# The language-specificity of Conceptual Structure: Path, Fictive Motion, and time relations*

Jürgen Bohnemeyer
University at Buffalo

## 1. Introduction

This chapter addresses the encoding of spatial semantics at Conceptual Structure (CS) in the framework proposed by Jackendoff (1983, 1987, 1996, 2002). The central question is what aspects of the representation of space at CS are universal and therefore presumably innate.

Jackendoff envisions CS as a language-independent faculty of cognition that generates non-iconic conceptual representations of an algebraic internal structure (a recursive predicate-argument calculus that is syntactically different from both language and predicate logic). Reasoning and any transfer of information between different

* This chapter has grown out of discussions among the members of various research projects at the Max Planck Institute for Psycholinguistics, going back as far as the short-lived *Change of State Project* of 1994-1995. I would like to single out Sotaro Kita, who first introduced me and the other members of *Change of State* to the idea of a language-specific framing of Motion as state change, and Steve Levinson, who created the *Motion Verbs* stimulus, which elicited the data presented in section 3. I have had many insightful discussions of this topic with both of them over the years, and I am certain that neither of the two will completely agree with the take I develop here. Earlier versions of this chapter have been presented at the University at Buffalo, the University of Rochester, and the 2004 Annual Meeting of the Society for the Study of the Indigenous Languages of the Americas in Boston. I thank the participants of these presentations for comments and suggestions, and I am indebted to the editors of this volume, Barbara Malt and Phil Wolff, and to Carolyn O'Meara for insightful comments and general help with the final version of the chapter. The research presented here was fully supported by the Max Planck Institute for Psycholinguistics and the University at Buffalo.

peripheral systems is divided between CS and another module of higher cognition, Spatial Structure (SpS).[1] SpS encodes geometrical properties in an "image-schematic" fashion. SpS representations are primarily the product of high-end visual processing, but receive input in other modalities as well, and are themselves a-modal. Jackendoff assumes that language primarily interfaces with CS. Linguistic meaning is a mapping between the syntactic and phonological representations of utterances and some corresponding CS representations. Lexical meaning components that involve shape, "manner of motion" (Talmy, 2000b), and certain other spatial properties are fully interpreted at SpS (perhaps via some sort of placeholders at CS); but all aspects of syntactic structure map exclusively into CS. The exact division of labor between CS and SpS remains very much an open question within this framework.

My concern here is specifically with the representation of Motion events in language and cognition. Jackendoff (1983, 1990) has advanced a number of arguments to the effect that CS encodes notions of Translational Motion and Path, based on English data. I argue in the following on the basis of evidence from Yucatec Maya that these arguments do not apply universally, and that Yucatec Motion event descriptions do not involve a semantics based on Translational Motion and Path (henceforth, a "Path semantics"), but merely a state-change semantics. On the account proposed here, cognitive representations of Motion are comparable between English and Yucatec at the level of SpS, but not at CS.

Translational Motion involves a homomorphic mapping from the time course of the Motion event into the Path traversed (e.g., Krifka, 1998; Zwarts, 2005), as depicted

[1] SpS was added to the framework in Jackendoff, 1987 under the label "Spatial Representations"; the term "Spatial Structure" was introduced in Jackendoff, 2002.

schematically in Figure 1. Translational Motion must be encoded on *some* level of cognition – but to what extent is it encoded in language? It has often been assumed that linguistically, Motion is represented as a special case of state change – Change of Location (e.g., Miller & Johnson-Laird, 1976 and Dowty, 1979).[2] Location Change representations decompose Motion events into state-change event structures and Locative relations that characterize their beginning or end states, rendering, e.g., the meaning of *go under the table* as something like 'come to be/end up under the table', or the meaning of *leave the house* as 'cease to be inside the house', or 'end up outside the house', etc.

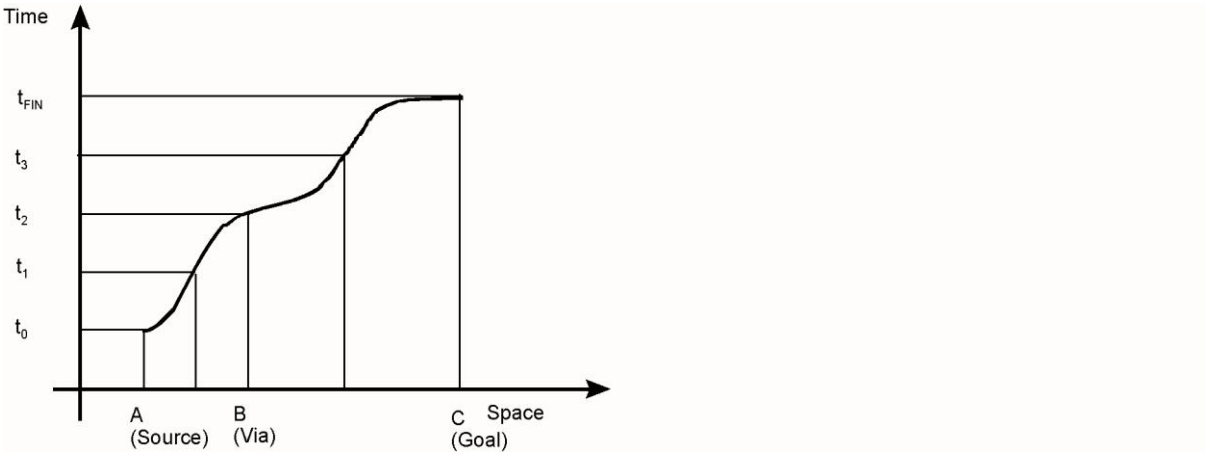


**Figure 1.** *Space-time diagram of translational motion*

Jackendoff (1983: 170-174; 1990: 91-95) argues against a general reduction of Motion semantics to Location Change. He proposes that representations of Motion events at CS require a primitive conceptual function of Translational Motion (represented by the

[2] It is only Motion of a "Figure" with respect to some external reference point – a "Ground" – that can be argued to be represented in terms of Location Change in language, not Motion with respect to some internal axis, such as rotation, spinning, or wobbling. Such non-translational Motion is represented in language mostly as Manner of Motion (Talmy, 2000b) and ignored in the following.

conceptual function GO) and the set of five basic Path functions TO and FROM (for "Bounded Paths", i.e., Paths defined in terms of their end points), VIA (with "Routes", i.e., Paths defined in terms of Places on them in non-terminal position), and TOWARD and AWAY-FROM (with "Directions", i.e., Paths defined in terms of their orientation in some Frame of Reference). The alternative is illustrated in (1): is the meaning of (1a) conceptually encoded as in (1b) or as in (1c)? "INCH" in (1c) stands for the conceptual function of state change, represented by "BECOME" in work within or based on the Generative Semantics tradition (e.g., Dowty, 1979). (1c) also captures the meanings of descriptions such as *X came to be at Y* or *X ended up at Y*; so another way of framing the issue at hand is in terms of the question whether or to what extent (1a) is synonymous with such utterances.

(1) a. *X went to Y*
b. [$_{\text{Event}}$ GO ([$_{\text{Thing}}$ X], [$_{\text{Path}}$ TO ([$_{\text{Place}}$ AT ([$_{\text{Thing}}$ Y])])])]
c. [$_{\text{Event}}$ INCH ([$_{\text{Thing}}$ X], [$_{\text{State}}$ BE ([X], [$_{\text{Place}}$ AT ([$_{\text{Thing}}$ Y])])])]

Henceforth, I refer to representations with the format of (1b) as "Path semantics" and to analyses along the lines of (1c) as "state-change semantics" or, more specifically, "Location-Change semantics." Jackendoff advances three arguments in favor of a Path semantics for Motion event descriptions. First, Translational Motion is clearly a cognitive primitive, so why should Conceptual Structure (CS) not encode it as well?

> "…we can perceive an object as in continuous motion without knowing anything about the endpoints of its motion. It moreover appears (Marr, 1982) that the visual system contains specialized motion detectors that are rather independent of the channels that individuate and localize objects. If motion is a primitive even in elementary aspects of visual cognition, why should conceptual structure be so stingy as to provide no way to encode it?" (Jackendoff, 1990: 94)

But this argument can be turned around to buttress the case *against* Path semantics: if Translational Motion and Path information is already adequately encoded by other

systems of cognition, and there is another way of representing Motion linguistically – namely, in terms of Location Change – then why duplicate the information at CS? Jackendoff's remaining two arguments, however, directly challenge the notion that Motion can be adequately represented as Change of Location in language. Bounded Path functions representing Motion FROM Source and/or TO Goal are straightforwardly enough decomposed along the lines of (1c). But such an analysis seems much less natural for Route Path functions as in (2), where location at the Ground defines neither the Source nor the end state of the event, but some state of the Figure in between:

(2) a. *The eagle soared across the canyon*
b. *The train went through the tunnel*
c. *The expedition crossed the river*
d. *The horse jumped over the fence*

I would like to add a similar problem, which arises with complex Motion descriptions in which multiple Path functions are combined in a single verb phrase, as in (3). State-change descriptions do not appear to specify both the source and the target state (rather than to treat one as the negation of the other), unless they involve Motion metaphors, as in (4).

(3) *The supporters went from the meet-up to the rally*
(4) *The lights went from green to red*

Jackendoff's third argument concerns the use of Path functions in what Talmy (1996, 2000a) has called Fictive Motion metaphors: state descriptions which do not encode, and therefore cannot be reduced to, Location Change:

(5) a. *The highway extends from Denver to Indianapolis*
b. *The house faces away from the mountains*
c. *The firehouse is across the street from the library* (Jackendoff, 1983: 167-172)

My working assumption is that the phenomena illustrated in (2)-(5) robustly support the case for Path semantics in English Motion event descriptions. The question I wish to

address in the following is to what extent these arguments extend to other, and perhaps all, languages. As my test case, I choose Yucatec Maya. The evidence to be examined includes Location change descriptions that are true both of Motion events and of events involving, for instance, objects emerging into or disappearing from spatial configurations.

In "satellite-framed" (Talmy, 2000b) languages such as English, a Location-Change verb phrase can be constituted by combining a manner-of-motion verb such as *walk* or *slide* with a Path-denoting satellite or prepositional phrase (*walk in*(*to the room*); *slide down*/*off the table*). Yucatec behaves like a "verb-framed" language in this respect: only verb phrases projected from Location-Change verbs – verbs corresponding to the English "Path verbs" (Talmy, 2000b) *come*, *go*, *enter*, *exit*, *ascend*, *descend*, and *pass* – can be used in reference to Location-Change events. In fact, as discussed in detail in section 2, in contrast to better-studied verb-framing languages such as Japanese, Spanish, and Turkish, in Yucatec, Ground phrases (the expressions of the Place with respect to which Location (Change) of the Figure is described) do not encode Locative or Path relations at all, but merely specify spatial regions that may serve as "landing sites" for such relations. If Path relations are lexicalized at all in Yucatec, they must be lexicalized in the Location-Change verbs – just as Path relations are lexicalized, on Talmy's analysis, in the English and Spanish equivalents of these verbs. But do Yucatec Location-Change verbs have Path semantics? Evidence that they do not comes from the fact that Motion event descriptions formed with the Location-Change verbs can be used in reference to events involving not only Figure Motion, but also Ground Motion or emergence/disappearance of Figure or Ground, discussed in section 3. Such uses of Location-Change descriptions were first documented by Kita (1999) for Japanese.

