Así que cada vez que leía las cartas del libro de su tío El Aventurero, se quedaba impresionado. Su tío había pasado 10 años explorando lugares lejanos de la tierra. Cada noche, Fragel empezaba una nueva aventura mientras dormía. Pero un día Fragel despertó en el mundo extraño. Fragel se quedó atónito, estaba en lo alto de un montículo con un árbol de tronco verde y flores rojas. El montículo parecía tener al menos diez veces su altura. Tenía que regresar a casa como fuera. Fragel empezó a pensar que hacer, sabía que no podía saltar pues era demasiado alto, ni escalar porque no tenía nada a que agarrarse.

De repente, se dio cuenta de que había un/una ***monse*** en el montículo, parecía un túnel perpendicular. Entonces, se le ocurrió una idea. Sacó su cuerda irrompible, la ató al árbol y dejó caer el resto de la cuerda por el túnel, entonces Fragel empezó a descender por el túnel.

¿Qué crees que es ''un/una monse''?

Notes

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1. The term *satellite* has been used both in a narrow sense, to refer only to a verb particle, and in a broad sense, to include gerunds, participles, and other words belonging to the event description that may accompany a verb. We will use the broader sense.
2. Of course, this prediction applies only to concrete entity nouns, and would not apply for a novel relational noun such as a kinship term (Gentner 1982, 2005).
3. Because there is no standard list of motion and path verbs for the Spanish and English verbs produced by our participants, we coded them ourselves in a separate coding session in which other Spanish and English verbs were also considered, striving for consistency with existing linguistic analyses.
4. The Spanish verb *pasar* was used to mean *to go through* in this passage.
5. We also suggest that even in cases where speakers did encode the same meanings, the fact that their languages lead them to distribute the elements differently across the constructions is of interest, because the choice of construction may have further ramifications.
6. Serial verb languages express path and manner by equivalent grammatical forms. Some language families are Niger-Congo (Ewe, Akan), Sino-Tibetan, Tai-Kadai, Mon-Khemer and Austronesian. See Ameka and Essegbey (in print), Slobin (2003: 26), and Zlatev and Yangklang (2004: 60) for a more detailed account on serializing languages.

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