Culmination Entailments in V and P: Evidence from White Hmong

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1. Introduction

The verbal and prepositional domains are known to encode similar notions of completeness, usually referred to as "culmination" in the verbal domain and "boundedness" in the prepositional domain. Recent analyses of (non-)culmination in Accomplishment verbs (Nadathur & Filip 2021) and (un-)boundedness in Goal PPs (Martin et al. 2021) have converged on conceptually-similar representations: the extension of the relevant predicate is taken to include both total and partial events/paths, which are unified by a modal relationship to a particular endpoint. In both domains, the core meaning of the predicate in question is non-culminating.[1]

The formal and conceptual similarities between these two accounts lead us to certain expectations. First, there is a robustly-attested typological split between those languages in which perfective Accomplishments receive a culminating interpretation by default, among them English, French, and Russian, and those in which perfective Accomplishments receive a non-culminating interpretation by default, such as Mandarin, Hindi, and Malagasy (Martin 2019). This should, in principle, be mirrored by a similar typological split in the prepositional domain: we might expect also to find languages in which Goal predicates receive a non-culminating interpretation by default. Such a typological distinction has not, to my knowledge, been previously described. Second, if Accomplishment and Goal predicates are formally parallel, we might expect that some natural languages realize these predicates with parallel surface forms, or subject them to parallel syntactic and semantic processes.

White Hmong (Hmong-Mien) is a language that satisfies both of these expectations. In Section 2, I present novel data from elicitation with speakers of Hmong, that shows (i) that both Accomplishment and Goal predicates in Hmong are non-culminating by default, and (ii) that Hmong employs a consistent strategy across both domains for deriving culmination entailments: secondary predication. Section 3 offers a formal analysis of this behavior. Section 4 addresses important questions about the status of Goal predicates (and other path predicates) in Hmong, and Section 5 concludes with a few words on the cross-linguistic typology of (non-)culmination.

2. Culmination in Hmong

White Hmong (henceforth simply "Hmong") is a tenseless, isolating, SVO language of the Hmong-Mien family, traditionally spoken in Laos and Thailand. It is also a non-culminating Accomplishment language of the "weak perfective" type (in the terminology of Martin 2019). That is, perfective sentences containing Accomplishment predicates convey cessation, but not completion, of the action described. For example, (1) is felicitous even in a context where the object of *nrhiav* 'search for, find' is not successfully located (as the continuation makes expressly clear).

(1) kuv **nrhiav** lub pob (tabsis tsis nrhiav tau)
1SG find CLF ball (but NEG find can)
'I found the ball (but I didn't manage to find it).' ≈ 'I searched for the ball.'

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[1] I use "culmination" throughout this paper to conflate the notions of culmination in V and boundedness in P.

To explicitly convey culmination, a more marked form is required. Several strategies exist in Hmong for deriving culmination entailments, but one is of primary interest here: secondary predication. As shown in (2), an Accomplishment predicate may combine with an Achievement predicate (here *pom* 'see') to describe a necessarily-culminating complex event.

(2) kuv **nrhiav pom** lub pob (#tabsis tsis nrhiav tau)
1SG find see CLF ball (but NEG find can)
'I found the ball (#but I didn't manage to find it).'

In this construction, both predicates contribute truth-conditional meaning. That is, the action described by the Accomplishment predicate (necessarily) reaches a culmination point described by the Achievement predicate. Similar behavior is attested in other non-culminating Accomplishment languages; Martin & Gyarmathy (2019) show that in Mandarin and Hindi, the addition of a secondary predicate likewise derives a culmination entailment for an otherwise non-culminating main verb.

Goal predicates in Hmong behave similarly. The simpler form in (3), with a single Goal predicate *mus* 'go, to', does not entail that the goal, *tom tajlaj* 'the market', was reached. The more complex form in (4), which adds a secondary predicate *txog* 'arrive, at', does entail that the goal was reached. That is, following the path *to* the market results in an arrival *at* the market.[2]

(3) kuv khiav **mus** tom tajlaj (tabsis tsis txog)
1SG run to DEM market (but NEG arrive)
'I ran to that market (but I didn't get there).'
≈ 'I ran towards that market.'

(4) kuv khiav **mus txog** tom tajlaj (#tabsis tsis txog)
1SG run to at DEM market (but NEG arrive)
'I ran to that market (#but I didn't get there).'

