

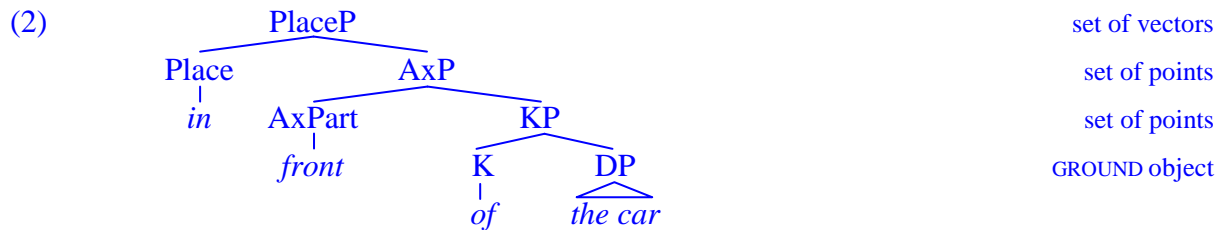
TOPS AND BOTTOMS: AXIAL NOUNS AS KINDS WCCFL 36, APRIL 20-22, 2018

1. AxPARTS AS A FUNCTIONAL CATEGORY

Axial prepositional complexes:

- (1) a. El libro está **de-l-ante** **de la** mesa. Spanish, Fábregas 2007
the book is from-the-front of the table
The book is in front of the table.
- b. hu haya **mi-taxat** **la-bayit/ha-bayit**. Hebrew, Botwinik-Rotem 2008
he was from-bottom to.DEF-house/ DEF-house
He was under the house.
- c. **S-pered-i** **ot** **dom-a** roslo derevo. Russian, Mitrofanova and Minor 2013
off-front-LOC from house-GEN grew tree
A tree grew in front of the house.

Svenonius: axial elements (AxParts) regarded as **purely functional**:



(Svenonius 2006, 2010, Pantcheva 2006, Muriungi 2006, Svenonius 2006, 2010, Fábregas 2007, Takamine 2007, Botwinik-Rotem 2008, Roy and Svenonius 2009, Romeu 2014, etc.)

2. PROBLEMS FOR A FUNCTIONAL STATUS

2.1. AxParts can have nominal counterparts

Often a corresponding noun with nominal syntax and lexical meaning:

- (3) a. A hat is **on top of your head**. AxPart
b. Your forehead is **at the top of your head**. noun
- (4) Maria a-mami **î-gûrû ri-a metha**. Kîitharaka, Muriungi 2006
1.Maria SM1-sleep 5-top 5-AS 9.table
Maria is sleeping/lying on top of the table.
- (5) **Î-gûrû i-rî** ciat-ir-w-e.
5-top F-SM5 sweep-PERF-PASS-FV
The top [of something] was swept.

What is the **connection** between an AxPart and the **corresponding** lexical noun?

2.2. AxParts can have nominal content

AxParts can be highly idiosyncratic and semantically conditioned by the ground:

- (6) a. There is a defibrillator **on board this train/aircraft/spaceship/#theater**.
b. Les fleurs poussent **au pied de l'arbre**.
the flowers grow at.the foot of the.tree
Flowers grow at the foot of the tree. [i.e., on the soil around the tree]

Not compatible with a functional element

2.3. AxParts can have nominal morphosyntax

Definite article, gender agreement *en/au* alternation (cf. Cornulier 1972, Zwicky 1987, Miller, Pullum and Zwicky 1997, Matushansky 2015) and **plural**:

- (7) a. à la tête du train Roy 2006
 to the.F head.F of.the train
in the front section of the train
 b. en tête du train
 in head of.the train
in the front section of the train
- (8) a. aux alentours de la ville French
 to+the.PL surroundings.PL of the city
around the city
 b. La casa está a orillas del río. Spanish, Romeu 2014
 the house is to riverside.PL of.the river
The house is at the river side.

Russian: locative vs. directional interpretation of some PPs encoded by the case on the NP (cf. Bierwisch 1988, den Dikken 2003, 2010, Zwarts 2005, 2006, Caha 2010):

- (9) a. Marina bežit v gorod. / v.perəd. Russian
 Marina runs in city.ACC / in.front.ACC
Marina is running to the city / forward.
 b. Marina bežit v gorode. / v.peredi.
 Marina runs in city.LOC / in.front.LOC
Marina is running in the city. / in front.

