

Tracking the Dependencies of Dependencies

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1. Introduction

Various kinds of linguistic dependencies:

- **Category-dependencies**

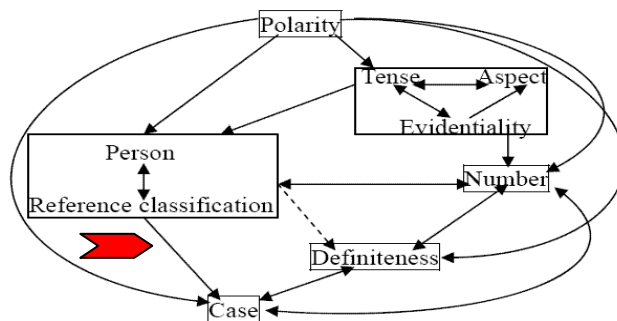
>> The availability of one feature depends on the availability of another feature

E.g. Greenberg (1963)

(1) 36. “If a language has the category of gender, it always has the category of number.”

>> The availability of certain values of a feature depends on the values of another feature

(2)



Aikenvald & Dixon (2011: 203)

Person > Case

“the choices available in the Case system depend on the choice that is made in the Person system” (*ibid.*: 187).

(3) case distinctions of pronouns (A = trans. subj; S = intr. subj; O = trans. obj)

a. Warrgamay

	1sg	2sg	3sg
A			
S			
O			

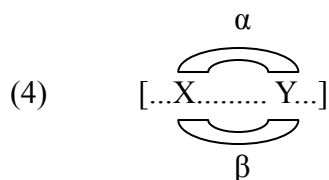
1sg and 2sg pronouns distinguish case forms for each of S, A and O, while 3sg has one form for S and O and another for A.

b. Dhalandji

	1sg	all other pronouns
A		
S		
O		

S and A fall together for 1sg, but are distinguished in all other pronouns.

- This talk tries to study **relation-dependencies**.



In the same construction [...X...Y...], if both dependency α and dependency β are available for X and Y, whether X is the principal one and Y is the dependent one consistently.

It is about the correlations of dependency directions of certain dependencies.

- It is not comprehensive and considers only a few basic dependencies, especially those related to the topic of this conference. => More conservative.

- It tries to track the dependencies beyond the domain of syntax. => More ambitious.

It is in the framework of generative grammar and considers issues like projection and government.

Similar to the above two studies, “we are simply examining synchronic dependencies

within a grammar. The present study does not venture into the question of diachronic development or the matter of cause and effect.” (Aikenvald & Dixon 2011: 180)

2. The dependency directions of four basic syntactic dependencies

- This talk studies the relations of four basic syntactic dependencies, based on the relation of X and Y in three basic constructions:

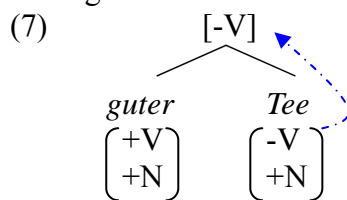
(5) dependency \Rightarrow construction \Downarrow	projection relation	agreement relation	gov. case relation	co-occurrence relation
[Vtr N]				
[Adj N]				
[Det N]				

2.1 The projection relation

The projection relation means that the syntactic category of the principal element is the category of the mother (e.g., Chomsky 2008: 145).

In (6), the nominal category of *Tee* is the category of the whole expression *guter Tee*.

- (6) gut-er Tee [German]
 good-MASC.NOM tea.MASC.NOM
 ‘good tea’



In the table in (8), the subscript element depends on the other element (i.e., the principal one) with respect to the relation labeled in the top row.

(8) dependency \Rightarrow construction \Downarrow	projection relation	agreement relation	gov. case relation	co-occurrence relation
[Vtr N]	V _N			
[Adj N]	Adj _N			
[Det N]	Det _N			

2.2 The agreement relation

The agreement relation (ϕ - & case-agreement) means that the ϕ or case features of an element (the dependent one) depend on the same kind of features of another element (the principal one). => Both elements exhibit the same or compatible features.

In (9a), the feminine and plural features of the verb *repeint-es* correlate with the same ϕ features of the object *les*.

- (9) a On les a repeint-es. [French]
 one them has repainted-FEM.PL
 ‘We repainted them.’
- b. gut-er Tee [German] (= (6))
 good-MASC.NOM tea.MASC.NOM
 ‘good tea’

- c. gut-en Tee-s [German]
 good-MASC.GEN tea-MASC.GEN
 ‘good tea’
- d. Sie öffnet die Tür. [German]
 she opened Det.FEM.SG.ACC door.FEM.SG.ACC
 ‘She opened the door.’

