On the Syntax-Semantics Interface of Directed Transport and Caused Motion Expressions

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Directed Transport and Caused Motion Expressions

(1) Mary brought/carried/threw/pushed/slid the box to John/into the room.

Some observations

- ▶ *bring* is lexically a three-place predicate, in contrast to the other verbs occurring in (1).
- ▶ *carry*, *throw* and *push* specify the manner of the action performed by the effector, in contrast to *bring* and *slide*.
- ▶ *slide* (and *roll*) specify the manner in which the theme moves, in contrast to *push*, *bring* (or *transport*).
- ▶ *throw* describes a punctual initiation/causing of the motion of the theme carried out by the effector, *carry* and *bring* do not, and *roll* and *slide* are underspecified in this respect.

Introduction

Directed Transport and Caused Motion Expressions

(1) Mary brought/carried/threw/pushed/slid the box to John/into the room.

Some observations (cont'd)

- ▶ *carry* and *bring* imply accompanied motion of theme and effector, while *push* does not.

- ▶ *throw* does not entail the arrival of the theme at the destination, in contrast to *carry* and *bring*.

- ▶ *into* combines locative and directional information.

- ▶ *to* may trigger a recipient interpretation in case of animate goals.

Introduction

Examples of tests

Assertion/entailment tests

(2) a. John threw the ball to Peter but the wind blew it to Paul.

    $\rightarrow$ arrival of the theme is not lexically entailed   (e.g. Beavers 2011)

  b. Standing at the entrance, John pushed the box into the corner.

    $\rightarrow$ locomotion of the effector is not lexically entailed

Aspect/Aktionsart tests

(3) a. John carried / #threw / #brought the box for ten minutes.

  b. John carried / #threw / brought the box in ten minutes from here to there.

  c. John #carried / threw / brought the box at three.

Core semantics of directed transport and caused motion

An EFFECTOR acts on/applies force to/affects a THEME such that the THEME moves (forward), i.e., (continuously) changes its location (along a PATH).

Differentiae specificae (*inter alia*)

▶ specific manner of motion of the THEME
 (*slide* vs. *push*, *bring*)

▶ specific manner of how the EFFECTOR acts on the THEME
 (*carry*, *push* vs. *slide*, *bring*)

▶ continuous control of the motion of the THEME by the EFFECTOR
 (*carry*, *push* vs. *throw*)

▶ accompanied motion, i.e., shared path of THEME and EFFECTOR
 (*carry*, *bring* vs. *throw*)

Semantic analysis

Sketch of verb classification (for English)

- ► *bring*, *take* (, *transport*)
  accompanied motion, change of location (to destination)

- ► *carry*, *schlep*
  accompanied motion, continuous control, manner of action

- ► *throw*, *toss*, *flip*
  initially caused motion, manner of action

- ► *push*, *shove*, *pull*, *drag*
  enforced motion, manner of action

- ► *slide*, *roll*, *bounce* (, *move*)
  enforced motion, manner of motion

Semantic analysis

Event decomposition

Events as described/conceptualized by verbs/words often have (linguistically relevant) internal event components, including:

- ▶ Consecutive subevents representing cause and effect.
- ▶ Overlapping subevents representing continuous interaction
- ▶ Scales related to the progression of events.

Various representational approaches (in linguistics):

- ▶ ((Neo)Davidsonian) event logic (Krifka, …)
- ▶ (Term-based) event templates (Jackendoff, Van Valin/LaPolla, Rappaport Hovav/Levin)
- ▶ Event trees I (Pinker)
- ▶ Event trees II (Pustejovsky)
- ▶ **Decompositional frame semantics**
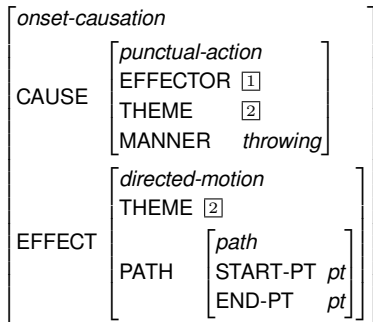
Advantages of decompositional frames

Frames allow us to combine two central aspects of template-based decompositions and logical representations:

- ▶ Like decompositional schemas they are concept-centered and have inherent structural properties.