There are conceptual parallels between (1–2) and (3–4), but at a glance, the key *difference* between these two sets of examples may not be apparent. While the Accomplishment/Achievement predicates in (1–2) are clearly verbal, many path predicates in Hmong, including *mus* 'go, to' and *txog* 'arrive, at', are categorially-flexible. These path predicates can serve as verbs in certain syntactic contexts and as prepositions in others (see Jarkey 2015: §4.2). This categorial flexibility is a significant complication. We must be careful to distinguish their prepositional usage from examples like those in (5) below, where they (in their verbal usage) stand alone as the main predicate of the clause.

(5) a. kuv **mus** tom tajlaj
1SG go DEM market
'I went to that market.'

b. kuv **txog** tom tajlaj
1SG arrive DEM market
'I got to that market.'

For the time being, I will operate under the assumption that predicates like *mus* 'go, to' and *txog* 'arrive, at' in (3–4) are, in fact, prepositions. (I defend this assumption in Section 4.) In the meantime, I lay out a formal analysis in Section 3 of verbal and prepositional secondary predication in Hmong that formalizes the conceptual similarities between the two. In both cases, the Accomplishment/Goal predicate has a potentially large temporal/spatial extent, and may be oriented towards (but need not reach) a particular endpoint. Likewise, the secondary predicate in both cases represents a minimal temporal/spatial transition.

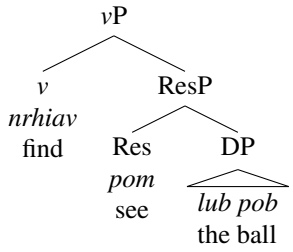
[2] In this paper, I translate Hmong path predicates in a nonstandard way: for *mus* I use 'go, to' rather than 'go', and for *txog* I use 'arrive, at' rather than 'arrive'. My goal is to be consistent with the present claim that these predicates may serve both as verbs and prepositions. Note also that English 'at' does not fully capture the meaning of *txog*, which describes the endpoint of dynamic motion (i.e., 'become at') and never a static locative relation (i.e., 'be at').

3. Culmination via secondary predication

The verbal and prepositional secondary predication constructions presented in Section 2 have a high degree of syntactic and semantic similarity. In this section, I propose that these constructions instantiate parallel structures, modulo (i) the syntactic categories they spell out, and (ii) the semantic type of the individual they predicate. I model the verbal case as a complex event, formed from two causally-linked (sub-)events (following Ramchand 2008), and the prepositional case as a complex path, formed from two concatenated (sub-)paths (following Zwarts 2005).

In propose that the culminating Accomplishment construction in (2) can be represented as in (6). In the spirit of Ramchand (2008), the Accomplishment itself merges in *v*, with the secondary predicate as head of its complement Res(ult)P. This resembles analyses of resultatives and verb-particle constructions in other languages (see e.g. Ramchand 2008, Folli & Harley 2016).

(6)



In this treatment, ResP describes a simple property of events of *seeing the ball*, as in (7a). *v*, after incorporating the property denoted by *nrhiav* 'search for, find', receives the denotation in (7b). This represents a simplification for expository purposes of Ramchand's (2008: p. 45) denotation for *proc(ess)*.[3]. The CAUSE operator here represents direct causal implication (along the lines of Hale & Keyser 1993); that is, this property holds of complex events whose first part directly leads to their second. This *v* then takes ResP as its complement, deriving the complex event description in (7c), in which a *finding* sub-event directly causes a sub-event of *seeing the ball*.

(7) a. $[\![\text{ResP}]\!] = \lambda e.see(e, \text{the-ball})$

b. $[\![v]\!] = \lambda P_{\langle v,t\rangle} \lambda e.\exists e_1, e_2[e = \text{CAUSE}(e_1, e_2) \wedge find(e_1) \wedge P(e_2)]$

c. $[\![v\text{P}]\!] = \lambda e.\exists e_1, e_2[e = \text{CAUSE}(e_1, e_2) \wedge find(e_1) \wedge see(e_2, \text{the-ball})]$

Importantly, the property of events in (7c) also supplies a culmination entailment for free. To assert that a complex event described by (7c) occurs means also asserting the existence of the two causally-related sub-events: that is, both a *finding* e_1 and a *seeing* e_2 must occur. Of course, an event described by an Accomplishment may still in principle be partial, regardless of whether it forms part of a larger complex event. But (following Piñón 1997, Martin & Gyarmathy 2019), an Achievement is a minimal transition with no proper parts: that is, there can be no such thing as a partial Achievement.