Consider Figure 2. The circle moves and ends up enclosing the square. Example (6), but not its literal English translation, can be used to describe the scenario in Figure 2:[3]

(6) Shikaku-ga en-ni hai-ta.
JPN square-NOM circle-LOC enter-PAST
'The square entered the circle.' (Kita, 1999: 344)

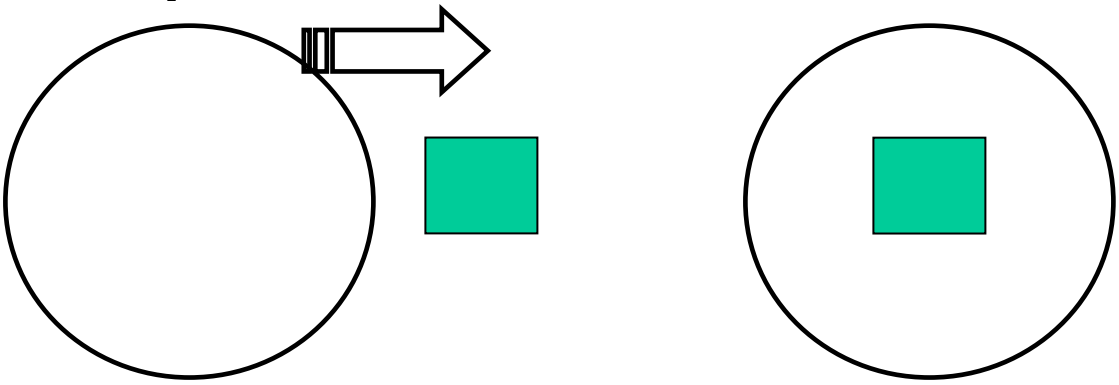

**Figure 2.** *A scenario for (6)*

Kita concludes that the verb *hairu* really means 'become inside', rather than 'enter'. As shown in section 3, similar phenomena occur in Yucatec on a broader scale, involving not just 'enter' and 'exit' verbs, but also verbs corresponding to *ascend*, *descend*, and *pass*. This provides direct evidence against Path semantics in Motion event descriptions

[3] Abbreviations used in morpheme glosses: 3 – 3rd person; A – Cross-reference "Set-A" (actor/possessor); ACAUS – Anticausative/middle voice; AN – Animate; B – Cross-reference "Set-B" (undergoer/theme); CL – Classifier; CMP – Completive; CON – Perfective connective; D1 – Proximal deictic particle; D2 – Distal/anaphoric particle; D3 - Textual deictic particle; D4 – Negation/anaphoric Place particle; DEF – Definite article (Spanish); DET – Determiner; DIM – Diminutive particle; IMPF – Imperfective; IN – Inanimate (classifier); INC – Incompletive; INCH – Inchoative; IRR – Irrealis (subordinator); LOC – Locative (Japanese); NEG – Negation; NOM – Nominative (Japanese); PAST – Past tense (Japanese, Spanish); PREP – Generic preposition; PROG – Progressive; PROSP – Prospective; PRS – Present (Spanish); PRSV – Presentative; PRV – Perfective; REC – Recent past marker; REL – Relational derivation; REP – Repetitive particle; RES – Resultative derivation; SG – Singular; SPONT – Anticausative derivation; SUBJ – Subjunctive; TOP – Topic.

formed with these verbs. As far as descriptions formed with these Location-Change verbs are concerned, a Yucatec speaker and an English speaker looking at the same Motion event in extra-linguistic reality must form different CS representations to talk about it, if one assumes, as Jackendoff does, that linguistic meaning is a direct mapping from syntax into CS. If the CS representations that "interpret" Yucatec Motion descriptions encoded Translational Motion of the Figure along a Path, the Yucatec description would be incompatible with non-Figure-motion scenarios, just like their English expressions.

In addition to presenting direct counterevidence against Path semantics in Yucatec motion event descriptions, I also show that the arguments discussed above that favor a Path semantics for English do not apply to Yucatec. Descriptions of Motion events involving Route Paths are generally vague, since they all employ the same Location-Change verb, *máan* 'pass' (4.1). Since there are no verbs that lexicalize Location Change with respect to multiple Grounds (in Yucatec or, as far as I am aware, any other language), combinations of multiple Path functions in a single verb phrase are impossible. Consequently, a journey from Source A to Goal B is described by a multi-clause sequence along the lines of 'She left A, and eventually she arrived at/on/in B' (4.2). And there is no evidence of Fictive Motion metaphors in Yucatec. There are metaphoric uses of Location-Change expressions; but these have much more restricted domains of use which do not support an analysis in terms of Path meanings (4.3). The case against Path semantics in Yucatec is further buttressed with indirect evidence from spatio-temporal metaphors. As discussed in section 4.4, Yucatec lacks temporal connectives with meanings such as 'after' and 'before', which on localist accounts draw on Motion metaphors (e.g., Clark, 1973; Traugott, 1978). To round up the picture, L2-

Spanish data from Yucatec native speakers are briefly considered in section 4.5. I conclude that there is no *linguistic* evidence for the encoding of Path semantics in Yucatec.

Do Yucatecans require CS representations of Translational Motion and Path at CS to *reason* about Motion? While this question cannot be answered conclusively in this article, I argue in section 5 that SpS may well be able to afford the requisite functions. I also briefly examine the typological conditions of the framing of Motion as state change – making it clear that the case of Yucatec is probably not exotic. Finally, I discuss possible implications of the language-specificity of Motion semantics for Jackendoff's framework, drawing in particular on the Thematic Relations Hypothesis, which accords Path semantics a special role built into the very architecture of CS.

## 2. The grammar of Motion event descriptions in Yucatec

Yucatec is a Mayan language spoken by over 800,000 people on the Yucatan peninsula in Mexico and Belize. Like all Mayan languages, Yucatec is a polysynthetic language, i.e., a language in which grammatical functions are predominantly expressed by the structure of word forms, rather than or in addition to combinations of words or phrases. It is exclusively head-marking (i.e., to the extent that the relation between the head of a phrase and a dependent is morphologically marked, it is marked on the head), shows productive incorporation of nouns and adverbs into the verbal complex and productive verb compounding, and has rich valence changing and voice morphology (i.e., morphological derivations that change the argument structure of verbs and inflections that change their linking properties, such as a passive). Yucatec is verb-initial and almost exclusively head-initial. The language has a typologically unusual argument

marking split in intransitive clauses governed by aspect-mood marking (see Bohnemeyer, 2004 and references therein).

The bulk of the work reported on here was conducted in annual field trips between 1995 and 2004. The main consultants were six adult native speakers, one woman (age 30 in 2004) and five men (between age 27 and 56 in 2004), in the municipal district of Felipe Carrillo Puerto in the state of Quintana Roo, Mexico.

The following two subsections provide background information on the structure of the verbal core[4] (2.1) and the Ground phrase (2.2) in Motion event descriptions. Two facts are introduced that are critical prerequisites to the discussion of the framing of Motion as Change of Location (CoL) in Yucatec: verbal cores of Motion event descriptions must be headed by CoL verbs; and Ground phrases are strictly Path-neutral.[5]

### 2.1. The structure of the verbal core in Motion event descriptions

In terms of Talmy's (1985, 2000b) lexicalization typology, Yucatec may be considered in first approximation (but see below!) a "verb-framed" language. For a clause to be able to describe events of Motion, its main verb must encode Change of Location (CoL). The verbs that are most commonly used in this role are listed in Table 1. The English glosses used in Table 1 and throughout this paper do not adequately capture the hypothesized CoL semantics of the verbs; they merely serve to facilitate reading here. Evidence in support of the absence of the Path functions in the semantics of the verbs comes

[4] The term 'verbal core', adapted from Van Valin & LaPolla, 1997:25-52, is used here for the maximal syntactic projection of verb stems in Yucatec. There is no evidence of a verb phrase in the customary sense in this language. See Bohnemeyer, 2002: 81-129 for discussion.

[5] Cf. also Bohnemeyer, 1997; in press and Bohnemeyer & Stolz, in press.

primarily from their applicability to events that do not involve Figure Motion, as discussed in section 3. All verbs are base-intransitive, but produce derived causative stems. The spatial semantics of the verbs is captured by a Place function, denoting a spatial region projected from the Ground. On the analysis presented in this chapter, the output of this Place function is mapped into an event representation, not by a Path function, as in (1b) above, but by a Locative state function which characterizes the source state, target state, or a transitional phase in between, in a state-change event description, as in (1c). The corresponding Path functions are added in parentheses for ease of processing. *Tàal* 'come' and *u'l* 'return' (and their causative counterparts) assign the role of Ground to the deictic center.[6] *Bin* 'go' (and *bis* 'bring') can be interpreted with respect to either the deictic center or some Place specified in context as Ground. The remaining verbs combine with Ground phrases or track Places anaphorically from context in the absence of a Ground phrase in the clause.

The further discussion is limited to the verbs in Table 1 on account of the systematic character of the set. There are, however, other verbs that may occur in verbal cores denoting CoL. These include *náak* 'reach', 'extend up to', which is sometimes used as an alternative to *k'uch* 'arrive'. *Náachtal* 'become distant' may be used in some contexts instead of *bin* 'go' or *luk'* 'leave'. *Sùut* 'turn', 'spin', 'return', the antipassive form of the transitive root *sut* 'turn', is basically an activity verb, but is recruited by metaphoric

[6] These are *deictic* or *indexical* verbs just like English *come* and *go* (Fillmore, 1971; Wilkins & Hill, 1995). For instance, the verb *come*, when used without a ground phrase, will be interpreted with the deictic center – the location of the speaker and/or addressee – as goal. However, in the case of *come*, it is possible to replace the intrinsic deictic goal with one encoded by a ground phrase (e.g., *come to the bookstore*); in the case of Yucatec *tàal* 'come', *bin* 'go', and *u'l* 'return', this is not possible.

extension for the purpose of expressing return to a Place not necessarily identical with the deictic center. It thus fills a gap in the system of Table 1, given the deictic specialization of *u'l*. There are also transitive roots of caused CoL, in particular in the domain of insertion and extraction and in the ballistic Motion domain. One example is *pul* 'throw'. For the interaction between verbs and Ground-denoting adjuncts in CoL-denoting verbal cores, it makes no difference whether the cores are headed by such transitive verbs or by the CoL verbs in Table 1; hence the further discussion is restricted to the latter.

The roots in Table 1 belong to two different inflectional classes, both of which host exclusively (non-causative) state-change verbs (cf. Bohnemeyer, 2002: 153-215; 2004 and references cited there). State change is attested on the basis of criteria such as the one illustrated in (7)-(9): combinations of CoL verbs such as *bin* 'go' (7), *òok* 'enter' (8), and *hóok'* 'exit' (9) with the progressive aspect marker *táan* (fused with the 3rd person cross-reference marker *u-* in (7) and (9)) allow only for prospective (pre-state reference) interpretations, not for imperfective interpretations, as they would if the verbal core had process semantics. The diagnostic of prospective reference in (7)-(9) is paraphrase with the prospective aspect marker *mukah*.[7,8]

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[7] The verbal cores in (7)-(9) are achievements, i.e., they describe instantaneous events. The same verbs produce accomplishments - events whose completion may be non-instantaneous - if Figure, Ground, or both are conceptualized as spatially extended. In this case, the progressive yields imperfective reference. Imperfective interpretations also occur when the Figure and/or Ground argument are non-quantized (cf. Krifka, 1998) – e.g., when having the reference of bare plurals in English. In this case, the verbal core is atelic. All verbs in Table 1 follow this pattern, except for *lúub* 'fall', *na'k* 'ascend', *em* 'descend', *líik'* 'rise', and their causative stems. When occurring without Ground phrases, these verbs can be used as "degree

| CoL root | causative stem | Place function of Ground | Locative description characterizes | Ground encoding |
|---|---|---|---|---|
| *tàal* 'come'; *u'l* 'return' | *tàas* 'bring'; *u's* 'return' | AT | target state ('TO') | inherently deictic |
| *k'uch* 'arrive' | *k'uhs* 'cause to arrive' | | | lexical |
| *bin* 'go' | *bis* 'take' | | source state ('FROM') | inherently indexical |
| *luk'* 'leave' | *lu's* 'remove' | | | lexical |
| *lúub* 'fall' | *lu's* 'fell', 'drop' | ON /ABOVE | target state ('TO') | |
| *na'k* 'ascend' | *na'ks* 'lift' | | | |
| *em* 'descend' | *èens* 'pluck', 'lower' | | source state ('FROM') | |
| *líik'* 'rise' | *li's* 'lift' | | | |
| *òok* 'enter' | *òoks* 'insert' | IN | target state ('TO') | |
| *hóok'* 'exit' | *ho's* 'extract' | | source state ('FROM') | |
| *máan* 'pass' | *máans* 'pass' | under-specified | N.A. (cf. section 4.1) | |

**Table 1.** *The basic CoL verbs of Yucatec*

(7) Túun bin Juan Carrillo=e',
PROG:A3 go Juan Carrillo=TOP
káa=h-k'àas-chah u=kòombi.
CON=PRV-bad-INCH.CMP(B3SG) A3=van
Káa=t-y=a'l-ah=o', mukah bin.

achievements" (Dowty, 1979: 88-91), i.e., as encoding gradual change without a discrete end state or specific degree of change.