  I.e., structural positions relevant to the *linking* between syntax and semantics have a natural characterization.

- ▶ Like logical representations frames are flexible and can be easily extended by additional subcomponents and constraints.
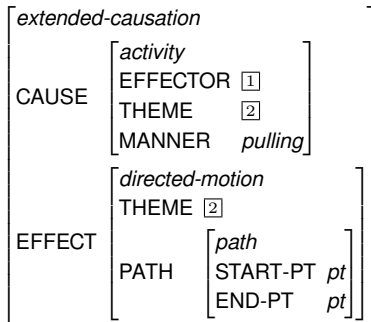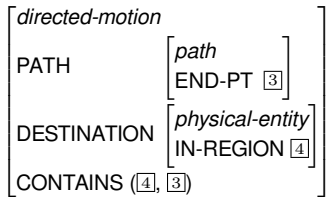
Semantic analysis

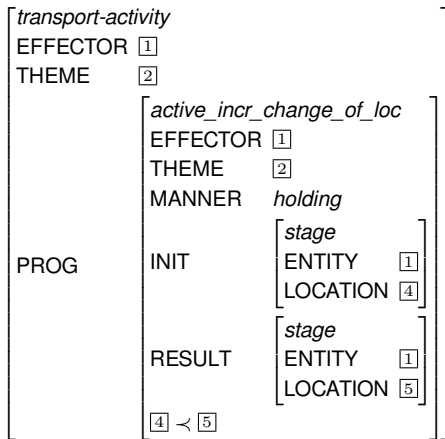## Sketches of decompositional frames

throw

$$
\begin{bmatrix}
\textit{onset-causation} \\
\text{CAUSE} \begin{bmatrix} \textit{punctual-action} \\ \text{EFFECTOR} & \boxed{1} \\ \text{THEME} & \boxed{2} \\ \text{MANNER} & \textit{throwing} \end{bmatrix} \\
\text{EFFECT} \begin{bmatrix} \textit{directed-motion} \\ \text{THEME} & \boxed{2} \\ \text{PATH} \begin{bmatrix} \textit{path} \\ \text{START-PT} & \textit{pt} \\ \text{END-PT} & \textit{pt} \end{bmatrix} \end{bmatrix}
\end{bmatrix}
$$

pull

$$
\begin{bmatrix}
\textit{extended-causation} \\
\text{CAUSE} \begin{bmatrix} \textit{activity} \\ \text{EFFECTOR} & \boxed{1} \\ \text{THEME} & \boxed{2} \\ \text{MANNER} & \textit{pulling} \end{bmatrix} \\
\text{EFFECT} \begin{bmatrix} \textit{directed-motion} \\ \text{THEME} & \boxed{2} \\ \text{PATH} \begin{bmatrix} \textit{path} \\ \text{START-PT} & \textit{pt} \\ \text{END-PT} & \textit{pt} \end{bmatrix} \end{bmatrix}
\end{bmatrix}
$$

(Kallmeyer/Osswald 2012)

Sketches of decompositional frames

into

$$\begin{bmatrix} \textit{directed-motion} \\ \text{PATH} \quad \begin{bmatrix} \textit{path} \\ \text{END-PT} \quad \boxed{3} \end{bmatrix} \\ \text{DESTINATION} \quad \begin{bmatrix} \textit{physical-entity} \\ \text{IN-REGION} \quad \boxed{4} \end{bmatrix} \\ \text{CONTAINS} \; (\boxed{4}, \boxed{3}) \end{bmatrix}$$