Culmination is thus derived indirectly. The property in (7c) asserts that both *finding* and *seeing* sub-events exist, and a *seeing* sub-event (in its Achievement sense) can only occur in totality. This means that although a simplex Accomplishment predicate need not culminate in Hmong, a complex predicate of events like that derived by (6) *must* culminate—and it culminates in precisely the endpoint described by the Achievement secondary predicate.[4]

Turning now to the culminating Goal construction in (4), we must first carefully consider what the meanings of the individual predicates are. In such cases, *mus* 'go, to' and *txog* 'arrive, at' do not offer any

[3] Here $\langle v, t\rangle$ is the semantic type of properties of events. For Ramchand, a syncategorematic rule inserts the property denoted by the root into a placeholder position within the denotation of *proc*/*v*. For simplicity, I assume the same, but this is not crucial—the same output could be derived by combining *v* and the root by function application.

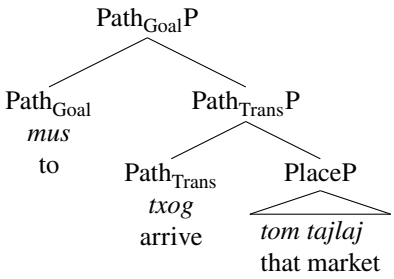
[4] The present proposal is similar to Martin & Gyarmathy's (2019) analysis of "complex verbs" in Mandarin and Hindi, which also relies on the notion that Achievement predicates are atomic, and therefore necessarily culminating.

description of the manner of motion; rather, they describe the deictic and/or geometric properties of the path of motion. They are not predicates of events, but predicates of paths.

The meaning of *mus* 'go, to' appears largely consistent with the meaning for English *to* described by Martin et al. (2021): *mus* characterizes a set comprising both total and partial paths to/toward particular locations. Essentially, *mus* can apply to any goal-oriented path.[5] The predicate *txog* 'arrive, at', on the other hand, appears to impose a stricter constraint on the paths it describes: it describes a set of minimal paths into a locative relation. That is, *txog* 'arrive, at' describes a path consisting of two points, an origin point at which the figure is not located at the ground, and a terminal point at which the figure is located at the ground. *Txog* 'arrive, at' is not the only Hmong predicate describing this sort of transitional path; rather it is one member of a class of approximately half a dozen such predicates, including *nto* 'reach (a high place)', *cuag* 'reach, catch up to', and others. Effectively, these paths are the prepositional analogue of Achievement verbs: they also describe an atomic, necessarily-total transition. For convenience, I adopt the term "Transition predicates" for this class of path predicates.

We can now begin to see how culmination might also be derived by secondary predication in the prepositional domain. I propose that both *mus* 'go, to' and *txog* 'arrive, at' merge within the Path domain, the higher of the two prepositional domains in the decompositional approach originally due to Jackendoff (1983), and the locus of dynamic directed motion. I disambiguate between the two Path heads in this structure by referring to the higher as $\text{Path}_{\text{Goal}}$ and to the lower as $\text{Path}_{\text{Trans}}$ (for "Transition"). The exact labels for these heads are not crucial to the present proposal; what *is* crucial is that these two heads are associated with the distinct classes of path predicates for which they are labeled.[6] $\text{Path}_{\text{Goal}}$ hosts predicates that, like *mus* 'go, to', describe motion along a potentially long path towards a goal, while $\text{Path}_{\text{Trans}}$ host predicates that, like *txog* 'arrive, at', describe a punctual transition into a locative relation.

(8)



A mechanism for joining two paths already exists in the literature on prepositional paths: the concatenation operation over paths outlined by Zwarts (2005). Concatenation, represented here by $+$, is a partial operation defined only when the second path begins where the first path ends. It joins two paths end-to-end, and is undefined if the two paths in question do not share an endpoint.

