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:

(2) PlaceP
    Place
    in AxPart
    front KP
    of DP
    of the car

(set of vectors
set of points
set of points
GROUND object)


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. Kîtharaka, 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-ri ciat-ir-w-e. Flower, F-SM5 sweep-PERF-PASS-FV
    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  
    to the.F head.F of the train  
    *in the front section of the train*  
    Roy 2006  

b. en tête du train  
    in head of the train  
    *in the front section of the train*  

(8) a. aux alentours de la ville  
    to+the.PL surroundings.PL of the city  
    *around the city*  
    French  

b. La casa está a orillas del río.  
    the house is to riverside.PL of the river  
    *The house is at the river side.*  
    Spanish, Romeu 2014  


(9) a. Marina bežit v gorod. / v.perëd.  
    Marina runs in city.ACC / in.front.ACC  
    Marina is running to the city / forward.  
    Russian  

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.)  


- 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**

\[(\text{FRONT}) = \lambda x \in D_e . \lambda u \in D_v . \text{START}(u) = \text{CENTER}(x) \text{ and END}(u) \in \text{BOUNDARY}(x) \text{ and UP}(u),\]

the function that maps an object to the **set of vectors** starting from its center, ending at the boundary and directed forward

the primitives \text{START}, \text{END}, \text{BOUNDARY}, etc., a axiom defined as in Zwarts and Winter 2000

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

\[(\text{FRONT}(\text{the-car}))\]

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

\[(\text{FRONT}_\text{PART}) = \lambda x \in D_e . \text{OBJECT}(\text{FRONT}(x))\]

- regular entity denotation for ordinary nominals
- uniqueness accounts for definite article

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

\[(\text{FRONT}_\text{PROJ}) = \lambda x \in D_e . \text{PROJECT}(\text{FRONT}(x))\]

- 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

\[(\text{PROJECT}(\text{the-front-of-the-car}))\]

why projecting the axial object is wrong
5. **Weak Axial Nouns as Kind-Referring**

Problem: if front\textsubscript{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. Ḵitharaka, 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
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 rosl 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)

8. **BIBLIOGRAPHY**