carry

$$\begin{bmatrix} \textit{transport-activity} \\ \text{EFFECTOR} \quad \boxed{1} \\ \text{THEME} \quad \boxed{2} \\ \\ \text{PROG} \quad \begin{bmatrix} \textit{active\_incr\_change\_of\_loc} \\ \text{EFFECTOR} \quad \boxed{1} \\ \text{THEME} \quad \boxed{2} \\ \text{MANNER} \quad \textit{holding} \\ \text{INIT} \quad \begin{bmatrix} \textit{stage} \\ \text{ENTITY} \quad \boxed{1} \\ \text{LOCATION} \quad \boxed{4} \end{bmatrix} \\ \text{RESULT} \quad \begin{bmatrix} \textit{stage} \\ \text{ENTITY} \quad \boxed{1} \\ \text{LOCATION} \quad \boxed{5} \end{bmatrix} \\ \boxed{4} \prec \boxed{5} \end{bmatrix} \end{bmatrix}$$

Lexicalization & morphosyntax

Cross-linguistic variation

Languages differ w.r.t. their lexical and morphosyntactic means for expressing manner of motion, direction, causation, etc.

- ▶ Different lexicalization strategies
- ▶ Richness of the case and adposition system
- ▶ Availability of multi-verb constructions

Talmy's distinction between *verb-framed* and *satellite-framed* languages:

Some languages provide primarily deictic motion verbs (or path verbs) while others provide primarily manner (of motion) verbs.

Example: Spanish (verb framed) vs. English (satellite framed)

(4) a. La botella entro   a la   cueva (flotando).
        the bottle   MOVED.in to the cave (floating).

   b. The bottle floated into the cave.

Lexicalization & morphosyntax

The distinction between verb- and satellite-framed languages has been criticized as being too coarse:

- ▶ Slobin: In addition, equipollently-framed languages.

- ▶ Matsumoto: Head-framed vs. non-head-framed languages

- ▶ Croft/Barðdal/Hollmann/Sotirova/Taoka:
    a. verb framing
    b. symmetrical (coordinate, serial, compounding)
    c. satellite framing
    d. double framing

- ▶ Beavers/Levin/Tham:

    Talmy's typology is *epiphenomenal* and should better be accounted for by a more detailed analysis of the underlying lexical and constructional constraints.

Lexicalization & morphosyntax

Research goals

The formulation of language-specific constraints and cross-linguistic generalizations about the syntax-semantics interface of the verb-based constructions under investigation, combining decompositional frame semantics and Role and Reference Grammar (e.g. Van Valin 2005)

Languages currently under investigation:

English, German, Dutch, French, Spanish, Russian, Bulgarian, Tagalog, Korean, Japanese, Lokhota

Data basis:

- ▶ Dictionaries, linguistic literature and native speaker judgements.
- ▶ Small set of native speaker translations of a (very) short story.
- ▶ More systematic work with corpora and questionnaires is planned for the future.

Verb-verb combinations

- ► *i*-compounds (more or less lexicalized)
- ► *te*-compound/construction (syntactic and semantic variation)

bring: *motte iku* (*motsu*: 'hold', 'have'; *iku*: 'go')

(5) Taroo wa sono hon o gakkoo ni mot-te it-ta. (*te*-construction)
    Taro TOP the book ACC school GOAL have-TE go-PAST
    'Taro brought the book to the school.' (Matsumoto 1996)

Note *bring* = *have/hold* + *go*
is a common pattern in serializing languages (Wälchli 2009)

Lexical motion causatives

ireru: 'cause to go in', *dasu*: 'cause to go out', …

(6) Boku wa booru o hako ni ire-ta.
    I TOP ball ACC box GOAL cause.to.go.in-PAST
    'I put the ball into the box.'

Case studies: Japanese

throw: *nageru* / carry: *hakobu*

(7) a. Boku wa booru o hako ni nage-ire-ta. (*i*-compound)
    I TOP ball ACC box GOAL throw-cause.to.go.in-PAST
    'I threw a ball into the box.' (Matsumoto, handout)

   b. Boku wa Taroo o heya ni hakobi-ire-ta.
    I TOP box ACC room GOAL carry-cause.to.go.in-PAST
    'I carried Taroo into the room.'