With this concatenation operation, the intuitive meaning of the structure in (8) can be formalized. $\text{Path}_{\text{Trans}}\text{P}$ receives the denotation in (9a), where *arrive* is a placeholder for the minimal geometry associated with *txog* 'arrive, at' and other Transition predicates. $\text{Path}_{\text{Goal}}$ receives the denotation in (9b)[7], then combines with its complement $\text{Path}_{\text{TransP}}$ to yield the complex property of paths in (9c). This property characterizes a set of paths which have both Goal and Transition components, and just as in the verbal domain, this results in a culminating interpretation: all paths in the set characterized by (9c) must contain a Transition path component, and Transition paths necessarily attain the goal of motion.

(9) a. $[\![\text{Path}_{\text{Trans}}\text{P}]\!] = \lambda p.arrive(p_2) \wedge p_2(1) = \text{location(that-market)}$

[5] Due to competition with *los* 'come (home), to' and *tuaj* 'come, to', the use of *mus* 'go, to' is often dispreferred (though still grammatical) for paths towards the deictic center.

[6] In Pantcheva's (2011) decompositional approach, $\text{Path}_{\text{Goal}}$ corresponds to GoalP, though $\text{Path}_{\text{Trans}}$ is not attested.

[7] Here, I assume a similar syncategorematic rule for combining the property of paths described by *mus* 'go, to', with the concatenative meaning of $\text{Path}_{\text{Goal}}$—though again, this could be modeled equally well by function application. The meaning in (9b) is intended to represent only of the version of $\text{Path}_{\text{Goal}}$ that combines with $\text{Path}_{\text{Trans}}$. I assume that similarly to v, $\text{Path}_{\text{Goal}}$ may come in different "flavors" corresponding to the complements it combines with: when $\text{Path}_{\text{Goal}}$ combines directly with PlaceP, for example, it will require a different semantics than proposed here.

b. $[\![\text{Path}_{\text{Goal}}]\!] = \lambda P_{\langle p,t\rangle}.\lambda p.\exists p_1, p_2[p = p_1 + p_2 \wedge to(p_1) \wedge P(p_2)]$
c. $[\![\text{Path}_{\text{Goal}}\text{P}]\!] = \lambda p.\exists p_1, p_2[p = p_1 + p_2 \wedge to(p_1) \wedge arrive(p_2) \wedge p_2(1) = \text{location(that-market)}]$

Conceptually, the two secondary predication constructions discussed here are the same. By adding a necessarily-culminating transition, whether by causation or concatenation, an otherwise non-culminating predicate gains a culmination entailment. And given the similar meanings proposed for Accomplishment and Goal predicates, this sort of parallelism seems only natural.

4. Prepositional and verbal uses of Hmong path predicates

The analysis presented in Section 3 rests on the assumption that path predicates like those in (4), reprinted here as (10), genuinely do function as prepositions rather than verbs.

(10) kuv khiav **mus txog** tom tajlaj (#tabsis tsis txog)
1SG run go arrive DEM market (but NEG arrive)
'I ran to that market (#but I didn't get there).'

In this section, I defend that assumption. First, Section 4.1 presents evidence that path predicates can serve as prepositions in both adjunct and complement PPs. Then, in Section 4.2, I propose that the "main verb" use of these path predicates is derived transformationally from the prepositional use.

4.1. Path predicates are prepositions

Jarkey (2015: §4.2) provides many examples of Hmong path predicates functioning as prepositions. One of the primary criteria used to distinguish prepositions from verbs in Hmong is that verbs must predicate the clausal subject, while prepositions need not. In the case of adjunct PPs describing the spatial or temporal location/extent of an event, this diagnostic is particularly clear. For example, the adjunct headed by *mus* 'to' in (11) is understood to describe the temporal extent of the subject's living in a particular place, not any motion on the part of the subject.[8] Likewise, the adjunct in (12) describes the spatial extent across which people are currently standing. Importantly, it does not indicate that any of those people are in motion.

(11) kuv yuav nyob qhov no [**mus txog** thaum kuv yuav tau kuv ib tsev tso]
1SG IRR dwell place this to arrive time 1SG IRR get 1SG one house first
'I will live here **until** I get my own house.' (Jarkey 2015: p. 210)

(12) [**dim** qhov rooj **txog** phab.ntsa] mas, cov neeg sawv.ntsug
get.away CLF door **arrive** wall TOP, CLF.PL person be.standing
'**From** the door **to** the (back) wall, people are standing.'

