

TWO MOVEMENT PARADOXES IN ZAPOTEC

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Abstract: Bresnan (2001) has drawn attention to *movement paradoxes* in syntactic theory. These are cases where the category of a constituent in a derived position differs from the category of the same constituent when it is *in situ*. San Dionisio Ocotepc Zapotec (SDZ), an Otomanguan language of Mexico, also shows a movement paradox. For a number of verbs with semantics like 'cover/fill/be spread' which subcategorize for a Theme and a Location, the usual argument realization has two NPs after the V. However, when the Theme occurs in an “extraposed” position, it may optionally appear as a PP. This phenomenon finds a natural explanation in LFG, which allows the same grammatical function to have a different categorial realization in different parts of the c-structure.

1 Movement paradoxes and syntactic theory

Bresnan (2001) has drawn attention to *movement paradoxes*:

- 1) a. *This theory accounts for _{CP}[that languages are learnable]
- b. _{CP}[That languages are learnable] is accounted for by this theory.

- 2) a. *We talked about _{CP}[that he was sick] for days.
- b. _{CP}[That he was sick], we talked about for days.

Theories which use movement to derive passive and topicalization must posit some category-change or other mechanism to account for the facts. In contrast, a theory with base-generated passive subjects and topics faces no such difficulties.

2 Background

San Dionisio Ocotepc Zapotec (SDZ) is an Otomanguan language of Mexico.¹ The most neutral word order is VSO:

¹ I thank Ash Asudeh, Joan Bresnan, Miriam Butt, Brook Lillehaugen, Pamela Munro, and Mike Galant for helpful comments on this paper, along with other members of the audience at the 2009 SSILA session on Zapotec languages and the LFG 2010 conference. Special thanks are due to Luisa Martínez, who supplied all the data for this paper.

The orthography for San Dionisio Ocotepc Zapotec is adapted from the practical orthographies for other Zapotec languages spoken in the Valley of Oaxaca. In the SDZ orthography, <x> = /ɣ/ before a vowel and /ʃ/ before a consonant, <xh> = /ʃ/, <dx> = /ɟʃ/, <ch> = /tʃ/, <c> = /k/ before back vowels, <qu> = /k/ before front vowels, <e> = /ɛ/ and <ey> = /e/. Doubled vowels are long. SDZ is a language with four contrastive phonation types: breathy <Vj>, creaky <V'V>, checked <V'>, and plain <V>. High tone is marked with an acute accent, low with a grave. Nominal tones are affected by position within the intonational phrase, and so nouns may show slightly varying tones from example to example.

A SDZ verb root must always be preceded by some aspect prefix. The citation form of a SDZ verb contains the habitual aspect prefix /r- ~ rr-/. Sample lexical entries show the verb root, while mentions in the text show the citation form.

Ordinary affixes are separated from the stem by the hyphen; clitics are separated by =. Glosses use the following abbreviations: aff = affirmative, com = completive aspect, def = definite future aspect, hab = habitual aspect, neg = negative, neu = neutral aspect, p = possessed, pot = potential aspect, pred = predicative, 1s = 1st person singular, 3 = 3rd person human (ordinary respect level), 3i = 3rd person inanimate.

- 3) ù-zìì' Juáàny tòyby xhùmbreèjl. VSO
 com-buy Juan a hat

'Juan bought a hat.'

In addition to this word order, SDZ also has several word orders in which one or more constituents with a special discourse function precede the verb. Of these variants, one in which the subject appears in the internal topic/focus position ([Spec, IP]) is particularly frequent, yielding SVO order:

- 4) Juáàny ù-zìì' tòyby xhùmbreèjl. SVO
 Juan com-buy a hat

'Juan (TOP/FOC) bought a hat.'

We also see *wh*-elements in [Spec, CP]:

- 5) ¿Túú ù-dííny bè'cw?
 who com-hit dog

'Who hit the dog'

- 6) ¿Xhíí cùn ù-dííny Juáàny bè'cw?
 what with com-hit Juan dog

'What did Juan hit the dog with?'

The unusual order in example (6) also shows pied-piping with inversion (Broadwell 2001).

3 Movement paradox I: Cover themes in San Dionisio Ocotepc Zapotec

3.1 Normal vs. 'displaced' orders

For a number of verbs with semantics like 'cover/fill/be spread over' which subcategorize for a Theme and a Location, the usual argument realization has an NP and a PP after the V.