Observations & issues

▶ The directed caused motion verb *ireru* encodes locational information and evokes the full caused motion frame wihout specifying the manner of action.

▶ To what extent does *nageru* lexically entail directed motion, compared e.g. to *hakobu*?
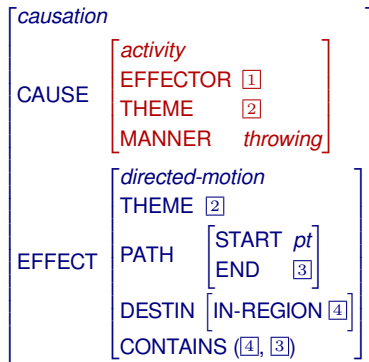
Case studies: Japanese

roll: *korogasu* (vt), lexical causative of *korogaru* (vi) ('roll', 'tumble')

(8) a. Watashi wa taru o   korogashi-**te** chikashitsu ni   ire-ta.
    I   TOP barrel ACC roll-and   basement   GOAL put.into-PAST
    'I rolled the barrel into the basement.'   (Croft et al. 2010)

   b. Watashi wa taru o   chikashitsu ni   korogashi-**te** ire-ta.
    I   TOP barrel ACC basement   GOAL roll-TE   put.into-PAST

   c. #Watashi wa taru o   chikashitsu ni   korogashi-ire-ta.
    I   TOP barrel ACC basement   GOAL roll-put.into-PAST

Possible Hypothesis

▶ Lexical causatives of intransitive manner-of-motion verbs are less
  preferred in *i*-compounds than manner-of-action caused motion verbs,
  since the former are already causativized.

(9) Watashi wa   taru o   chikashitsu ni   korogashi-te ire-ta.
    I   TOP barrel ACC basement   GOAL roll-TE   put.into-PAST

$$
\begin{bmatrix}
\textit{causation} \\
\text{CAUSE} \begin{bmatrix} \textit{activity} \\ \text{EFFECTOR} \;\; \boxed{1} \\ \text{THEME} \;\;\;\;\; \boxed{2} \end{bmatrix} \\
\text{EFFECT} \begin{bmatrix} \textit{motion} \\ \text{THEME} \;\;\; \boxed{2} \\ \text{MANNER} \; \textit{rolling} \end{bmatrix}
\end{bmatrix}
\sqcup
\begin{bmatrix}
\textit{causation} \\
\text{CAUSE} \begin{bmatrix} \textit{activity} \\ \text{EFFECTOR} \;\; \boxed{1} \\ \text{THEME} \;\;\;\;\; \boxed{2} \end{bmatrix} \\
\text{EFFECT} \begin{bmatrix} \textit{directed-motion} \\ \text{THEME} \;\; \boxed{2} \\ \text{PATH} \begin{bmatrix} \text{START} \; \textit{pt} \\ \text{END} \;\;\;\;\; \boxed{3} \end{bmatrix} \\ \text{DESTIN} \begin{bmatrix} \text{IN-REGION} \; \boxed{4} \end{bmatrix} \\ \text{CONTAINS} \; (\boxed{4}, \boxed{3}) \end{bmatrix}
\end{bmatrix}
$$
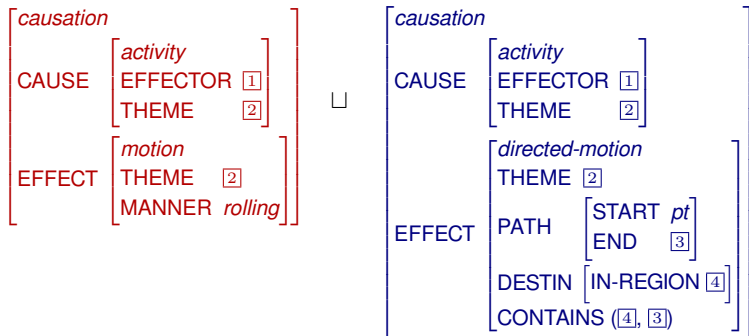
Head-framed languages (Matsumoto)

Path is encoded by the head (verb) of a clause; these are *causative* verbs of motion for caused motion expressions, since the head determines the subject, which is the causer.