3. PROPOSAL: AxPARTS ARE ‘WEAK’ NOUNS

AxParts are *nouns*, which helps to explain:

- how they connect to axial objects
- why they can have idiosyncratic ‘lexical’ restrictions
- where article, gender agreement, number, case come from

But they can’t be ordinary nouns (as Svenonius already demonstrated): their syntax is restricted (with respect to modification, pronominalization, pluralization, etc.)

AxParts are *weak* nouns (cf. Ross 1996, Stvan 1998, 2007, Carlson and Sussman 2005, Aguilar Guevara and Zwarts 2010, 2013, Aguilar Guevara 2014, etc.)

- like *bed* and *school* (*in bed*, *at school*)
- presence or absence of the article intimately linked to the choice of the noun
- similar restrictions in syntax (Ross 1996)
- presence of an **outer preposition** and its rigid choice

- (10) a. **in (#the) front** of the car
 b. **at *(the) foot** of the bed
- (11) a. **au/*à pied** du lit
 to.DEF.M/to foot.M of.DEF.M bed
at the foot of the bed
 b. **à/#au côté** de chez Swann
 to/to.DEF.M side.M of at Swann
by the Swann’s house

To work out:

- regular and weak version of an axial noun based on the same axis
- weak axial nouns involve kinds

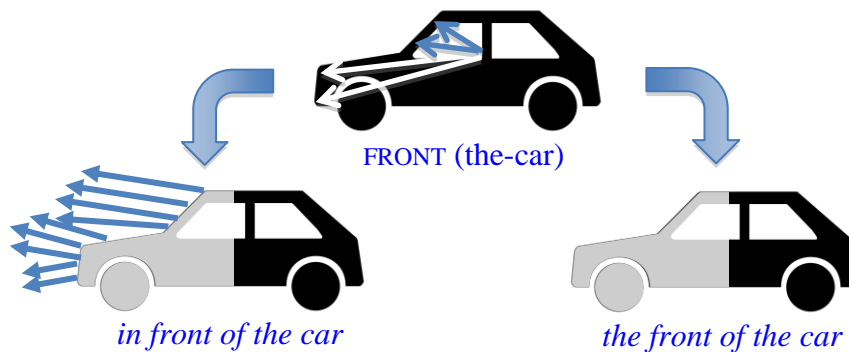
4. THE AXIS OF AXIAL NOUNS

Axes (like tops and fronts) can be assigned to objects (cf. Herskovits 1986, Levinson 1996a, b and many others), represented as **sets of vectors**

- (12) $\text{FRONT} = \lambda x \in D_e . \lambda u \in D_v . \text{START}(u) = \text{CENTER}(x) \text{ and } \text{END}(u) \in \text{BOUNDARY}(x) \text{ and } \text{UP}(u)$,
 the function that maps an object to the **set of vectors** starting from its center, ending at the boundary and directed forward
 the primitives **START**, **END**, **BOUNDARY**, etc., axially defined as in Zwarts and Winter 2000

From this spatial core we can derive the **axial part object** and the **axial projection**

- (13) Axial derivatives



Object part meaning of *front* (in *the front of the car*)

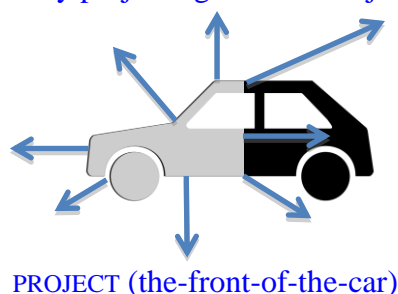
- (14) $\llbracket \text{front}_{\text{PART}} \rrbracket = \lambda x \in D_e . \text{OBJECT}(\text{FRONT}(x))$
OBJECT maps an axis to the unique object occupying it
- regular entity denotation for ordinary nominals
 - uniqueness accounts for definite article

Projective meaning of *front* (in *in front of the car*)

- (15) $\llbracket \text{front}_{\text{PROJ}} \rrbracket = \lambda x \in D_e . \text{PROJECT}(\text{FRONT}(x))$
PROJECT maps an axis to the external region that extends it
- set of vectors pointing in the same direction as the axis
 - regular spatial denotation for locative PPs (Zwarts and Winter 2000)

Crucial: *in front of the car* cannot be derived from *the front of the car*: a projection of an object would be in all directions, including the interior of the car

- (16) why projecting the axial object is wrong



5. WEAK AXIAL NOUNS AS KIND-REFERRING

Problem: if *front*_{PROJ} of the car denotes a set of vectors (a location), then why wouldn't it behave like a locative (e.g., like *home* or *over the car*)?