Path predicates describing directed motion show this contrast in a more subtle way. Although they are frequently understood to predicate the subject, as in (3), they do not necessarily do so. In combination with certain verbs, like *xa* 'send' or *tso* 'send (a person)', they instead describe the path of motion followed by the object. In (13) for example, it is Shoua, not the speaker, who is traveling to the market.

(13) kuv tso Sua **mus** tajlaj
1SG send.(a.person) Shoua to market
'I sent Shoua **to** the market.'

[8] Note that *txog* 'arrive, at' also appears as a secondary predicate within this constituent, meaning that prepositional secondary predication is not restricted only to the cases presented in Section 2, but rather is found in PPs in other syntactic environments as well.

To the extent that predication of the subject is a robust diagnostic for verb-hood in Hmong, examples like (11–12) and like (13) stand in a clear contrast to the "main verb" uses like those seen in (5) above.

This diagnostic is corroborated by typological evidence. Consider that under the present proposal, a simple non-culminating motion event like that in (3) receives the structure in (14). This structure is consistent with the general typological profile of a so-called "satellite-framed" language (Talmy 1985). In such languages, English being a notable example, motion events can consist of a manner-of-motion verb plus a "satellite" (in English, a PP) that encodes directed motion.

(14) $[_{vP}\ [_{v}$ run] $[_{\text{PathP}}\ [_{\text{Path}}$ to] $[_{\text{PlaceP}}$ the market]]]

Importantly, satellite-framed languages also exhibit a constellation of other syntactic properties: (i) noun-noun compounds, (ii) resultatives, (iii) verb-particle constructions, (iv) "created-result" constructions, and (v) double object constructions (see e.g. Snyder 2001, Folli & Harley 2016). Most of these, if not all, are attested in Hmong, as the examples in (15) show.[9] This means that the proposed structure in (14) is already plausible on solely typological grounds.

(15) a. Noun-noun compounds (Ratliff 1992):

dab-npuas	qab-paj	roj-npuas	kab-ke
trough-pig	bottom-lake	fat-pig	custom-way
'pig trough'	'lake bottom'	'pig fat'	'custom, ceremony'

b. Resultatives:

nws **tsoo** lub tais **tawg**
3SG smash CLF bowl break.INTRANSITIVE
'He smashed the bowl (and it) broke.' ≈ 'He smashed the bowl broken.'

c. Verb-particle constructions:

nws **pov** cov khob **tseg**
3SG throw CLF.PL cup leave.TRANSITIVE
'He threw the cups away.'

d. Created-result constructions:

nws **xaws** daim ntaub **ua** (daim) tiab
3SG sew CLF cloth make (CLF) skirt
'She sewed the cloth into a skirt.'

Finally, in Hmong, constituents that denote complex paths display syntactic effects characteristic of the prepositional domain. Notably, there are strict constraints on the relative ordering of Hmong path predicates. When Route, Source, and Goal predicates co-occur within a single complex path description, they obligatorily appear in that order (Jarkey 2015: p. 111).[10] The path predicates in (16), for example, cannot be freely rearranged: the Route predicate *hla* 'pass, cross' must precede the Source predicate *dim* 'get away, escape' which must precede the Goal predicate *mus* 'go'.

(16) cov Hmoob khiav [**hla** dej Na.Koom **dim** hauv Nplog-teb **mus** Thai-teb]
CLF.PL Hmong run cross water Mekong get.away inside Laos go Thailand
'The Hmong fled [across the Mekong River from Laos and to Thailand].'

Precisely this same Route–Source–Goal ordering is identified by Pantcheva (2011), who proposes that the path domain can be decomposed as in (17).

(17) [RouteP [SourceP [GoalP [PlaceP …]]]] (Pantcheva 2011: p. 3)

[9] The status of double-object constructions in Hmong is unclear.

[10] To avoid terminological confusion, I use the alternative label "Route" instead of Jarkey's original term, "Path", which applies to only a specific subset of what I call "path predicates" here.

Whether or not Hmong examples like (16) can truly be said to instantiate this sort of cartographic syntax is an open question, but at minimum, the syntactic and semantic composition proceeds in a similar fashion, with Goal paths being simplest and Source and Route paths successively derived. And there is little reason, so far as I can see, to suspect that verbal predicates would be bound to these same constraints.