Case studies: Thai and Chinese

Examples for nonhead-framed languages with V-V constructions (Matsumoto)

Thai

(10) a. khwaaŋ lûukbɔn khâw bâan
      throw ball   enter house
      'throw a ball into the house'

   b. khwaaŋ lûukbɔn phàan nâataàng long   pay nay sàp
      throw ball   pass window descend go in pond
      'throw a ball out of the window down into the pond.'

Chinese

(11) Tā rēng-chū-lái   le yige píngzi
     s/he throw-exit-come Asp oneCl bottle
     'He threw out a bottle (toward the speaker).'

Caveat The notion of head is not easy to define for isolating languages.

Native American language spoken in North and South Dakota.
(Data are largely taken from Ullrich 2008)

Some properties

- ▶ Head-marking (i.e. "pro-drop")

- ▶ Left-branching and verb-final

- ▶ Split-intransitive (active intransitive verbs are marked in a different way than stative and neutral ones)

- ▶ General causative suffix *-ya*.

- ▶ Causative instrumental, "manner-of-action" prefixes which attach to stems and intransitive verbs (partially productive)

Some properties (cont'd)

Subset of instrumental prefixes:

ka-   by hitting with an instrument (as an ax or hammer)
by action of wind or water, by outer force

wa-   by cutting with a knife or saw

pa-   by pushing, by a steady push away from the actor,
by pushing along, by pressure

yu-   by hand, by pulling toward the actor, manually;
general causation.

(12) a. Žaŋžáŋ kiŋ   ka-bléče.
     Glass   DEF   cause.by.hitting-be.shattered
     'He broke the glass.'

    b. Wópȟaȟte kiŋ   wa-ȟlóke.
     Package   DEF   cause.by.cutting-have.a.hole
     'He cut a hole into the package.'

Some properties (cont'd)

▶ A rich system of deictic motion verbs, including:
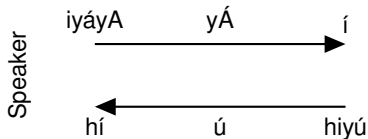
▶ Manner of motion verbs occur with deictic motion verbs in verb-verb constructions.

(13) Ziŋtkála kiŋ   kiŋyáŋ iyáye.
Bird   DEF   fly   depart.from.here
'The bird flew away.'

Some properties (cont'd)

► Derivation of accompanied motion verbs (*bring/take*)
  and caused motion verbs (*cause to come/go*) from
  deictic motion verbs.

  a-prefixation → deictic accompanied motion verbs

    e.g. *hí* ('arrive here') → *ahí* ('bring smth/sb here')

  ya-suffixation → deictic caused motion verbs

    e.g. *iyáyA* ('depart from here')
         → *iyayéyA* ('cause to depart from here', 'send away')

► Locative and directional prefixes and postpositions/adverbs.

Case studies: Lakhota

carry   *yuhá* – to hold/carry in the hands, have, own
          yuhá hí – to carry smth/sb bringing it here

Pattern   *hold + coming/going*

   (*ahí* etc. provide more primitive accompanied motion verbs for *bring*)

throw   *kaȟ'ól* – throwing, tossing, sending flying forth, slinging, flinging

(14)   Kaȟ'ól   hiyú-**ye**.
       throw(ing) depart.from.there.towards.here-CAUS
       'He threw it toward here.'