[8] Note that "Path verbs" (in Talmy's 2000b parlance) of English, such as *ascend* and *enter*, behave like state-change verbs according to similar aspectual diagnostics. This by itself does not mean that these verbs do not lexicalize Path functions. Direct evidence against the expression of Path functions in the Yucatec CoL verb roots is presented in section 3. That the verb roots in Table 1 have state-change event structures is a necessary, but not sufficient, condition on the validity of the claim that Motion is framed as Location Change in Yucatec.

CON=PRV-A3=say-CMP(B3SG)=D2 PROSP(B3SG) go(INC)
'Juan was going to Carrillo, (when/and then) the van broke down. At this moment (lit. when it said that), he was going to go.'

(8) Pedro=e' táan y=òok-ol t-u=nah-il=e',
Pedro=TOP PROG A3=enter-INC PREP-A3=house-REL=TOP
káa=t-y=il-ah=e', hach sùusyo u=nah-il.
CON=PRV-A3=see-CMP(B3SG)=D3 really dirty(B3SG) A3=house-REL
Káa=t-y=a'l-ah=o', ma' òok-ok=i'.
CON=PRV-A3=say-CMP(B3SG)=D2 NEG enter-SUBJ(B3SG)=D4
Mukah òok-ol.
PROSP(B3SG) enter-INC
'Pedro, he was entering his house, (when/and then) he saw it, his house was very dirty. At that moment (lit. when it said that), he hadn't entered yet. He was going to enter.'

(9) Hun-túul uy=alak' wakax don Valen=e',
one-CL.AN A3=CL.domestic.animal cow don Valen=TOP
túun hóok'-ol te=koràal=o',
PROG:A.3 exit-INC PREP:DET=corral=D2
káa=h-k'uch u=yúum-il.
CON=PRV-arrive(CMP)(B3SG) A3=master-REL
Káa=t-y=a'l-ah=o', mukah hóok'-ol.
CON=PRV-A3=say-CMP(B3SG)=D2 PROSP(B3SG) exit-INC
'One of don Valen's cows, it was exiting the corral, (when/and then) its owner arrived. At that moment (lit. when it said that), it was going to exit.'

Other diagnostics of state-change semantics include compatibility with the stative resultative derivation in *–a'n* and incorporation of the universal quantifier to encode complete affectedness of the theme.

Process verbs are employed in Motion event descriptions to denote 'manners of motion' (Talmy, 2000b). An example is *xíiknal* 'flutter', 'fly (in the manner of birds)' in (10)-(12):

(10) Le=ch'íich'=o' túun xíiknal y=óok'ol le=che'=o'.
DET=bird=D2 PROG:A3 fly A3-top DET=wood=D2
'The bird is flying (i.e., circling!) above the tree.'

(11) Le=ch'íich'=o' xíiknal-il h-úuch uy=em-el
DET=bird=D2 fly=REL PRV-happen(B3SG) A3=descend-INC
te=che'=o'.
PREP:DET=wood=D2

'The bird flew down from the tree (lit. flyingly (is how) it happened to descend wrt the tree).'

(12) Le=ch'íich'=o' h-em u=xíiknal te=che'=o'.
DET=bird=D2 PRV-descend(B3SG) A3=fly PREP:DET=wood=D2
'The bird flew down from the tree (lit. it descended flying wrt the tree).'

In clauses formed with a Manner verb as the sole verb, as in (10), Ground phrases merely refer to the Location of the event; CoL is neither entailed nor implicated. There are two constructions that are regularly used to integrate Manner information: the Manner focus construction (Bohnemeyer, 2002: 123-125) exemplified in (11), in which the CoL-denoting verbal core is subordinate to the Manner predicate in a cleft-like structure, and the gerundial construction (Bohnemeyer, 2002: 100-101) illustrated in (12), in which the Manner-denoting core1 is embedded as an adjunct. Table 2 gives an overview over the Yucatec Manner-of-Motion verbs, sorting them in terms of selectional restrictions regarding the Figure's animacy and the property of "propulsiveness" – propulsive Manners may cause CoL, whereas non-propulsive ones involve Motion with respect to some axis of the Figure.

The facts reviewed so far establish a broad similarity between Yucatec and better-studied languages of Talmy's verb-framed type such as Japanese, Spanish, and Turkish, in that verbs that appear to be translational equivalents of "path-conflating" verbs such as *enter*, *exit*, *ascend*, and so on are required to form Motion descriptions. However, there are two important differences: First, as discussed in the next section, Path distinctions are not reflected at all outside the verb; so Yucatec at the very least exhibits a more radical kind of verb-framing. But secondly, evidence is presented in section 3 suggesting that the Yucatec CoL verbs do not, in fact, encode Path functions either – and that these notions are therefore not lexicalized at all in Yucatec.

| Selection restrictions<br>Propulsiveness property | Figure must be animate | Figure need not be animate |
|---|---|---|
| propulsive | *áalkab* 'run'; *bàab* 'swim'; *xíimbal* 'walk'; … | *balak'* 'roll'; *háarax* 'slide'; … |
| non-propulsive | *síit'* 'jump'; *xíiknal* 'flutter', 'fly'; *òokot* 'dance'; … | *mosòon* 'whirl', 'revolve'; *péek* 'move'; *pi'k'* 'shake', 'twirl'; *úumbal* 'swing', 'rock', *walak'* 'turn', 'revolve'; … |

**Table 2.** *Some common Manner-of-Motion verbs of Yucatec*

### 2.2. The structure of the Ground phrase

Ground phrases denote Places with respect to which Location and Motion (or Location Change) of the Figure are described. If the Ground object is denoted by a common noun (as opposed to a toponym), the Ground phrase is headed by a preposition or relational noun. The prepositions that occur in Ground phrases are the generic *ti'* and *ich(-il)* 'in' (cf. Bohnemeyer & Stolz, 2006; Levinson, Meira, & The Language and Cognition Group, 2003; examples below). The relational nouns found most commonly in Ground phrases are listed in Table 3.[9]

| Construction | relational noun | gloss |
|---|---|---|
| $[\text{SetA}_i\text{-N}_{rel}\ \text{NP}_i]_{GroundP}$ | *àanal*<br>*iknal*<br>*óok'ol* | under<br>at<br>on/over |
| [*ti'* $[\text{SetA}_i\text{-N}_{rel}\ \text{NP}_i]]_{GroundP}$<br>or $[\text{N}_{rel}$(*-il*) *ti'* NP$]_{GroundP}$ | *chúumuk*<br>*háal*<br>*nak'*<br>*(ba')pàach*<br>*(ak)táan* | center<br>edge<br>belly<br>back/outside<br>front |

[9] Table 3 sorts the relational nouns into two sets: those that can be possessed by the Ground-denoting nominal and those that require combination with *ti'* to head a Ground phrase. *Chúumuk* 'center' is special in that it permits optional dropping of *ti'*.

| Construction | relational noun | gloss |
|---|---|---|
| | *tséel* | side |
| | *ts'u'* | core |
| | *xno'h* | right |
| | *xts'i'k* | left |
| | *xùul* | end |
| | *yáam* | interstice |

**Table 3.** *Frequent relational nouns in Yucatec Ground-denoting phrases (Key: GroundP – Ground phrase; NP – Ground-denoting nominal; $N_{rel}$ – relational noun; SetA – cross-reference marker "Set A")*

In better-studied exemplars of both the satellite-framed and the verb-framed language type, the Ground phrase denotes a Path or Locative function. Thus, in (1), repeated below for convenience, the PP *to Y* maps the Ground object denoted by *Y* into the Place denoted by *at Y* and the latter into a Path that has that Place as its end point.

(13) a. *X went to Y*
b. [$_{\text{Event}}$ GO ([$_{\text{Thing}}$ X], [$_{\text{Path}}$ TO ([$_{\text{Place}}$ AT ([$_{\text{Thing}}$ Y])])])]

For verb-framed languages such as Japanese, Spanish, or Turkish, this has the consequence of actual "double-marking" of Path in both the verb and the Ground phrase (cf. Bohnemeyer, Enfield, Essegbey, Kita, Ibarretxe-Antuñano, Lüpke et al., ms.). Consider the Spanish paradigm illustrated in (14):

(14) a. El carro de juguete esta-ba en la caja
SPA DEF cart of toy be.at-PAST.IMPF3SG in DEF box
'The toy car was in the box'
b. El carro de juguete entr-ó en la caja
DEF cart of toy enter-PAST.PRV3SG in DEF box
'The toy car entered (lit. in) the box'
c. El carro de juguete sali-ó de (/*en) la caja
DEF cart of toy exit-PAST.PRV3SG of in DEF box
'The toy car exited (lit. from) the box'

The PP *en la caja* 'in(to) the box' conflates Locative ('in'; 14a) and Goal ('into'; 14b) functions – a pattern of syncretism common across languages according to Clark (1973)

– but is incompatible with the Source function (‘out of’) in (14c). Compare this to the Yucatec equivalents in (15):

(15) a. Le=kàaro=o’ ti’=yàan ich / ti’ le=kàaha=o’
DET=cart=D2 PREP=EXIST(B3SG) in / PREP DET=box=D2
‘The cart, it is in the box’
b. Le=kàaro=o’ h-òok ich / ti’ le=kàaha=o’
DET=cart=D2 PRV-enter(B3SG) in / PREP DET=box=D2
‘The cart, it entered (lit. in) the box’
c. Le=kàaro=o’ h-hóok’ ich / ti’ le=kàaha=o’
DET=cart=D2 PRV-exit(B3SG) in / PREP DET=box=D2
‘The cart, it exited [lit. in] the box’

In (15), *ich(-il)* ‘in’ alternates with the generic preposition *ti’*. Neither *ich(-il)* nor *ti’* distinguish between Locative (15a), Goal (15b), or Source (15c) functions; and they are compatible with Route (VIA) and Direction (TOWARD/AWAY-FROM) functions as well. *Ich(-il)* is compatible with all of these interpretations because it does not encode any of them - it is Path-neutral. The Ground phrases in (15) merely denote a Place projected from the Ground object, the box. *Ich(-il)* specifies the inside of the box as this Place; *ti’* is semantically compatible with any spatial region projected from the box. Either way, it is the verb that determines the role the Place has in the CoL description. This analysis generalizes to all Yucatec Ground phrases. The examples in (16) illustrate the point for Ground phrases headed by the relational noun *óok’ol* ‘on’, ‘above’. The Ground phrase in (16a) refers to the location of the rolling event, the one in (16b) to the Goal of a CoL event, and the one in (16c) denotes a Source.

(16) a. …h-tàal u=balak’ y=óok’ol le=pak’=o’
PRV-come(B3SG) A3=roll A3=on DET=brickwork=D2
‘…it came rolling on the wall’
b. H-na’k y=óok’ol le=che’=o’
PRV-ascend(B3SG) A3=on DET=wood=D2
‘It went onto the piece of wood’
c. Káa=h-em y=óok’ol le=che’=o’…
CON=PRV-descend(B3SG) A.3=on DET=wood=D2
‘It went down from the piece of wood…’

Yucatec Ground phrases do not encode Path functions. The role of the Ground in the CoL event is encoded by the predicate entailing a Locative relation that characterizes the source or target state of the CoL event (an exception is *máan* 'pass'; cf. section 4.1 for a treatment). Also compatible with the facts presented so far is an analysis of the Ground phrase as invariably encoding event Locations, i.e., Locations at which the CoL event described by the main verb takes place, rather than Places at which the Figure is located beginning or end of the event. Under an event Location analysis, the role of the event Locations in the semantic composition of the event description is left to pragmatic inferences. On this account, both (17a) ('The Figure entered the circle') and (17b) ('The Figure entered the square') should be fine as descriptions of the scenario in Figure 3-4, in which a ball enters a circle and both the ball and the circle are located inside a square throughout the event. This, however, is not the case.