- 7) Rr-sè'w nìjs lòò yùù.
 hab-cover water on floor

'Water covers the floor.'

If the Theme argument of a verb like 'cover/fill/be spread over' is fronted, it may occur with the preposition *cùn* 'with':²

² *Cùn* is an old borrowing from Spanish *con* 'with'.

- 8) a. Cùn nìjs rr-sè'w lòò yùù
with water hab-cover on floor

'Water (TOP/FOC) covers the floor.'

- b.) ¿ Xhíí cùn rr-sè'w lòò yùù?
what with hab-cover on floor

'What covers the floor?'

A fronted NP in these environment is also possible:

- 9) a.) Nìjs rr-sè'w lòò yùù.
water hab-cover on floor

'Water (TOP/FOC) covers the floor.'

- b.) ¿ Xhíí rr-sè'w lòò yùù?
water hab-cover on floor

'What covers the floor?'

3.2 The impossibility of PP *in situ*

Cùn 'with' may not appear if the Theme is *in situ*, either immediately after the verb or after the other PP:

- 10) a. *Rr-sè'w cùn nìjs lòò yùù.
hab-cover with water on floor

- b. *Rr-sè'w lòò yùù cùn nìjs.
hab-cover on floor with water

(*intended*: Water covers the floor.)

Thus SDZ shows a movement paradox – we have fronted PPs, but an *in-situ* PP is ungrammatical.

The Zapotec alternation is not found with all Theme arguments, but only with those in the 'cover/fill/be spread' class where the Theme is in complete contact with a Location. I will refer to this subclass of Themes as Cover-Themes. Using a slightly modified version of the formalism of Jackendoff (1990:160ff), the semantic representation of such verbs contains the following:

- 11) [_{Event} INCH [_{State} BE ([_{Thing}]_i, [_{Place} IN_d/ON_d [_{Thing}]_j)]]]

IN_d and ON_d are distributive versions of the IN and ON locational predicates.

3.3 Analogous alternations in the causative counterparts

There is also a homophonous causative version of this verb which subcategorizes for Agent,

Cover-Theme, and Location.

12) Rr-sè'w Juààny dà' lòò yùù
hab-cover Juan mat on floor

‘Juan puts the mat on the floor/
Juan covers the floor with the mat.’

These sentences also show an alternation in the realization of the Cover-Theme: NP when *in-situ*, but PP when fronted, as seen in the following:

13) a.) Cùn dà' rr-sè'w Juààny lòò yùù.
with mat hab-cover Juan on floor

‘Juan puts the mat (TOP/FOC) on the floor/
Juan covers the floor with the mat.’

b.) ¿Xhíi cùn rr-sè'w Juààny lòò yùù?
what with hab-cover Juan on floor

‘What does Juan put on the floor/
What does Juan cover the floor with?’

The Cover-Theme may also be fronted as an NP:

14) a.) Dà' rr-sè'w Juààny lòò yùù.
mat hab-cover Juan on floor

‘Juan puts the mat (TOP/FOC) on the floor./
‘Juan covers the floor with the mat (TOP/FOC).’

b.) ¿Xhíi rr-sè'w Juààny lòò yùù.
what hab-cover Juan on floor

‘What does Juan put on the floor?’
‘What does Juan covers the floor with?’

As seen in the non-causative version of ‘cover’, it is impossible for the Theme argument to appear as a PP when *in situ*:

15) *Rr-sè'w Juààny cùn dà' lòò yùù
hab-cover Juan with mat on floor

(*intended* ‘Juan puts the mat on the floor/Juan covers the floor with the mat.’)

3.4 Other verbs that participate in this alternation

We find a similar alternation with a few other verbs like *rr-dá* ‘fill’ and *r-yè* ‘spread’ (causative *rr-zè*). Consider the following examples:

- 16) a.) Rr-dá’ nìjs lè’èn rì’.
hab-fill water in jug

‘Water fills the jug/The jug is filled with water.’

- b.) (Cùn) nìjs rr-dá’ lè’èn rì’.
(with) water hab-fill in jug

‘Water (TOP/FOC) fills the jug.’

- c.) *Rr-dá’ cùn nìjs lè’èn rì’.
hab-fill with water in jug.

(intended: ‘Water fills the jug.’)

- 17) a.) N-yé’ màntèquìi lòò gèèt_xtíily
neu-spread butter on bread

‘The butter is spread on the bread.’