Note   *kaȟ'ól* is a reduced verb form which seems not to occur without a
   motion verb (and it is characterized as an adverb in Ullrich 2008).

roll   *pagmígmA* – to push smth so that it rolls
         kagmígma – rolling, tumbling
         gmigmÁ – to be round (spherical), ball-like (, roll)

(15) Čha   pa-gmígma   iyáye-khi-**ye**.
      and.so cause.by.pressure-roll depart.from.here-DAT-CAUS
      'So she rolled it [the bottle] to him.'
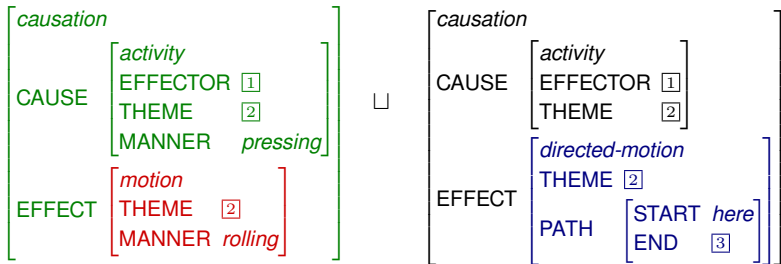
Case studies: Lakhota

slide, *push*,	*paslóhAŋ* – push smth along	
pull, *drag*	*yuslóhAŋ* – to pull smth/sb over the ground, to drag along	
	slohÁŋ – to crawl, creep	

(16) a. Wakšíča kiŋ pa-slóhaŋ   iyé-khi-**ye**.
       Dish   DEF cause.by.pressing-crawl depart.from.here-DAT-CAUS.
       'She slid the dish to him.' ('She slid him the dish.')

   b. Yu-slóhaŋ   **á**-ye.
      cause.by.pulling-crawl bring.away
      'He was dragging it away.'

   c. Iwátȟokšu kiŋ ektá waná čȟaŋwógnaka kiŋ **o**-pá-slóhaŋ   iyéya-pi.
      Truck   the into now coffin   the **into**-by.pushing-crawl let.go-PL.
      'They slid the coffin into the truck.'   (*iyéyA < iyáyeyA*)

Conclusion

The next steps

1. Careful morphosyntactic analysis of the constructions under investigation across languages, building on the framework of Role and Reference Grammar.

2. More detailed frame-semantic representation of the various (event) semantic components involved.
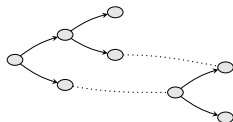
3. Formulation of language-specific constraints and cross-linguistic generalizations on the basis of the results of 1. and 2.

4. More data.

The Larger Picture
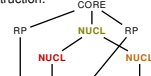
**Thank you very much
for your attention!**

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Directional verb prefixes in German

E.g.: *hin*/*her* ('to'), *hinein*/*(he)rein* ('into')   (deictical)

(17) a. werfen ('throw'), hinwerfen, hineinwerfen
      b. tragen ('carry'), hintragen, hineintragen
      c. schieben ('push'), hinschieben, hineinschieben
      d. rollen ('roll'), hinrollen, hineinrollen

Double marking of path information:

(18) a. weil   Peter das Fass zum   Eingang hinrollen wollte.
          because Peter the barrel to-the.DAT entrance to-roll.INF want.PAST
          'because Peter wanted to roll the barrel to the innkeeper.'
      b. weil   Peter das Fass in   den   Raum hineinrollen wollte.
          because Peter the barrel in(to) the.ACC room into-roll.INF want.PAST
          'because Peter wanted to roll the barrel into the room.'

Zu-prefixation in German

(19)   zuwerfen ('to-throw'), #zutragen ('to-carry'), zurollen ('to-roll')

Zu-prefixation as *applicative construction*:

(20) a.   weil   Peter das Fass zum   Wirt   rollte.
           because Peter the barrel to-the.DAT innkeeper roll.PAST
           'because Peter rolled the barrel to the innkeeper.'

     b.   weil   Peter dem   Wirt   das Fass zurollte.
           because Peter the.DAT innkeeper the barrel to-roll.PAST
           'because Peter rolled the innkeeper the barrel.'

Preferred reading for (20-b):
   'Peter pushed the barrel to make it roll to the innkeeper.'