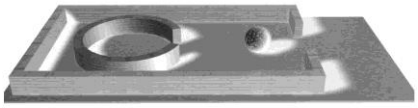

**Figure 3.** *First frame of ENTER_EXIT 10*

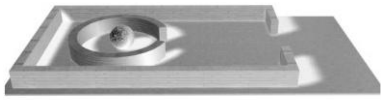

**Figure 4.** *Last frame of ENTER_EXIT 10*

(17) a. …káa=h-òok (le=bòola) ich-il le=sìirkulo=o'.
CON=PRV-enter(B3SG) DET=ball in-REL DET=circle=D2
'…it entered (lit. in) the circle.'
b. #H-òok (le=bòola) ich-il le=kwàadro=o'.[10]
PRV-enter(B3SG) DET=ball in-REL DET=square=D2
'…it entered (lit. in) the square.'

[10] The hatch mark (#) is employed here for forms or constructions which are structurally well-formed, but cannot be used in reference to a particular scenario.

My consultants reject (17b) as a description of Figure 3-4, despite the fact that the CoL event takes place inside the square. For (17b) to be true, the ball would have to be located outside the square in the source state of the CoL event and inside in the end state. An event Location interpretation of the Ground phrase in (17b) is unavailable. The Ground phrase invariably encodes a Place function, not a Locative relation. Using the notational conventions of Jackendoff (2002), the semantic composition in (17b) can be represented as in Figure 5, either in terms of a Jackendoffian Path semantics (CS I) or in terms of a state-change semantics (CS II) – both analyses are compatible with the facts presented in this section. Double lines indicate the projection of phrases from their heads in the syntactic representation and the determination of ontological types from conceptual functions in Conceptual Structure (CS); the parallelism is intended as a reminder that conceptual functions tend to be encoded by syntactic heads. Dashed lines encircle the domains of the contribution of "Lexical Conceptual Structures" (LCS) as encoded in particular by the verb *òok* 'enter' (or 'become inside') and the preposition *ich(-il)* 'in'. Functional categories and the internal structure of the noun phrases are ignored in Figure 5. Indices encode the mapping between CS and syntax. The LCSs of *òok* and *ich*(*-il*) are combined through the process of "argument fusion" as discussed in Jackendoff (1990). The PP headed by *ich(-il)* encodes a Place function which is mapped either into a Path function (CS I) or a Locative state which in turn maps into a state change (INCH "inchoative") function (CS II), depending on whether *òok* has a Path (CS I) or CoL (CS II) semantics. The evidence presented in particular in section 3 below suggests that the latter analysis (CS II) is correct.

The absence of Path encoding in Ground phrases sets Yucatec apart from better-studied verb-framed languages such as those mentioned above, although, as argued in

Bohnemeyer et al., ms., it does not appear to be a rare phenomenon in the languages of the world. For present purposes, the absence of Path specifications in the Ground phrase combined with the requirement of CoL verbs as heads of verbal cores in CoL-denoting clauses sets the stage for the hypothesis, pursued in the following sections, that Path is not encoded at all in Yucatec and that Motion is systematically cast as CoL in Yucatec semantics.

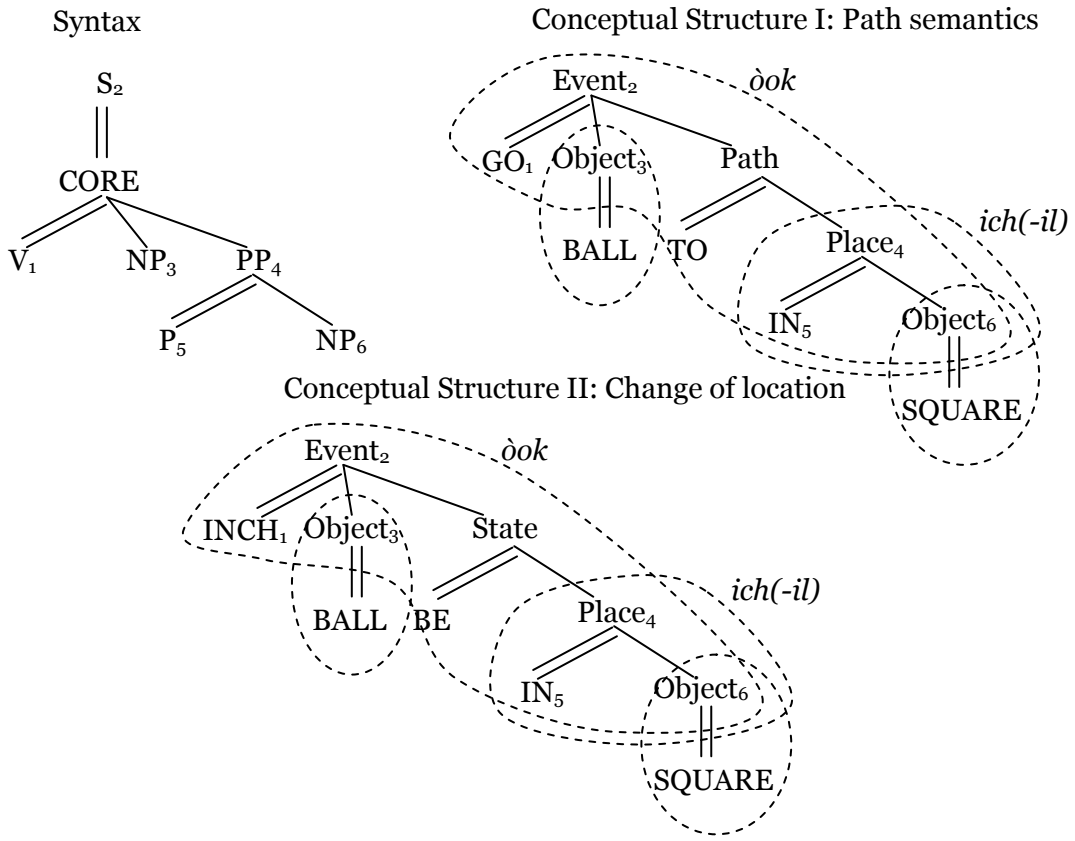


**Figure 5.** *Semantic composition in (17b)*

### 3. Location change without Figure Motion

Section 2 has shown that Path functions are not encoded *outside* verb roots in Yucatec, and that the verbal core of a Motion event description must be headed by a verb of "inherently directed motion" (Levin, 1993: 263), which aspectual tests identify as a

state-change verb, i.e., a change-of-location (CoL) verb. This and the following sections are dedicated to making the case that Path functions are not lexicalized in Yucatec CoL verbs either, and are therefore not expressed at all in Yucatec – put differently, the case for a consistent framing of Motion as CoL, not Translational Motion (T-Motion), in this language. The most direct source of evidence is presented in this section: the applicability of verbal cores and clauses projected from CoL verbs to scenarios that involve CoL, but not T-Motion, of the Figure with respect to the Ground, along the lines of Kita's (1999) work on Japanese *hairu* and *deru*, as discussed in the introduction. The following sections examine additional evidence of a more indirect nature. The impossibility of composing complex Path functions, the underspecification of CoL with respect to Route Paths, and the lack of "Fictive Motion" and spatio-temporal metaphors involving Path functions are all readily understood as consequences of the absence of Path encoding.

The data presented in this section were collected with five adult native speakers in 2001, using the "Motion verb stimulus" (MoVerbs) designed and produced by Stephen Levinson (Levinson, 2001). MoVerbs comprises 96 computer-animated video clips featuring a variety of CoL scenarios varied according to the spatial relation between Figure and Ground at the source or target state or in between, the involvement of Figure Motion, and perspective (toward/away from observer vs. lateral to the observer's viewing axis). Additional data collected with improvised stimuli is reported in Bohnemeyer (1997).

Three types of scenarios are discussed in the following subsections: scenarios in which the Ground moves instead of the Figure ("Ground Motion"; 3.1) and scenarios in which the Figure emerges in or disappears from a configuration with the Ground or,

conversely, the Ground emerges in or disappears from a configuration with the Figure (3.2). It is not claimed that such scenes are significantly more natural to Yucatec speakers than they are to English speakers. These scenes are merely used here as analytical tools to probe the semantics of CoL-encoding constructions, since they effectively divorce CoL from T-Motion. As it so happens, the results suggest that Path semantics plays a much lesser role in such constructions in Yucatec than it does in English.

### 3.1. Ground Motion

Consider Figure 6-7: the enclosure moves such that the ball ends up inside.

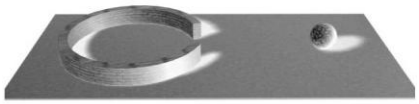

**Figure 6.** *First frame of ENTER_EXIT 03*

**Figure 7.** *Last frame of ENTER_EXIT 03*

Out of context, most speakers consider (18) misleading as a description of this scenario:

(18) #Le=bòola=o' h-òok te=sìirkulo=o'.
DET=ball=D2 PRV-enter(B3SG) PREP:DET=circle=D2
'The ball, it entered the circle.'

However, unlike its English translation, (18) is not semantically in contradiction with Figure 6-7 for most of my consultants. Example (18) merely invites a strong implicature to the effect that the theme of *òok* 'enter', 'become inside', the ball, moves. If this implicature is blocked or cancelled in context, application of (18) to Figure 6-7 is fine for most speakers:

(19) H=tàal le=àaro y=iknal le=bòola=o';
PRV=come(B3SG) DET=ring A3=at DET=ball=D2
le=bòola=o' h=òok-ih.
DET=ball=D2 PRV=enter-B3SG
'The ring came to the ball; the ball, it entered.'

And even consultants who reject (19) generally accept (20), in which a derived stative form of the verb is used to ascribe the result state of having entered to the ball:

(20) T-u=huts'-ah u=báah=e',
PRV-A3=approach-CMP(B.3.SG) A3=self=D3
káa=t-u=k'al-ah le=bòola=o',
CON=PRV-A3=close-CMP(B3SG) DET=ball=D2
káa=h=ts'o'k=e', le=bòola=o', òok-a'n, (...)
CON=PRV=end(B3SG)=TOP DET=ball=D2 enter-RES(B3SG)
'[The ring] approached, and it enclosed the ball, and then, the ball, it was entered, (...)'

It appears that (20) is even more widely accepted than (19) in reference to Figure 6-7 because the Path semantics implicature is weaker with the resultative form, as the resultative form gives more prominence to the target state of the ball being inside the enclosure than to the event that brought about that state.

Essentially the same distribution as with *òok* 'enter' is found with *na'k* 'ascend' in relation to the scenario in Figure 8-9, in which a slope slides under a ball:

**Figure 8.** *First frame of FIGURE_GROUND 14*

**Figure 9.** *Last frame of FIGURE_GROUND 14*

Most consultants find the description in (21) perfectly acceptable for this scenario:

(21) Le=chan tàabla=o' h=péek-nah-ih,
DET=DIM plank=D2 PRV=move-CMP-B3SG
káa=h-na'k le=chan kanìika
CON=PRV-ascend(B3SG) DET=DIM marble
y=éetel che' te'l y=óokol=o'.
A.3=with wood there A3=on=D2
'The little plank, it moved, and the little marble and the tree ascended there on top.'

And again, the result state of *na'k* 'ascend' is considered even more applicable to the ball:

(22) Le=tàabla=o' káa=h-háarax-nah=e',
DET=plank=D2 CON=PRV-slide-CMP(B3SG)=D3
káa=h-em kàabal. Káa=h-p'áat
CON=PRV-descend low CON=PRV-quit\ACAUS(B3SG)
le=bòola y=óokol na'k-a'n.
DET=ball A.3=on ascend-RES(B3SG)
'The plank, it slid, it went down. The ball ended up on top of it ascended.'