- b.) (Cùn) màntèquìi n-yé’ lòò gèèt_xtíily
(with) butter neu-spread on bread

‘The butter (TOP/FOC) is spread on the bread.’

- c.) *N-yé’ cùn màntèquìi lòò gèèt_xtíily
neu-spread with butter on bread

(Intended: ‘The butter is spread on the bread.’)

3.5 Similar verbs that do not alternate

Other verbs that have a Theme and Location do not show this alternation, though they have apparently similar semantics.

Rrdòyby ‘be splashed/splattered with’ (causative *rr-tóoyby*) and *rr-dxàj* (causative *rr-cháj*) ‘be splashed/spattered’ fail to show this alternation:

- 18) a.) Û-dòyby bààny x-càrr=à.
com-splatter mud p-car=1s

‘Mud splattered my car.’

- b.) *Cùn bààny ù-dòòyby x-càrr=à.
with mud com-splatter p-car=1s

(Intended: ‘Mud (TOP/FOC) splattered my car.’)

- 19) a.) Rr-dxàj nìjs lòò lààdy
hab-splashed water on clothes

‘Water is splashed on the clothes.’

- b.) *Cùn nìjs rr-dxàj lòò lààdy
with water hab-splashed on clothes

‘Water is splashed on the clothes.’

We also see an apparently similar verb *rrgàè’by* ‘smear’ which does not alternate:

- 20) a.) Ù-dàè’by Màrí zàj lòò gèèt.
com-smear Maria lard on tortilla

‘Maria smeared lard on the tortilla.’

- b.) *¿Xhíi cùn ù-dàè’by Màrí lòò gèèt?
what with com-smear Maria on tortilla

(Intended ‘What did Maria smear on the tortilla?’)

The difference between these verbs and those that show the alternation is that spraying, splashing, and smearing do not involve covering a location distributively. Covering and filling do involve complete contact of the Theme with all of the Location.

4 Cross-linguistic comparisons

4.1 Figure-ground alternations

Pinker (1989) examines verbs in English which express a locative relationship between Figure and Ground and finds that they fall into four syntactic classes, depending on whether the Theme or the Location is presented as Ground (NP) and whether both Theme and Location are obligatory.

- a.) Non-alternating Figure verbs (Theme NP | Location PP)

- 21) *John poured water into the glass.*
**John poured the glass with water.*

- b.) Non-alternating Ground verbs (Location NP | Theme PP)

- 22) *John filled the glass with water.*
**John filled the water into the glass.*

c.) Figure-alternating verbs (*pile, spray, load*) (expression of Location optional)

- 23) *John loaded books (on the table).*
John loaded the table with books.

d.) Ground-alternating verbs (*stuff, paint, wrap*) (expression of Theme optional)

- 24) *John stuffed feathers into the pillow.*
John stuffed the pillow (with feathers).

For alternating verbs like *load* or *stuff* in English, the simplest treatment is to say that they have two subcategorizations, related by a lexical rule. In one subcategorization, the Theme has an NP realization (*feathers; books*) and in the other it has a PP realization (*with feathers; with books*). However, the NP/PP realization in English is not related to the in-situ/displaced status of the argument:

- 25) a.) They loaded hay on the wagon. (NP realization of Theme)
 b.) What did they load on the wagon?
 c.) *With what did they load on the wagon?

- 26) a.) They loaded the wagon with hay. (PP realization of Theme)
 b.) With what did they load the wagon?
 c.) *What did they load the wagon?

The SDZ alternation instead always has the Location realized as PP. The Theme is variably realized as NP or PP in extraposed positions, but as NP only *in-situ*. Schematically, the pattern is as follows:

- 27) [NP/ PP], [s V (NP) PP]
 Theme Causer Location
- [s V (NP) NP/*PP PP]
 Causer Theme Location

There is a family resemblance between the English *spray/load* alternations and the SDZ alternation, but they are not exactly the same.

4.2 Alternations in other languages

Similar alternations are found in many languages, including Korean (Kim, Landau, and Phillips 1999), Hungarian³ (Ackerman 1992), and Modern Greek (Kordoni 2003):

³ Ackerman (1992) shows that the Hungarian alternation is accompanied by a change in the prefix which indicates the telicity of the action.

28) Hungarian

- a.) A paraszt (rá=)rakta **a szénát** a szekerre
the peasant (onto)=load the hay:acc the wagon:sublative

'The peasant loaded hay onto the wagon.'