In many languages (some) axial nouns do in fact not need prepositions:

(17) Maria a-kari **ru-ngu** rw-a ndagaca. Kĩtharaka, Muriungi 2006
 1.Maria SM1-sit 11-under 11-AS bridge.9
Maria is sitting under the bridge.

(18) yeš hadaš **taxat** la-šemeš. Hebrew
 there.is new bottom to.DEF-sun
There is something new under the sun.

(19) The town is located **north of the border**.

Their semantic composition:

(20) ru-ngu rwa ndagaca
 PROJECT (BOTTOM (BRIDGE))

What is not expected:

- outer preposition in *in front of the car*
- definite article in other cases: *at the foot of the bed*

What do the axial projections *front of the car* and *foot of the bed* denote in such cases?

Proposal: as weak nominals they refer to kinds (Aguilar Guevara and Zwarts 2010)

- *front of the car* and *foot of the bed* denote **spatial “kinds”**
- spatial version of Chierchia's (1998) nominalization operator NOM maps a set of vectors to the singleton set consisting of the corresponding **entity-correlate**
- depending on the noun, there is an overt definite article to mark the uniqueness
- prepositions are there to go from the entity-correlate “back” to vectors that **realize/instantiate** the kind

Semantic composition:

(21) a. in front of the car
 INST (DEF (NOM (PROJECT (FRONT (THE-CAR)))))
 b. to the north of the border
 INST (DEF (NOM (PROJECT (NORTH (THE-BORDER)))))

PROJECT might be missing (if there is location at the boundary, i.e., contact)

(22) on top of the table
 INST (DEF (NOM (TOP (THE-TABLE))))

6. THE ROLE OF THE PREPOSITION

Why do different AxParts require different Ps (*in*, *to*, *on*)?

Two options:

- same semantics (instantiation of spatial kind, INST) but different realizations in function of the noun they combine with
- the prepositions have their normal semantics and the choice depends on how the axial noun is conceived of (in relation to notions like ‘container’, ‘surface’)

No evidence yet for making a choice ...

The outer preposition might not always be INST

We find **source** prepositions:

- (23) a. El libro está **de.l.ante** de la mesa. Spanish, Fábregas 2007
the book is from.the.front of the table
The book is in front of the table.
- b. hu haya **mi.taxat** la-bayit/ha-bayit. Hebrew, Botwinik-Rotem 2008
he was from.bottom DIR+DEF-house/ DEF-house
He was under the house.
- c. S-pered-i ot dom-a roslo derevo. Russian, Mitrofanova and Minor 2013
off-front-LOC from house-GEN grew tree
A tree grew in front of the house.

How come that a source preposition like *mi-* is used to describe a location?

Answer: they lexicalize PROJECT

- (24) a. mi.taxat ha-bayit
PROJECT (BOTTOM (THE-HOUSE)))
- b. de.l.ante de la mesa
PROJECT (INST (DEF (NOM (FRONT (THE-TABLE)))))

Consequence: NOM, INST, and PROJECT can be combined in different ways

- (25) a. first project the axis, then nominalize it
in front of the table
INST (DEF (NOM (PROJECT (FRONT (THE-TABLE)))))
- b. first nominalize the axis, then project it
delante de la mesa
PROJECT (INST (DEF (NOM (FRONT (THE-TABLE)))))

7. CONCLUSION

The usually assumed syntactic structure in (2) does not account for the observed patterns

- lexical inadequacy: axial elements are lexical, not functional
- descriptive inadequacy: axial complexes do not all have the same syntax

Proposed here:

- AxParts are nominal and weak
- semantics based on locative notions, which may be encoded as ‘kinds’
- PROJECT concept needed, which may but need not be syntactically present
- functional elements appearing the axial complex must be taken at face value

Some of the many remaining issues:

- why do different AxParts require different Ps? (*in front of the house, to the side of the house, ...*)
- how much of the semantic structure is syntactically projected and how much is in the lexicon?
- how to account for differences in frame of reference between AxParts (*on top of the car*) and axial object nouns (*on the top of the car*)

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