However, not all CoL verbs/scenarios are compatible with Ground Motion. Consider the scenario in Figure 10-11, in which a stick moves to a ball. In this case, the verb *k'uch* 'arrive' is completely unacceptable with the ball as theme to all consultants, even if it is stated in context that it is the stick that moves. Even the result state of *k'uch* is considered applicable to the ball by only one out of five speakers. Her description is quoted in (23).

**Figure 10.** *First frame of FIGURE_GROUND 11*

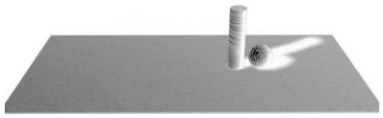

**Figure 11.** *Last frame of FIGURE_GROUND 11*

(23) Káa=h-bin u=háarax=e'; káa=h-ts'o'k=e',
CON=PRV-go(B3SG) A3-slide=D3 CON=PRV-end(B3SG)=D3
k'uch-a'n le=bòola y=iknal=o'.
arrive-RES(B3SG) DET=ball A3=at=D2
'(The stick) went sliding; [when/and then] that became over, the ball was in the state of having arrived next to it.'

It appears that there is a hierarchy of CoL verb roots in terms of acceptability with Ground Motion:[11]

[11] Note that the placement of *em* 'descend', *líik'* 'rise', *lúub* 'fall', and *u'l* 'return (to deictic center)' in Figure 12 is by conjecture, based on their semantic relations to the other verb roots; these have not actually been tested for applicability under Ground Motion.

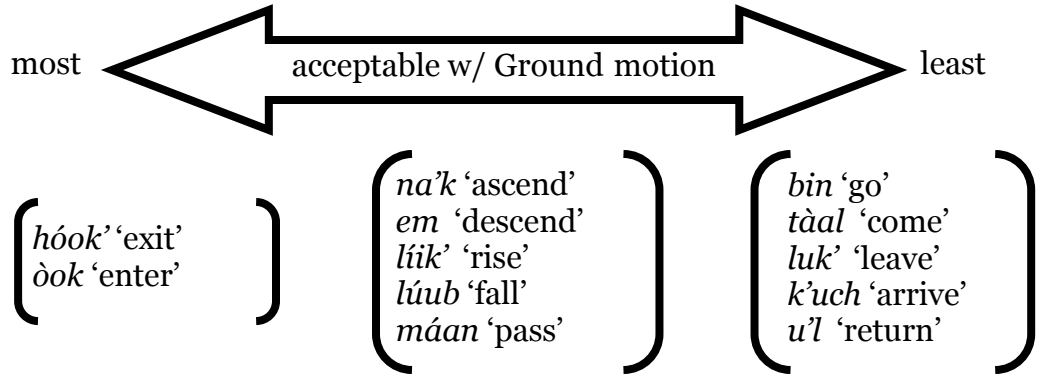


**Figure 12.** *Acceptability of CoL roots with Ground Motion*

By hypothesis, the verbs in the column on the right in Figure 12 are most strongly and those in the left column least strongly associated with Path semantics. But the explanation for the existence of this hierarchy is not entirely clear. It is of course possible that the roots in the right column in fact lexicalize Path functions. But given that they pattern with the other CoL verbs in all those aspects discussed in the previous section and the sections to follow, such a radical semantic difference would itself call for an explanation that is nowhere in sight at present. In contrast, a hypothetical explanation of Figure 12 in line with the CoL analysis can at least be outlined. The three columns of Figure 12 differ neatly in terms of the Place function of the Ground: IN (containment) in the left column, ON (support) or ABOVE (superposition) in the middle column and AT (proximity or contact) in the column on the right (see Table 1 above). Now, at least in English and related languages, it is perfectly natural to linguistically locate a Figure IN, ON, or ABOVE a *moving* Ground (e.g., a moving vehicle); but to do so AT a moving Ground seems impossible. Thus, the car in (24a) may be in Motion or stasis; but (24b) is only acceptable if the car is not moving at the time.

(24) a. *Floyd was in the car*
b. *Floyd was at the car*

The generalization seems to be that AT Place functions can only be assigned to static objects. Future research will have to establish whether this generalization holds for Yucatec as well. If it does, that would explain why the verbs in the column on the right in Figure 12 are not applicable to Ground Motion scenarios. Indirect confirmation of this hypothesis comes from the fact, reported in the next subsection, that the verbs in the right column are in fact more compatible with events involving the emergence or disappearance of the Figure in or from a configuration with the Ground.

### 3.2. Figure/Ground emerging/disappearing

Another test of CoL semantics is CoL coming about as a result of the Figure emerging in or disappearing from a configuration with the Ground. Compatibility with such "beaming" scenarios - just as compatibility with ground motion - shows that Yucatec CoL descriptions do not entail Translational Motion of the Figure. The stimuli employed in the present study instantiate this type of scenario with teleportation of the Figure, as in science fiction movies. Examples (24)-(25) feature *òok* 'enter' in descriptions of a scene in which a ball "beams" into an enclosure; cf. Figure 13-14.

**Figure 13.** *First frame of Moverbs ENTER_EXIT 07*

**Figure 14.** *Last frame of Moverbs ENTER_EXIT 07*

(24) Le=chan bòola=o', káa=h-sáat=e',
DET=DIM ball=D2 CON=PRV-lose\ACAUS(B3SG)=TOP
káa=h-chíik-pah ka'=téen=e', ich le=chan àaro
CON=PRV-appear-SPONT(B3SG) two=CL.times=TOP in DET=DIM ring
yàan=o'; h=òok chíik-pah-al.
EXIST(B3SG)=D2 PRV=enter(B3SG) appear-SPONT-INC
'The little ball, [when/and then] it vanished, [when/and then] it appeared again, it was in the ring; it entered emerging.'

(25) Káa=h-sáat=e',

CON=PRV=lose/ACAUS(B3SG)=TOP
káa=h-chíik-pah=e',
CON=PRV=appear-SPONT(B3SG)=TOP
ich-il le=sìirkulo yàan=i'; òok-a'n.
in-REL DET=circle EXIST(B3SG)=D4 enter-RES(B3SG)
[When/and then] [the ball] disappears; [when/and then] it appears [again], it's inside the circle; it has entered.'

Just as under Ground Motion, the applicability of CoL verbs under teleportation Motion of the Figure, as in (24). And likewise just as illustrated with Ground Motion scenarios, acceptability of uses of CoL verbs in reference to teleportation scenarios generally increases when some form of the verb is chosen that focuses on the result state of the CoL event, such as the resultative derivation in *–a'n* in (25).

Applicability of CoL verbs to teleportation events seems to vary across verbs along a scale similar to the one for Ground Motion depicted in Figure 12 above. Only scenarios of teleportation into or out of some kind of containment configuration elicit dynamic CoL descriptions with the Figure as theme in perfective aspect; the remaining types of scenes are merely amenable to descriptions featuring resultative forms of the CoL verbs with the Figure as the sole argument. Example (26) illustrates this type of response with *máan* 'pass' in reference to the result state of an event of "beaming" across a dyke, as depicted in Figure 15-16:

**Figure 15.** *First frame of Moverbs PATHS 06*

**Figure 16.** *Last frame of Moverbs PATHS 06*

(26) Káa=h-sáat=e',
CON=PRV-lose/ACAUS(B3SG)=TOP
káa=h-ka'=chíik-pah=e' tu=láahun-tséel

CON=PRV-REP=appear-SPONT(B3SG)=TOP LOC:A3=other:one-side
le=pak' màaha'n yàan=o'.
DET=wall pass:RES(B3SG) EXIST(B3SG)=D2
'[When/and then] [the ball] vanished, [when/and then] it reappeared, it had passed [to] the other side of the wall.'

Unlike in Ground Motion scenarios, the verbs in the right column of Figure 12 are acceptable with Figure teleportation, as shown in (27), a description of the scenario in Figure 17-18 (a ball "beaming" from a tree to a hill).

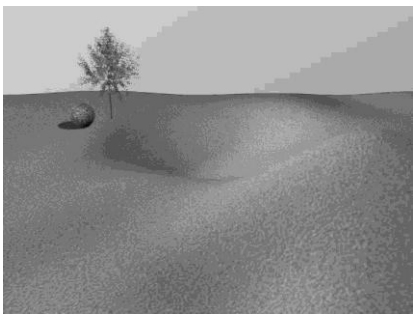

**Figure 17.** *First frame of Moverbs PATHS 11*

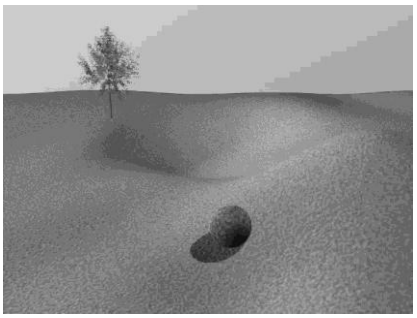

**Figure 18.** *Last frame of Moverbs PATHS 11*

(27) Káa=h-sáat=e',
CON=PRV=lose/ACAUS(B3SG)=TOP
káa=h-chíik-pah=e'
CON=PRV= appear-SPONT(B3SG)=TOP
sáam k'uch-uk y=iknal le=mùul=o'.
REC arrive-SUBJ(B3SG) A3=at DET=hill=D2
'[When/and then] [the ball] vanished, [when/and then] it appeared, it had already/just arrived at the hill.'

In (27), the verb *k'uch* 'arrive' appears with a recent past marker, a construction sometime used as a pragmatic alternative to the resultative and various other constructions denoting post-state reference (Bohnemeyer, 2002: 328-342). Another speaker described the same clip using a resultative form of *tàal* 'come':

(28) Káa=h-sáat t-u=chùun le=che'=o',

CON=PRV-lose/ACAUS(B3SG) PREP-A3=begin/ATP DET=wood=D2
káa=h-tàal chíik-pah-al,
CON=PRV-come(B3SG) appear-SPONT-INC

náats' t-inw=iknal tàaha'n.
near PREP-A1SG=at come:RES(B3SG)
'[When/and then] [the ball] vanished at the trunk of the tree, [when/and then] it came appearing, it was come close to me.'

Three out of five speakers accept descriptions such as (27) or (28) in reference to the "beaming" scenario in Figure 17-18. This supports the hypothesis that the blocking of the verbs in the right column of Figure 12 with Ground Motion is due to AT-Place functions operating on static objects only. Under this hypothesis, the same verbs should be acceptable in reference to emerging/disappearing Figures, and (27)-(28) confirm this. Unfortunately, the scenario in Figure 17-18 is the only one of this kind in the set; more evidence is clearly needed here.

A spatial configuration may also change due to the Ground emerging or disappearing. There are relatively natural instances of this (at least compared to scenarios of the Figure emerging or disappearing); e.g., if an enclosure is built around some object, can it be said that the object has entered the enclosure? And does the object exit when the enclosure is torn down? This has only been tested with ENTER, EXIT, and ASCEND scenarios (and, once again, with animations of teleportation). The results suggest a strong preference for result state reference with inactive CoL verbs. Example (29) shows a description of a stimulus clip in which a stick pierces a ball by the latter "beaming" onto it, depicted in Figure 19-20. The description uses the resultative form of *òok* 'enter'.

**Figure 19.** *First frame of Moverbs FIGURE_GROUND 20*

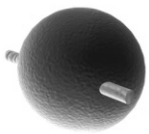

**Figure 20.** *Last frame of Moverbs FIGURE_GROUND 20*

(29) Káa=h-chíik-pah le=bòola=o',

CON=PRV-appear-SPONT(B3SG) DET=ball=D2
òok-a'n che' ti'.
enter-RES(B3SG) wood PREP(B3SG)
'[When/and then] the ball appeared, [a] stick had entered it.'