- b.) A paraszt meg=rakta a szekeret **szénával.**
the peasant perf=load the wagon hay:instr

'The peasant loaded the wagon with hay.'

29) Korean

- a.) Yumi-ka **kirul-ul** pyek-ey chilha-ess-ta.
Yumi-nom oil-acc wall-loc paint-past-decl

'Yumi painted the oil onto the wall.'

- b.) Yumi-ka pyek-ul **kirul-elo** chilha-ess-ta.
Yumi-nom wall-acc oil-applic paint-past-Decl

'Yumi painted the wall with the oil.'

30) Greek

- a.) O georgos fortose **to ahiro** sto karo.
the farmer:nom load:past:3s the hay:acc onto:the wagon

'The farmer loaded the hay onto the wagon.'

- b.) O georgos fortose to karo **me** **ahiro**
the farmer:nom load:past:3s the wagon with hay:acc

'The farmer loaded the wagon with hay.'

The generalization seems to be that Cover-Themes frequently show whatever morphosyntax is found with Instruments, whether this is an adposition (Zapotec, English, Greek) or a case marker (Korean, Hungarian).

5 Toward a solution

In order to capture the similarities between SDZ and the other languages cited, I argue that we need the combination of a lexical rule and Lexical Mapping Theory to produce two entries for verbs like *rr-sè'w* 'cover'. (31a) shows the Cover-Theme encoded as Theme; (31b) shows the Cover-Theme encoded as Instrument:

31) *sè'w*, V,

a. $[_{\text{Event}} \text{INCH } [_{\text{State}} \text{BE } ([_{\text{Thing}}]_A, [_{\text{Place}} \text{IN}_d/\text{ON}_d [_{\text{Thing}}]_A)]]]$
SUBJ OBL_{Loc}

b. $[_{\text{Event}} \text{INCH } [_{\text{State}} \text{BE } ([_{\text{WITH}} [_{\text{Thing}}]_A], [_{\text{Place}} \text{IN}_d/\text{ON}_d [_{\text{Thing}}]_A)]]]$
SUBJ OBL_{Loc}

In these lexical entries, subscript A marks the elements of syntactic structure which must be linked to some syntactic role.

Note that the entry does not say that the first argument must be a NP or that OBL_{Loc} must be a PP. This is determined by the phrase-structure rules of the language, where the mapping between categories and functions is constrained by the annotations.

The SDZ lexical rule that relates (31a) to (31b) is approximately as follows:

32) Zapotec Cover-Theme Rule

In a Lexical Conceptual Structure which contains

$[_{\text{Event}} \text{INCH } [_{\text{State}} \text{BE } ([_{\text{Thing}}]_A, [_{\text{Place}} \text{IN}_d/\text{ON}_d [_{\text{Thing}}]_A)]]]$,

$[_{\text{State}} \text{BE } [_{\text{Thing}}]_A \dots]$ is optionally replaced by $[_{\text{State}} \text{BE } [_{\text{WITH}} [_{\text{Thing}}]_A \dots]$

The Zapotec Cover-Theme Rule is a language-particular variant of a lexical rule found in many languages which allows a Cover-Theme to be expressed as an instrumental.⁴

In many other languages just cited, a rule like the Cover-Theme rule acts in concert with a rule which we might call the Distributive Location Rule. This rule allows a Location with IN_d/ON_d to appear as an unrestricted GF (SUBJ or OBJ).⁵

The combination of the two rules gives us familiar alternations like the English *load* alternation cited above:

33) a.) They loaded hay on the wagon.

b.) They loaded the wagon with hay.

The Zapotec alternation is important, however, since it shows that the two rules are not necessarily linked. Zapotec allows Cover-Themes to alternate between NP and 'with NP' but does not allow Locations to alternate between PP and NP.

Note that sentences like the following, which are parallel to (33b), are ungrammatical, since

⁴ Jackendoff (1990:161ff) gives a comparable English rule, though his WITH-Theme Adjunct Rule covers a much wider range of verb classes where *with* appears.

⁵ The English rule allowing a Location with IN_d/ON_d to have the feature [-r], and thus link to SUBJ/OBJ is a language-particular instantiation of a more general process allowing Locations to be [-r]. Locative inversion in Chicheŵa (Bresnan and Kanerva 1989) is probably another member of this family of rules.

Zapototec does not have any lexical rule that allows a Location to surface as SUBJ or OBJ.

- 34) *Rr-sè'w Juààny yùù cùn dà'
 hab-cover Juan floor with mat

(Intended: Juan covered the floor with mat.)