4.2. Path predicates as main verbs

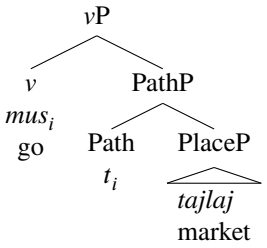
There is one remaining complication regarding the categorial status of path predicates in Hmong. As mentioned in Section 2, these path predicates can often serve as the "main verb" of the clause. Consider the minimal pair below, which intuitively describe the same path of motion—though (18a) includes only a path predicate, and (18b) also includes the manner-of-motion predicate *khiav* 'run'.

(18) a. kuv **mus** tajlaj
1SG go market
'I went to the market.'

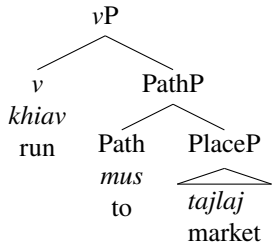
b. kuv **khiav mus** tajlaj
1SG run to market
'I ran to the market.'

Following in the spirit of Folli & Harley's (2016) analysis of resultatives, created-result constructions, and other phenomena associated with satellite-framed languages (as seen in Section 4.1), I take the prepositional usage to be primary, with the main verb usage being derived by head movement. I propose that Hmong path predicates like *mus* 'go' initially merge in Path, and subsequently raise to *v* only when *v* is not already occupied by another root. (When multiple path predicates co-occur within the same complex PathP constituent, only the highest need undergo movement.) This leads to the diverging structures illustrated in (19a) and (19b).

(19) a.



b.



The predicate *mus* 'go' enters both derivations in the same position, as head of Path, raising to *v* only in those cases where *v* is not occupied by a manner-of-motion verb (such as *khiav* 'run' in this example), a transfer verb (such as *nto* 'send (a person)' in (13) above), or another type of verbal predicate.

5. Conclusion

In this paper, I offer a unified formal analysis of a novel pattern found in White Hmong, in which certain predicates in both V and P domains (i) are non-culminating by default, and (ii) employ secondary predication as a strategy for deriving culmination entailments. The parallels between Hmong Accomplishment and Goal predicates offer novel corroboration for recent converging analyses of (non-)culmination in these two domains: in Hmong, the underlying formal similarity gives rise to clear surface similarities.

Given the increasing body of knowledge surrounding (non-)culmination in Accomplishment predicates, the behavior of Hmong Accomplishment predicates is not so surprising. There is a well-known link between secondary predication and telicity in the verbal domain (see e.g. Levin & Rappaport Hovav 1998), and Martin & Gyarmathy (2019) propose an account of culmination in Mandarin "complex verbs" that is quite similar to the present proposal for Hmong.

The behavior of Hmong Goal predicates, on the other hand, is a point of considerable typological interest. In formal typologies of paths of motion (see e.g. Zwarts 2008, Pantcheva 2011), it is generally assumed that the default interpretation of a Goal predicate is culminating—an observation that does not appear tenable for Hmong (and following Martin et al. (2021), ultimately may not be tenable for English or German either).

Likewise, secondary predication as a means of complex path formation is (to my knowledge) not specifically attested. There are, however, accounts of certain English prepositions, such as *into, onto, up to,* and *out from*, that treat them as internally complex (see e.g. Ramchand 2008, Pantcheva 2011). Although the precise syntax and semantics of these English complex prepositions likely differs from that proposed in Section 3 of this paper, they may have formal similarities with the prepositional secondary predicates found in Hmong.

However, the patterns found in Hmong are, if not common, at least attested to varying degrees in other languages. Goal predicates receive non-culminating interpretations in Mandarin (Nakazawa 2009) and the Southern Min variety SwaTawWe (Zheng 2012). And secondary predication of path predicates is found in Mandarin, SwaTawWe, and at least three other languages: Lao (Enfield 2008: ex. 230, 323), Tariana (Aikhenvald 2006: ex. 12, 19), and Teribe (Quesada 2011: ex. 3, 21, 34). Notably, in all five languages this takes the form of a "go+arrive" construction similar to that found in Hmong. However, as all of these languages employ productive verb serialization to some degree, it will require language-specific study to determine whether the locus of this behavior in these other languages might also be in the prepositional domain, as I claim for Hmong.

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