### 3.3. Summary

CoL verbs are used in a wide range of scenarios that do not involve Motion of the Figure/theme, namely under Ground Motion and with the Figure or the Ground emerging or disappearing. Generally, consultants are much more likely to produce or accept CoL verb constructions under lack of Figure Motion in case the context makes it clear that the Figure does not move. This suggests that the CoL verbs do not entail Translational Motion of the Figure, but carry generalized conversational implicatures to its effect. A plausible source for such implicatures would be Grice's (1975) second maxim of Quantity, "Do not make your contribution more informative than is required", or Levinson's (2000) corresponding I(nformativeness) Heuristic ("What is expressed simply is stereotypically exemplified"). Furthermore, aspectual reference has an impact on acceptability of CoL verb constructions under lack of Figure Motion. Perfect or resultative predications, focusing on the result state of the CoL event instead of the event itself, are accepted across the board (with the exception of verbs encoding AT-Place functions, as these arguably require static Ground objects). In contrast, the acceptance of perfective-aspect clauses in reference to the CoL events themselves is always equal or lesser than that of result state constructions.

## 4. Indirect evidence for the absence of Path lexicalization

Section 3 has presented direct evidence for the framing of Motion as Location change (CoL) in Yucatec: the semantic compatibility of the same clauses used to describe Motion of a Figure with scenarios in which a Figure undergoes CoL through Ground

Motion or emergence/disappearance of the Figure or the Ground. In the present section, I examine additional indirect evidence, in the form of consequences arising from the absence of the lexicalization of Path functions. In so doing, I address the two linguistic arguments Jackendoff (1990) advances against a representation of Motion in terms of CoL in Conceptual Structure (CS): the difficulty of encoding Motion with respect to Route Paths in this way and the occurrence of Path functions in what Talmy (1996, 2000a) has called "Fictive Motion" metaphors. I add an argument of my own: the difficulty of encoding events involving complex Path functions as CoL. I show that none of these arguments applies to Yucatec in a convincing fashion. Furthermore, I discuss the absence of Path metaphors for temporal relations and interference effects in Yucatecan L2-Spanish that may be viewed as reflexes of a lack of Path encoding in Yucatec CS.

### 4.1. The treatment of Routes

The framing of Motion as CoL leads, probably inexorably, to a certain amount of loss of information in the case of Route Grounds – Grounds that define neither the beginning nor the endpoint of the Path, but some point in between. Conceptually, CoL is composed out of a Locative relation plus information about a particular part of the event during which this relation applies. Routes cannot without "oversimplification" be reduced to Locative relations. My walking *across* the road is only inadequately characterized by saying that at some point during the "nucleus" of the event, I am *on* the road (cf. also Jackendoff, 1983: 174; 1990: 93-94). Thus in a language in which Motion is construed purely in terms of CoL we should expect a drastic amount of underspecification in the encoding of CoL VIA Route Grounds. And this is exactly what is found in Yucatec, where

a single verb, *máan* 'pass', is used to encode all CoL events involving Route Grounds. Consider (30):

(30) Túun bin u=balak'=e',
PROG:A3 go A3=roll=D3
káa=h-máan tu=bèel le=trèen=o',
CON=PRV-pass(B3SG) PREP:A3=way:REL DET=train=D2
káa=h-òok ich le=che'-o'b=o' ...
CON=PRV-enter(B3SG) in DET=wood-PL=D2
'[The ball] was going rolling, [and then] it passed across/along/on the railroad tracks, and it entered the group of trees...'

Example (30) was originally elicited as a description of a scene in which a ball rolls across railroad tracks. The clause *káah máan tu bèel le trèeno'* 'it passed across/along/on the railroad tracks' was also elicited in response to a scene in which a ball rolled along a set of railroad tracks, and my consultants confirm that the entire description in (30) can be understood to the effect that the ball (a) crosses the tracks or (b) moves along them or (c) follows the tracks rolling on them. However, the drastic vagueness of (30) is to some extent a function of the one-dimensional structure of railroad tracks. Both spatial prepositions of Yucatec, the generic *ti'* and *ich(il)* 'in', and all the relational nouns listed in Table 3 are compatible with *máan* 'pass'. Enriched through application of Gricean implicatures, these combinations accurately represent most scenarios.

There are two residual questions. First, does *máan* 'pass' itself encode a Path function? Since it is compatible with scenarios in which a Figure "beams" through/over/across a barrier (cf. (26) above), I tentatively conclude that this is not the case. And secondly, what might a plausible CoL semantics for *máan* look like? The verb is obviously not amenable to an ordinary CoL decomposition in terms of a Locative function that characterizes either the source or the target state. An alternative might be

an underspecified Place function (as *máan* is compatible with any Place function encoded by the Ground phrase) combined with change from the state of this Place not having been passed by the Figure to it having been passed, along the lines of (31):

(31) [$_{\text{Event}}$ INCH ([$_{\text{Thing}}$ ], [$_{\text{State}}$ BE ([ ], [$_{\text{Place}}$ PAST ([$_{\text{Place}}$ ([$_{\text{Thing}}$ ])])])])]

The Place function immediately projected from the Ground is left unspecified in (31). The state of having passed this ground is represented in terms of a secondary place function PAST. Of course, PAST must in turn derive its meaning from the mental representation of a Path. But as I argue in section 5, such a representation may be afforded by the Spatial Structure (SpS) system instead of CS. The "Lexical Conceptual Structure" of *máan* would tap into this SpS in a way similar to how, e.g., Manner-of-Motion verbs and shape expressions derive part of their meanings via SpS encoding (cf. Jackendoff, 1996; 2002: 345-350).

### 4.2. Complex Path functions

The composition of multi-Ground Paths represents another challenge to framing Motion in terms of CoL. Consider (32):

(32) *The supporters went from the meet-up to the rally*

A state-change analysis of (32) would have to rely on both source and target state of the CoL event being characterized by Locative functions – the state of being at the meet-up and the state of being at the rally. The format of the INCH function does not afford this; it allows for specification of a single state only – usually the target state. Tellingly, English often relies on Motion metaphors to express complex state changes:

(33) a. *The lights went/changed from green to red*
b. *Floyd's mood went/changed from exuberant to gloomy in a flash*

As shown in Bohnemeyer (2003b; in press) and Bohnemeyer et al. (ms.), Yucatec clauses do not express CoL with respect to more than one Ground. Complex CoL events are broken down into sequences of single-Ground CoL events each of which is encoded by a separate clause. For illustration, (34) is a description of a video clip in which a ball rolls from a tree past a dip to a hill (the setting is the same as in Figure 17-18 above, but the balls rolls through the landscape instead of "beaming"):

(34) H-luk' y=iknal le=che'=o',
PRV-leave(B3SG) A3=at DET=wood=D2
káa=h-tàal u=ba'+pàach-t-ik le=àaktúun=o',
CON=PRV-come(B3SG) A3=?+back-APP-INC(B3SG) DET=hole=D2
káa=h-k'uch he'l-el y=iknal le=búut'un=o'.
CON=PRV-arrive(B3SG) rest-INC A3=at DET=hill=D2
'[The ball] left at the tree, [and then] came going around (lit. surrounding) the dip, [and then] it arrived to rest at the hill.'

The restriction to one CoL Ground *per verbal core* is a consequence of the fact that Ground phrases denote Place functions which are mapped into Locative functions by the verb, as per the semantic composition illustrated in Figure 5 above. For multiple Ground phrases to be licensed in a single core, the verb would have to lexicalize multiple Locative functions and assign these to the different Grounds. Such verbs are unattested in Yucatec or any other language. The restriction to one CoL Ground *per clause* is a consequence of the restriction to one Ground per core and the lack of constructions of an appropriate kind that combine multiple CoL-denoting cores into clauses. Examples of such constructions are "serial verb" or "multi-verb" constructions in Ewe (Kwa/Gbe; Ghana and Togo) and Lao (Tai-Kadai; Laos), as discussed in Bohnemeyer et al. (ms.)[12]

[12] Yucatec does in fact have multi-core constructions that permit the integration of multiple CoL verbs in a single clause. However, in these constructions, the first core must be projected from *bin* 'go' or *tàal* 'come' and the second core is an oblique which stands in a purposive relation to the first, such that realization of

Thus, in line with the hypothesis of a systematic construal of Motion as CoL in Yucatec, there is no evidence of semantic composition of complex Path functions in the language.

### 4.3. Fictive Motion metaphors

One of the arguments Jackendoff (1983, 1990) gives in defense of Path semantics is the occurrence of Path relations outside the Motion domain, for instance in expressions of extent (cf. (35a)), orientation (cf. (35b)), or as "reference paths" ( "Access Paths" in Talmy's (2000a: 136-137) parlance) in Locative predications (35c)):

(35) a. *The highway extends from Denver to Indianapolis.*
b. *The house faces away from the mountains.*
c. *The firehouse is across the street from the library*. (Jackendoff, 1983: 167-172)

If Path functions occur independently of CoL, they should be primitives of CS, and this status should extend to the event functions that occur uniquely with them, i.e., event functions of T-Motion (encoded at CS by the primitive GO). The event functions in cases such as (35) are extensions of GO along the lines of Talmy's (1996, 2000a) "Fictive Motion".

The following observations are based on the elicitation of Yucatec renditions for instances of all types of English Fictive Motion metaphors[13] discussed in Talmy (2000a: 105-138) with five adult native speakers. The CoL verbs of Table 1, the prepositions *ti'*

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the event encoded by the second core is not entailed. The pragmatic function of such structures seems to be to add a deictic perspective, as expressed by the first core, to the CoL event denoted by the second core. Multi-CoL sequences such as in (34) cannot be expressed in this way. In other Mayan languages, structures of this kind often grammaticalize, yielding directional particles (Zavala, 1993).

[13] Jackendoff (1983: 209-211; 356-360) rejects the analysis of such expressions as metaphors in the context of the Thematic Relations Hypothesis discussed in section 5. This question is, however, irrelevant to present matters.

(generic) and *ich(il)* 'in', the relational nouns listed in Table 3, and the constructions that combine these expressions, all can be used metaphorically. But such metaphors are subject to the constraints on framing Motion as CoL discussed above. Thus, CoL verbs can be used in descriptions of "coextension paths" (Talmy, 2000a: 138) such as (35a); but due to the restriction to one CoL Ground per clause (section 4.2), these have to be broken down into sequences of clauses denoting "Fictive CoL" with respect to single Ground. Example (36) is a rendition of "This road here goes from Señor via Tixcacal to Yaxley":

(36) Le=bèeh he'l=a', k-u=hóok'-ol Señor,
DET=way PRSV=D1 IMPF-A3=exit-INC Señor
k-u=ts'o'k-ol=e', k-u=máan Tixcacal,
IMPF-A3=end-INC=TOP IMPF-A3=pass(INC) Tixcacal
k-u=ts'o'k-ol=e', k-u=k'uch-ul Yaxley,
IMPF-A3=end-INC=TOP IMPF-A3=arrive-INC Yaxley
'This road here, it exits Señor; then [lit. that having ended] it passes [through] Tixcacal; then [lit. that having ended] it arrives [in] Yaxley.'

There is no evidence that metaphorical uses of CoL expressions as in (36) involve Path semantics. Thus, they are more properly considered instances of "Fictive CoL", rather than Fictive Motion.[14]

Among the various types of metaphors distinguished by Talmy, only the "Co-extension Paths" and "Frame Motion" (virtual Motion effects; e.g., trees seen as passing by a car) types have equivalents in Yucatec that employ CoL expressions. Meanings corresponding to those of the remaining types are expressed non-metaphorically in Yucatec. Consider, first, the family of "Orientation Path" metaphors (Talmy, 2000a:

[14] Matsumoto (1996) finds differences between Fictive Motion metaphors in English and Japanese that are likewise attributable to lexical and syntactic differences between the two languages in the source domain.