6 The movement paradox again

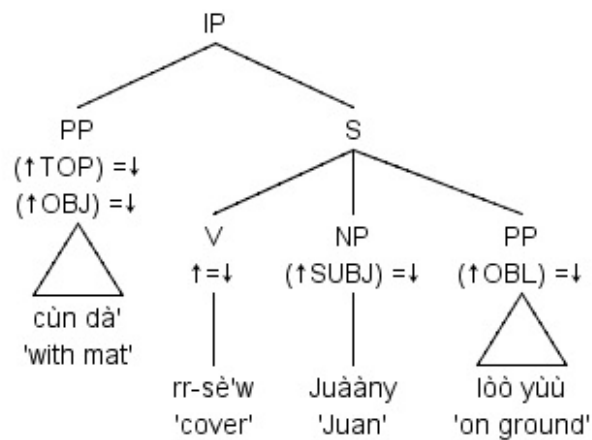
I will assume that SDZ contain phrase structure rules of the following sort:

- 35) CP → (COMP) (XP) IP
 ↑=↓ (↑INTERROG)=↓ ↑=↓
 (↑GF)=↓
- IP → (Infl) (XP) S
 ↑=↓ (↑TOPIC)=↓ ↑=↓
 (↑GF)=↓
- S → V (NP) (NP) (NP) PP*
 ↑=↓ (↑SUBJ)=↓ (↑OBJ_θ)=↓ (↑OBJ)=↓ (↑OBL_θ)=↓

The TOPIC and INTERROG functions may be assigned to any XP, but the SUBJ, OBJ, and OBJ_θ positions are restricted to NPs. Crucially, a postverbal PP cannot be a SUBJ or OBJ.

With these considerations in mind, the proposed c-structure representation of the movement paradox case is as follows:

36)



From the LFG perspective, the movement ‘paradox’ is not a paradox at all. A lexical rule which allows Cover-Themes to optionally appear as *with*-phrases has applied to make the Theme a SUBJ or OBJ. However, the phrase structure (PS) rules of Zapotec do not allow *in-situ* PPs as SUBJ or OBJ. Thus we only see the effect of the lexical rule when the argument is in a position outside S.

7 Movement paradox II – Comitative applicatives

7.1 Basic facts

SDZ has an optional comitative applicative /-néé/. Thus the following two sentences express the same content:

37) Û-dàw Màríi gèèt cùn Juáany
com-eat Maria tortilla with Juan

‘Maria ate tortillas with John.’

38) Û-dàw-néé Màríi Juáany gèèt.
com-eat-applic Maria Juan tortilla

‘Maria ate tortillas with John.’

When the comitative applicative appears, the OBJ_{Comit} appears between the SUBJ and the OBJ, as shown in the phrase structure rules in (35) above.

It is not possible to have both the applicative and the preposition *cùn* when a comitative object is *in-situ*:

39) *Û-dàw-néé Màríi cùn Juáany gèèt.
com-eat-applic Maria with Juan tortilla

‘Maria ate tortillas with John.’

As we shall see in the following section, however, when comitative objects are in fronted or extraposed positions, the *cùn* may reappear, giving rise to a second movement paradox.

7.2 Extraposition possibilities in sentences with comitatives

Comitative objects are largely like other objects in their syntax. In sentences with regular and comitative objects, both can be questioned.

40) ¿Xhíi ù-dàw-néé Màríi Juáany?
what com-eat-applic Maria Juan

‘What did Maria eat with Juan?’

- 41) ¿Túú ù-dàw-**néé** Màrí gèèt?
 who com-eat-applic Maria tortilla

‘Who did Maria eat tortillas with?’

It is also possible to question both the regular object and the object of the preposition *cùn* ‘with’ in the sentences without an applicative:

- 42) ¿Xhíí ù-dàw Màrí cùn Juáany?
 what com-eat Maria with Juan

‘What did Maria eat with Juan?’

- 43) ¿Túú cùn ù-dàw Màrí gèèt?
 who with com-eat Maria tortilla

‘Who did Maria eat tortillas with?’

It is surprising, therefore that a questioned comitative object may appear with the preposition *cùn*. Recall that this is ungrammatical *in-situ*:

- 44) ¿Túú cùn ù-dàw-**néé** Màrí gèèt?
 who with com-eat-applic Maria tortilla

‘Who did Maria eat tortillas with?’