In (9b) and (9c), the masculine feature of the adjective correlates with the same feature of the noun *Tee(s)*.

In (9d), the feminine and singular feature of the determiner *die* correlate with the same ϕ features of the noun *Tür*.

As seen in (9b, c), the case feature of the Adj depends on the case feature of N.

(10)

dependency \Rightarrow construction \Downarrow	projection relation	agreement relation	gov. case relation	co-occurrence relation
[Vtr N]	V _N	v N		
[Adj N]	Adj N	Adj N		
[Det N]	Det N	Det N		

2.3 The government case-relation

The government case-relation means that the case feature of an element is determined by another element (the principal one). It is also called the case-assigning relation.

The dependent one has the case feature, but the principal one does not (Lyons 1968: 341).

E.g. in (9a), the accusative case of the object *les* is determined by the verb *repeint-es*.

(11)

dependency \Rightarrow construction \Downarrow	projection relation	agreement relation	gov. case relation	co-occurrence relation
[Vtr N]	V _N	v N	V _N	
[Adj N]	Adj N	Adj N	-	
[Det N]	Det N	Det N	-	

2.4 The co-occurrence relation

The co-occurrence relation means that the occurrence of an element depends on the occurrence of the principal element.

In (9a), the transitive verb *repeint-es* needs to occur with its object, *les*, but not vice versa. Thus *les* is the principal element.

In (9b)/(9c), the adjective needs to occur with the noun.

In (9d), the determiner needs to occur with the noun.

(12)

dependency \Rightarrow construction \Downarrow	projection relation	agreement relation	gov. case relation	co-occurrence relation
[Vtr N]	V _N	v N	V _N	v N
[Adj N]	Adj N	Adj N		Adj N
[Det N]	Det N	Det N		Det N

2.5 A summary of the directions of the four dependencies

(13) dependency \Rightarrow construction \Downarrow	projection relation	agreement relation	gov. case relation	co-occurrence relation
[Vtr N]	V _N	v N	V _N	v N
[Adj N]	Adj N	Adj N	-	Adj N
[Det N]	Det _N	Det N	-	Det N

3. Tracking the dependencies of dependencies in syntax

- Observations
- >> the dependency direction is the same for the agreement & the co-occurrence relation
- >> the dependency direction is the same for the projection & the government case relation.

While the co-occurrence and projection relations are universal, the morphological agreement and government case-relation are not universal. Languages such as Chinese have the first two relations, but not the latter two.

Since projection and co-occurrence relations are assumed to exist in all language, we get the following generalizations:

- Generalizations
- (14) a. X depends on Y in the agreement relation if its occurrence also depends on Y.
 b. X depends on Y in the government case-relation if it also depends on Y in the projection relation.

The correlation in (14a) is also attested in the fact that a predicate (i.e., T') agrees with its subject in ϕ -features and also requires the presence of the subject (EPP).

The correlation in (14b) is also attested in the fact that in many languages when a preposition merges with a noun, it determines the case of the noun and also projects PP.

- (15) a. [PP mit mir] b. [PP für mich] [German]
 with 1SG.DAT for 1SG.ACC
 'with me' 'for me'

4. A broader view

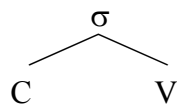
4.1 Projection and co-occurrence dependencies

- The projection relation

Among the syntagmatic relations listed in (13), the 1st one is purely syntactic.

The obligatory category-identity between the mother and one of the two different daughters is not seen in phonology or semantics.

- (16) In phonology



- (17) In semantics (Portner 2005: 38):

If a node has two daughters, and the meaning of one of them is a thing and the meaning of the other is a property, the meaning of the mother equals the result of allowing the thing to saturate the property.

=> Syntax-only dependency.

- The co-occurrence dependency

The co-occurrence dependency is also seen in phonology and semantics.

In phonology, e.g., in an onset-rime string, the occurrence of the former depends on the occurrence of the latter.

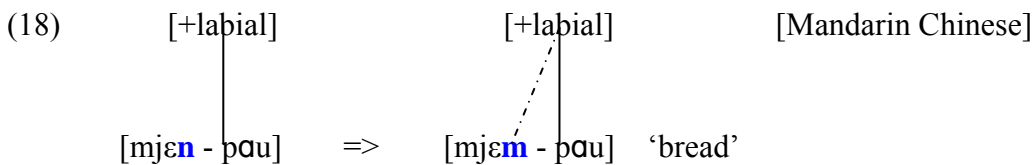
In semantics, e.g., the occurrence of a predicate-denoting element such as a relational noun depends on the occurrence of another element that can function as a subject.