106-111), all of which involve the Direction Paths functions TOWARD and AWAY-FROM. Since these do not entail CoL, they are not morphologically encoded at all in Yucatec. The same Ground phrases that, depending on the verb they combine with, may have AT, FROM, TO, or VIA readings are also compatible with TOWARD and AWAY-FROM readings. But since there are no verbs that lexicalize Direction, Direction specifications are never unambiguous, except in combination with the indexical verbs *bin* 'go', *tàal* 'come', and *u'l* 'return (to deictic center)'. These verbs entail CoL with respect to the deictic center or an anaphorically traced Place; so when they occur with Ground phrases, these are unambiguously interpreted as Directional adjuncts. However, none of these verbs can be used in Orientation Path metaphors such as (35b). While the reason is not entirely clear, the finding meshes with the fact that all verbs in Talmy's (2000a: 108-111) examples of the various types of orientation Paths are either stative (as in (35b)) or involve change of Direction (as in *I looked down into the well*). "Demonstrative Path" (Talmy, 2000a: 109), which describe a person or object pointing in a certain direction, are expressed using stative verbs such *e's* 'show' or *chíikult* and *túuchul*, both 'sign', 'signify'. The "Directional Goal" (corresponding to the TOWARDS Ground in English Directional expressions) is expressed by the object of these verbs. Thus, (37) is a Yucatec equivalent of "The broom is pointing towards don Modesto's house":

(37) Uy=òok le=mìis=o', k-uy=e's-ik
A3=foot DET=broom=D2 IMPF-A3=show-INC(B3SG)
u=nah-il don Modesto.
A3=house-REL don Modesto
'The broom stick (lit. the leg of the broom) is showing don Modesto's house.'

It is impossible to semantically encode Directions AWAY-FROM a Ground in this fashion. Example (38) is a typical response to persistent attempts at eliciting a rendition of "The broom is pointing away from the bucket":

(38) Le=mìis=a', y=áanal+tu'x súut-ul uy=òok, ma'
DET=broom=D1 A3=other+where turn\ACAUS-INC A3=foot NEG
t-u=toh-il le=kùubo=o'. Pero u=mìis-il=e',
PREP-A3=straight-REL DET=bucket=D2 but A3=broom-REL=TOP
ti'=yàan náats iknal le=kùubo=o'.
there=EXIST(B3SG) near at DET=bucket=D2
'This broom, its stick is turned elsewhere, not in the line of the bucket. But its bristles (lit. its broom), they are close to the bucket.'

The orientation of an object with a designated front part is often described in English with a "Prospect Path" metaphor (Talmy, 2000a: 108) such as (35b). Yucatec has non-metaphorical expressions for such configurations. An example is the relational noun *aktáan* 'front-to-front' in (39), which indicates that Figure and Ground face each other:

(39) U=nah-il Pablo=e', ti'=yàan t-u=láak
A3=house-REL Pablo=TOP there=EXIST PREP-A3=other
hun-p'éel tséel le=bèeh=o'; ak+táan ti' u=nah-il Pedro.
one-CL.IN side DET=way=D2 ?+front PREP A3=house-REL Pedro
'Pablo's house, it is on the other side of the road, front to front with Pedro's house.'

Example (39) also illustrates how Yucatec speakers convey the meanings expressed by "Access Path" metaphors (Talmy, 2000a: 136) such as *across the street from the library* in (35c) in English. Again, the Yucatec expression is non-metaphorical ("on the other side of the road").

Finally, consider "Line of Sight" and "Sensory Path" metaphors, which describe perception as fictive motion (e.g., *look into the well*; *see the enemy from the hill*; Talmy, 2000a: 110-111; 115-116). Most Yucatec perception verbs link the stimulus of perception to the undergoer argument, which may remain implicit with this class of verbs. Some in addition or alternatively combine with Ground phrases that denote the Place perception is focused on. How, then, does one convey the idea of looking *through* a window or the like? Example (40) shows one solution: the window and the stimulus seen through it are

referred to in different clauses with different perception verbs; the spatial relation between them is left to inferences.

(40) Káa=t-a=pakat-ah te=béentanah=o',
CON=PRV-A2=look.at-CMP(B3SG) PREP:DET=window=D2
káa=t-aw=il-ah ba'x yàan ich le=nah=o'.
CON=PRV-A2=see-CMP(B3SG) what EXIST(B3SG) in DET=house=D2
'[When/and then] you looked (lit. at it) at the window, [when/and then] you saw what was in the house.'

The findings presented here generalize to all known types of Fictive Motion metaphors. These meanings are expressed either as "Fictive CoL" or non-figuratively in Yucatec.

### 4.4. Spatio-temporal metaphors

Many natural languages use spatio-temporal metaphors to express ordering relations between time intervals. Temporal connectives such as *after*, *before*, and *while* often etymologically derive from metaphors involving Path semantics, and have been argued to be always based on such metaphors conceptually (e.g., Clark, 1973; Fillmore, 1971; Miller & Johnson-Laird, 1976: 462-464; Traugott, 1978). These are "localist" analyses, i.e., analyses that accord a prominent role to spatial relations as models in the conceptualization of non-spatial domains. The domain mapping in spatio-temporal metaphors is made possible by an isomorphism between the conceptual structures of time and Paths.[15] It has been shown in Bohnemeyer (1998, 2000, 2002, 2003a) that Yucatec lacks expressions of temporal ordering relations, with a few systematic exceptions such as deictic calendrical adverbs ('yesterday', 'tomorrow'), adverbs

[15] Briefly, the subinterval and sub-path relations define linear partial orders over time intervals and sub-paths such that any two time intervals and any two sub-paths either overlap, are adjacent to one another, or are connected by exactly one subinterval/sub-path that is adjacent to both; cf. Krifka, 1998 and Zwarts, 2005.

meaning 'now' and 'formerly', and idioms used as generic temporal anaphors ('when'). There are no connectives that encode a specific order between two time intervals such as *after*, *before*, *while*, *during*, *since*, or *until*. Temporal ordering in discourse is conveyed through the encoding of fine-grained aspectual and modal distinctions in combination with Gricean implicatures. Consider, for example, the aspectual verb *ts'o'k* 'end', used in (often reduced) topicalized clauses as a kind of aspectual connective (e.g., (20), (23), (36) above and (41) below). Semantically, the construction $[S_1$ [...ts'o'k...$]_{Topic}$ $S_2]$ encodes sequential order (non-overlap) between the events referred to by $S_1$ and $S_2$. Which of the two events happens first is inferred from the order of clauses; anti-iconic ordering, as is possible and quite natural with *after* (*Sally finished her report after talking to Floyd*), cannot be expressed in this construction.

Several of the prepositions and relational nouns discussed in section 2.2 can in fact be used in spatio-temporal metaphors. However, these metaphors do not represent two-place ordering relations, and that seems to be a direct consequence of the fact that the source expressions do not lexicalize Locative or Path relations. For example, the relational nouns *táan* 'front' and *pàach* 'back' can be used to refer to the first or last Place in a sequence of events (as well as in compound verb stems with the meaning 'do something prematurely/belatedly'). This is illustrated for *táan* in (41)-(42):

(41) Yáax táan-il=e', Pedro h-síih-ih.
first front-REL=TOP Pedro PRV-be.born-B3SG
Káa=h-ts'o'k=e' káa=h-síih Pablo.
CON=PRV-end=TOP CON=PRV-be.born(B3SG) Pablo
'First, Pedro was born. Then (lit. it having ended), Pablo was born.'

(42) Pedro=e', h-síih táan-il ti' Pablo;
Pedro=TOP PRV-be.born(B3SG) front-REL PREP Pablo
Pablo=e', h-síih táan-il ti' José.
Pablo=TOP PRV-be.born(B3SG) front-REL PREP José

'Pedro, he was born first with respect to Pablo; Pablo, he was born first with respect to José.'

*Táan(il ti'*) 'first (with respect to)' cannot take a verbal core or clause as a complement. Thus, the interpretation of what it is that happened to Pedro before Pablo in the first clause of (42) has to come from the verb (*síih* 'be born' in (42)). This is in direct parallel to the role of a Ground phrase headed by *táan(il ti'*) in the semantic composition of Locative or CoL descriptions (cf. section 2.2). Just as this Ground phrase denotes a Place whose role in the event is determined by the verb, instead of a Locative or Path function, so the PP in the temporal use denotes a metaphorical Place in a sequence of events whose interpretation is determined by the verbal core, instead of a temporal ordering relation. For one more illustration, consider the preposition *ich* 'in'. *Ich* is used with both duration ('for X time') and time span ('in X time') adverbials, as well as expressions of temporal distance as in (43)-(44). In (43), distance is projected into the past of reference time, due to the fact that the verbal core appears in the bare subjunctive, where in (44), the *ich* phrase is understood to measure distance with respect to an event in the future of reference time, due to the presence of the irrealis subordinator *kéen* (see Bohnemeyer, 2002: 411-413; 421-426 for discussion). *Ich* remains neutral with respect to the temporal relation, just as it does not distinguish Locative or Path functions in spatial usage.

(43) Pwesto'n =e', ich ts'e'ts'ek k'ìin hóok'-ok-o'n.
well us=TOP in a.few sun exit-SUBJ-B1PL
'Well, as for us, it was a few days ago that we left.'

(44) Pwesto'n =e', ich ts'e'ts'ek k'ìin keen hóok'-ok-o'n.
well us=TOP in a.few sun SR.IRR exit-SUBJ-B1PL
'Well, as for us, it is in a few days that we will leave.'

The absence of Locative/Path distinctions in the source expressions seems to preclude spatio-temporal metaphors in Yucatec from picking up temporal ordering relations. This supports localist assumptions about Motion and Path as the conceptual basis of expressions of temporal relations, albeit in an unexpected fashion, as localists might not expect expressions of Motion and Path to be language-specific to the extent argued for here. Discussion of the point is resumed in section 5.

### 4.5. Path in L2 Spanish

If Path functions are universal primitives of CS, it follows that they are primitives in the CS of Yucatec speakers as much as they are primitives in the CS of English speakers. If Yucatec speakers entertain CS representations of Path functions, there is no reason to expect that learning the meanings of Path expressions in a contact language should pose a particular problem for them, even if their native language does not express Path functions. Lehmann (1992) quotes anecdotal evidence indicating that this prediction might fail. The second-language Spanish utterances in (45a)-(48a) were produced by speakers whose L1 is Yucatec. In contrast to L1-Spanish usage (given in the b-examples), the Ground phrases in these sentences are interpreted as Place-denoting, suggesting straightforward calquing from Yucatec.

(45) a. ¿Donde vienes?
L2SPA where come:PRS:2SG
'Where do you come?' [intended: 'where from?']
b. ¿De donde vienes?
L1SPA from where come:PRS:2SG
'Where do you come from?'

(46) a. El ratón salió en su agujero.
L2SPA the rat exit:PAST:3SG in its hole
'The rat exited in its hole.' [intended: 'from its hole']
b. El ratón salió de su agujero.
L1SPA the rat exit:PAST:3SG from its hole
'The rat exited from its hole.'

(47) a. El ratón pasó en su agujero.
L2SPA the rat pass:PAST:3SG in its hole
'The rat passed in its hole.' [intended: 'through its hole']
b. El ratón pasó por su agujero.
L1SPA the rat pass:PAST:3SG via its hole
'The rat passed through its hole.'

(48) a. Saqué el venado sobre el camino.
L2SPA sack:PAST:1SG the deer on DEF way
'I took the deer on the road.' [intended: 'from the road']
b. Saqué el venado del camino.
L1SPA sack:PAST:1SG the deer from:DEF way
'I took the deer from the road.' (Lehmann 1992: 626)

A contrastive quantitative study is needed to assess how widespread such interference phenomena are. If they turn out to be representative of learner varieties among Yucatec native speakers, this would support the hypothesis that Yucatec speakers do not only not map Path functions from CS into syntax, but do not in fact encode them at all at CS.[16] However, this support would still be quite weak, as it rests on the unproven assumption that language-specificity at CS may foster L1-transfer. There is currently no empirical evidence for or against this assumption that I am aware of (while it is certainly all but clear that L1-transfer occurs independently of variation at CS); there simply has not been much research into the language-specificity of CS at all to date.