- 45) *Ù-dàw-**néé** Màrí cùn Juáany gèèt.
 com-eat-applic Maria with Juan tortilla

‘Maria ate tortillas with John.’

7.3 A lexical rule for Comitatives

The lexical rule for adding a comitative might be as follows:

46) Zapotec Comitative Applicative⁶

/X/, V, [_{Event} CAUSE [_{Thing}]_A ...] ==>

/X-néé/, V, [_{Event} CAUSE [_{Thing}]_A [WITH [_{Thing} HUMAN]]_A [+tr] ...]

⁶ I have tentatively included CAUSE in such lexical rules, since it seems that comitatives do not appear with all lexical classes, but are confined to those with causative (or agentive) semantics.

Likewise, I have tentatively made the Comitative [+Human], since my language consultant is very reluctant to accept non-human co-subjects (e.g. ?* Ù-dàw-néé Màrí bè'cw gèèt ‘Maria ate the tortilla with a dog.’). It is not absolutely clear to me whether this is a grammatical fact or a fact about Zapotec ideas of human/non-human co-agency (or both).

roles are conventional labels for particular arguments of underlying predicates like CAUSE, GO, AFFECT, etc.

The conventional Argument Structure can be thought of as a projection of Lexical-Conceptual Structure, where we look only at the parts of LCS that link to arguments. Lexical Mapping Theory regulates the way in which these arguments are realized as grammatical functions. But the Thematic Roles assigned to arguments by Lexical Mapping Theory are not themselves primitives – they are simply recurrent portions of Lexical-Conceptual Structure.

Lexical Mapping Theory need not be abandoned *in toto*, but the conventional starting point of LMT – a list of Thematic Roles – only works well for the most frequently-discussed and clear-cut verb classes. When we look at verbs with more complex lexical semantics, Argument Structure is too impoverished a representation to be able to account for the full range of effects. We need instead a more detailed representation like Lexical Conceptual Structure.

8.2 LFG architecture and movement paradoxes

Lexical-Functional Grammar gives a simple account of the two movement paradoxes discussed here. A few features of the LFG architecture are key to the solution. First is a theory of phrase-structure rules that allows a specified categorial realization (NP or PP) in some positions and a free categorial realization (XP) in others. Second is a concept of lexical entries that specifies the semantics and grammatical function, but not the categorial realization of arguments.

LFG is different in these respects from other syntactic theories such as Minimalism. Minimalism eschews the sort of detailed phrase structure rules that allow us to distinguish in-situ realizations of Cover-Themes and Comitative objects from their extraposed varieties (using simple versions of X-bar theory). Minimalism also has a theory of lexical entries which specifies the categorial realization of subcategorized arguments.

Thus movement paradoxes show that these aspects of the LFG architecture correctly model natural language in a way that is difficult for theories with different approaches to phrase-structure rules and lexical entries.

9 Appendix – Right extraposition

We also find effects similar to those mentioned above when Cover-Themes and Comitative Objects appear in right-extraposed positions.

The condition for comitative objects is that they optionally appear with *cùn* if they are right-extraposed via Heavy NP Shift:

51) Û-dàw-néé Chéé gèèt [(cùn) dáád ní=ù-dè'd mèl lòn=èby.]
 com-eat-applic José tortilla (with) man rel=com-give money to=3

‘José ate tortillas with the man who gave him money.’

Heavy NP-shift is near obligatory for sentences of this sort; NP and PP are both very marginal *in-situ*:

52) *?Û-dàw-néé Chéé [(cùn) dáád ní=ù-dè'd mèl lòn=èby] gèèt
 com-eat-applic José (with) man rel=com-give money to=3 tortilla

‘José ate tortillas with the man who gave him money.’

Another environment for a PP realization of the Cover-Theme is found with verbs of this sort. That is Rightward Extraposition:

53) Rr-sè'w Juàány lòn yùù, cùn dá'.
 hab-cover Juan on floor with mat

‘Juan put on the floor the mat/
 Juan covered the floor with the mat.’

However, the Cover-Theme apparently cannot be Right Extraposed as an NP:

54) *Rr-sè'w Juàány lòn yùù dá'.
 hab-cover Juan on floor mat

(*Intended*: Juan put on the floor the mat.)

This may be due to the fact that PPs can be rather freely extraposed, while NPs are only extraposed when sufficiently heavy.

I have not attempted a formalization of these facts here, since they appear to require a characterization of heaviness which would go beyond this scope of this paper.

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