### 4.6. Summary

[16] Why is it that the representation of Path information in SpS may not be sufficient to support Path encoding in L2 Spanish? There are two conceivable answers. First, Jackendoff has argued that all information relevant to syntax *must* be encoded in CS. Second, SpS presumably encodes much richer representations of the trajectory of moving entities. In CS, these are reduced to abstract Path functions determined in terms of topological relations with respect to one or more reference entities. Much continuous information about curvature, angles, and distances is lost. This abstraction may not be obvious to speakers of a language such as Yucatec which does not express it.

Corroborating evidence against a Path semantics for Yucatec Motion descriptions comes, first, from the semantic underspecification of CoL involving Route Grounds (4.1). All events of this type are described with the verb *máan* 'pass', regardless of whether they involve, from an English perspective, Motion past, along, across, over, under, or through a Ground object. The chunking of complex Motion events into sequences of single-Ground CoL events, each encoded by a separate clause, replaces the composition of complex Path functions, which is unavailable under the framing of Motion as CoL (4.2). Instead of "Fictive Motion" metaphors, which extend Path functions to non-Motion spatial domains, Yucatec employs a limited amount of "Fictive CoL" metaphors, which are subject to the same constraints as all CoL expressions, and otherwise uses non-metaphoric expressions of these meanings. The evidence from descriptions involving Route Grounds, multi-Ground change, and metaphoric uses of CoL descriptions show that the arguments for a Path semantics in English introduced in section 1 do not apply to Yucatec. In addition, temporal ordering relations, which have been hypothesized to be conceptualized as metaphorical extensions of Path functions, are largely not encoded at all; the semantics of temporal metaphors that employ spatial prepositions or relational nouns are constrained by the Place functions denoted by their sources.

## 5. The language-specificity of Path functions at CS

Let us now consider the implications of the evidence assembled in sections 2-4 for the question of language-specificity in Conceptual Structure (CS). Jackendoff (1992: ch.2-3; 2002: 334-339) has endorsed the view that the bulk of "lexical concepts" – more or less, word meanings – must be learned, but can be decomposed into (or, from the learner's perspective, built up from) conceptual primitives, a core set of which is innate.

Following common practice, I assume that innate concepts are universal, while acquired concepts may (but need not) vary with language and culture. Which concepts are innate and which acquired is an empirical question. Answers to this question can be provided by developmental psychology and (directly or indirectly) by the study of semantic acquisition and cross-linguistic variation in semantics (or "semantic typology"; cf. Bohnemeyer et al., ms.; Levinson, Meira, & The Language and Cognition Group, 2003). The last-mentioned angle is, of course, the one from which this study aims to make a contribution.

The question is, then, whether the Translational Motion (T-Motion) event function GO and the ontological type of Path functions are innate and therefore universal primitives of CS. The relevance of this question derives from the "Thematic Relations Hypothesis" (TRH), which proposes (following Gruber, 1965) an organization of CS in terms of different "semantic fields". Each field applies a subset of the same inherently domain-neutral and thus highly abstract conceptual functions and ontological types (Jackendoff, 1983: ch.10; 1992: ch.2-3; 2002: 356-373).[17] I understand Jackendoff's hypothesis to be that these abstract functions and types are unlearnable – they are a part of the innate organization of CS itself. Jackendoff has always maintained that the Path type and the function GO are among the domain-neutral categories. The spatial senses of Motion and Path expressions are generated by applying these abstract

[17] It appears that it has been an unstated goal of the Conceptual Semantics enterprise to push decomposition of verb meanings in terms of these generalized conceptual categories to its limits. While the set of ontological types is probably indeed small and wholly domain-neutral, the set of domain-neutral conceptual functions may need to be supplemented by an indefinite number of domain-specific functions. This will depend in part on the division of labor between CS and SpS addressed below.

functions to the spatial field; other applications are found, for example, in the field of possession, where donors/givers are assigned the Path function FROM and recipients the Path function TO.[18]

The evidence presented in sections 2-4 suggests that Path semantics is not encoded in Yucatec. To be more precise, it suggests that T-Motion and Path functions are not mapped into syntactic representations – that they are neither lexicalized nor grammaticalized. This result does not, however, directly bear on the question of the language-specificity of CS itself. If both T-Motion and Path functions as well as state-change functions are part of the abstract innate core of CS, then speakers of all languages have the same conceptual resources at their disposal, but English speakers use the Path system to linguistically describe Motion events, whereas Yucatec speakers achieve the same relying on the state-change system. This outcome is prima facie an eminently reasonable one, since CS is assumed to not only encode linguistic meaning, but at the same time support reasoning – and there is at present no evidence that Yucatec speakers reason about Motion events in any way other than how English speakers reason about them.

There are, however, several sources of indirect evidence that can be brought to bear on the question of the accessibility of Path-semantic functions in Yucatec. First, if CS encodes both conceptual and semantic representations - as Jackendoff argues - then the Yucatec speakers who produced the descriptions of the non-Figure-Motion scenarios discussed in section 3 must have mentally represented these events in terms of CoL. Had they "thought" about the events, *for the purposes of linguistic encoding*, in Path-

[18] In Yucatec, the donor/giver of *k'am* 'receive' and the recipient of *ts'a'* 'give', 'put', 'provide' are encoded by PPs headed by the same generic preposition *ti'*, thus confirming once more its Path-neutrality.

semantic terms, and stored these CS representations in memory, their descriptions would have been truth-conditionally incompatible with the scenes in question. However, we cannot conclude from this observation that Yucatecans represent Motion as CoL in CS for the purposes of linguistic encoding *outside this task*. This caveat carries some weight because of the observation that Ground Motion and teleportation scenarios seem just as "unnatural" to Yucatecans as to English speakers.

Independent evidence against the availability of Path-semantic functions in Yucatec comes from the L2 Spanish data presented in section 4.5. These indicate that Yucatec native speakers transfer the Path-neutral semantics of Yucatec Ground phrases to Spanish. If Path functions were readily available in the CS of Yucatec native speakers, one would expect the Spanish Path prepositions to be able to pick them up easily. Future research will have to assess to what extent the anecdotal data of section 4.5 are representative of learner varieties among Yucatec L1 speakers. To the extent that they are, the support for innate Path-semantic primitives is beginning to look somewhat thin.

On the other side of the equation, Jackendoff (1990: 93-94) argued that T-Motion and Path should be primitives of CS in view of experimental evidence suggesting that they are primitives of spatial cognition (as quoted in section 1). But this argument seems to rely on the original version of the "Conceptual Structure Hypothesis":

> "There is a single level of mental representation, *conceptual structure*, at which linguistic, sensory, and motor information are compatible." (Jackendoff, 1983: 17)

In Jackendoff 1987, however, this single level was complemented by a second, independent representational system, Spatial Structure (SpS). SpS encodes object geometry as axial structure and spatial relationships across objects in a way that is neutral regarding sensory modality. It is an iconic and "image-schematic", but not

"imagistic", representation. Jackendoff (2002: 347) characterizes the division of labor between CS and SpS as follows:

> "The work of understanding the conceptualized world is divided between CS and SpS … Judgments and inferences having to do with predicate-argument relations, category membership, the type-token distinction, quantification, and so forth can be formulated only in terms of CS. Judgments and inferences having to do with exact shapes, locations, and forces can be formulated only in terms of SpS. On the other hand, there is overlap between the two levels, in that the notion of physical objects, part-whole relationships, locations, force, and causation have reflexes in both systems."

It is perfectly evident that SpS *must* encode Motion, as well as the Locations of any Ground objects with respect to which the Path is conceptualized. It thus seems that SpS is sufficient to fully support non-linguistic reasoning about Motion events. I am not aware of any evidence that would motivate a duplication of the information at CS, except for the sole purpose of linguistic encoding. And that motivation does not appear to hold for Yucatec. This in turn calls into question the universality and innateness of Path semantics from an evolutionary perspective. Why would a particular subsystem of CS become encoded in the human genome, if it exists for the sole purpose of representing certain types of linguistic meanings, yet these meanings are not even expressed in all languages?

At this point, the question becomes relevant of just how exotic or widespread the systematic framing of Motion as CoL, Yucatec-style, is in the languages of the world. Two critical typological boundary conditions for representing Motion as CoL seem to be strict Path-neutrality of Ground phrases and the absence of "multi-verb" constructions that permit the semantic composition of complex Path functions (cf. section 4.2). Among the 18 genetically and typologically diverse languages surveyed in Bohnemeyer et al. ms., these conditions are simultaneously met by seven

languages: the Mayan languages Tzeltal and Yucatec and the Oto-Manguean language Zoogocho Zapotec (all spoken in Mexico); the Western Oceanic languages Kilivila and Saliba, spoken in Papua New Guinea; the West-Papuan language Tidore of Indonesia, and the East-Papuan language Yélî Dnye of Papua New Guinea. To this I would tentatively add many if not most members of the Bantu language family, which happened to not be represented in the sample of Bohnemeyer et al. ms. While none of the other languages have been examined for the phenomena discussed in sections 2-4 to the extent Yucatec has been, I see no reason at present to assume that Yucatec is an isolated case, or that the linguistic framing of Motion as CoL is restricted to a particular family or group of languages.

If it can be confirmed that there are languages all over the world (at least outside Eurasia and Australia) that systematically encode Motion as CoL, and if it can be confirmed that reasoning about Motion events is afforded by SpS alone, then the case for the innateness of Path semantics collapses. What are the implications of this hypothetical outcome? Jackendoff makes a convincing case for the spatial manifestations of Path semantics being just special instances of more abstract conceptual functions built into the very core of CS. We might have to seriously consider, then, the possibility that aspects of the very core of CS may be language-specific. This extent of language-specificity of CS would be made possible by a much greater degree of universality and language-independence in the SpS system. This in turn would call into question the position, advocated in Jackendoff (2002), that CS predates language considerably in evolution, being shared at least among primates and possibly other higher animals, and that language has evolved as an external representation for CS. The alternative picture more in line with the evidence for

language-specificity discussed here is one according to which the known facts of animal cognition are attributable to SpS, and CS has evolved as a cognitive support system to enable translation between SpS and language.

## 6. Conclusions

Converging evidence from a variety of sources suggests that Motion is consistently framed as state change - Change of Location (CoL) – in Yucatec. Verbal cores that describe Motion must be projected from state-change verbs. Ground phrases denote Place functions and are strictly Path-neutral. Yucatec thus exhibits a more radical type of "verb framing" than the languages considered in Talmy (2000b). CoL-denoting clauses implicate, but do not entail, Motion, as evident from the fact that they are acceptable as descriptions of scenarios in which CoL comes about by the Ground moving or Figure or Ground emerging or disappearing. Such phenomena, first attested in Japanese by Kita (1999), occur on a larger scale in Yucatec. Exempt from application to non-Figure-Motion scenarios are verbs selecting AT-Place functions, presumably because such Functions can only be projected from stationary Grounds. Assuming identity of semantic and Conceptual Structure (CS) representations, the compatibility of CoL descriptions with teleportation and Ground Motion events suggests that Yucatec speakers conceptualize and memorize such events in terms of CoL. The case for a possible absence of Path functions from the CS of Yucatec native speakers is further bolstered by the lack of spatio-temporal metaphors expressing two-place temporal ordering relations; these are assumed on localist accounts to be grounded in Path functions. Furthermore, anecdotal evidence points to transfer of Place semantics onto L2-Spanish Ground phrases. If Yucatec encoded Path functions in CS (even without directly expressing them syntactically),

such apparent difficulty in the acquisition of L2 Path expressions would be unexpected.

Arguments that may be advanced in defense of Path semantics in English do not apply to Yucatec. Thus, in line with the construal of Motion as CoL, Motion with respect to Route Grounds is semantically underspecified – all events of this type are described with a single verb, *máan* 'pass'. Complex Motion involving multiple Grounds is broken down into sequences of single-Ground CoL events, each encoded by an independent clause. CoL-denoting clauses can be used metaphorically to describe the extension of spatial objects; but such metaphors are subject to the one-Ground-per-clause rule as well. The meanings conveyed by other "Fictive Motion" metaphors in English are described non-metaphorically.

Lack of Path semantics may not be rare among the lesser-studied languages of the world. Language-specificity in the representation of Motion at CS may be afforded by the Spatial Structures system of cognition.

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