=> A dependency in all domains.

4.2 Agreement dependency

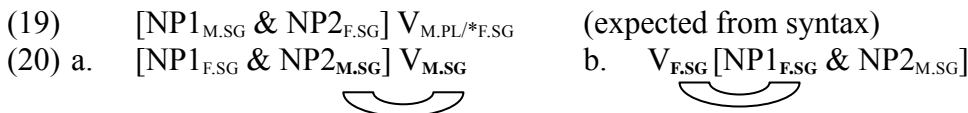
Agreement relation, as a feature-spreading effect, is similar to assimilation in phonology.

=> It should be treated as an instance of the more general Agree operation in both phonology and syntax (see Nevins 2010).



In the so-called agreement asymmetries, DP-verb agreement exhibits different patterns, depending on the position of the DP (preverbal or postverbal) (e.g. Hoekstra & Smits 1997; Fassi-Fehri 1993; Aoun, Benmamoun & Sportiche 1994; Harbert & Bahloul 2002; Bhatt & Walkow 2011).

E.g. There is a contrast between conjunct-resolved agreement, as in (19), and closest-conjunct agreement, as in (20).



In (20): a linear proximity effect. Not expected from syntax.

Many scholars (e.g. Bhatt & Walkow 2011) claim that the pattern in (20) is derived in PF, rather than in syntax.

If the operation of Agree is shared by phonology and syntax, it is not surprising that certain instances of the operation in syntax interact with more rules of phonology than other instances of such operations, and thus they look more like phonological operations.

No such operation is seen in semantics.

4.3 Government case-dependency and selection

- In government case-dependency, there is no sharing of case feature between the principal and dependent element. When a verb requires its object to have a genitive case, for instance, the verb itself does not bear a genitive case. This kind of asymmetry is parallel to selection.

- c-selection & s-selection

When a verb requires its object to have the feature of [+liquid] (e.g. *drink*), the verb itself does not bear the feature of [+liquid]. => s-selection

Similarly, when a verb requires its complement to be a DP rather than CP (e.g., *capture*, *express*), the verb itself has no D feature. => c-selection

Also, modifiers c-select their modified elements (Bruening 2010: 533):

- (21) a. Adjectives c-select category N;
 b. Adverbs c-select category V.

● Selection ≠ co-occurrence

The co-occurrence relation concerns whether an element can occur alone (cf. free form vs. bound form).

≠

The selection relation concerns whether the element that satisfies the co-occurrence relation is the right type.

Entailment & different perspectives.

The different perspectives are seen in the opposite directions of the two dependencies.

(22)	construction	projection	agreement	government	co-occurrence	selection
	[Vtr N]	V _N	v N	V _N	v N	V _N
	[Adj N]	Adj _N	Adj _N	-	Adj _N	Adj _N
	[Det N]	Det _N	Det _N	-	Det _N	Det _N

● Selection ≠ projection (contra Chomsky 2000)

In the selection of modifiers, the direction of selection is just opposite to the direction of projection.

- (23) Selectors Bruening (2010: 534)
 a. Modifiers: A(P), Adv(P)
 b. Argument takers: C, T, Asp, Appl, V, P, N, . . .

- (24) Principles of Projection
 a. If X selects and merges with Y and X is an argument taker, X projects.
 b. If X selects and merges with Y and X is a modifier, Y projects.

(25)	construction	projection	agreement	government	co-occurrence	selection
	[Vtr N]	V _N	v N	V _N	v N	V _N
	[Adj N]	Adj _N	Adj _N	-	Adj _N	Adj _N
	[Det N]	Det _N	Det _N	-	Det _N	Det _N

● case-selection (A new type of selection)

We can treat government case-relation as one more kind of formal feature selection. It is case-selection, parallel to c-selection and s-selection.

>> C-selection and s-election are lexical-item-specific, so is case-selection.

- (26) Wir trauen ihm
 1PL.NOM trust 3SG.MASC.DAT
 ‘We trust him.’

>> C-selection can interact with semantics, so can case-selection:

- (27) a. I want [_{DP} a cat]^{THING}
b. I want [_{CP} to go home]^{EVENT}
- (28) a. Die Leute gehen [in die Kirche]^{GOAL}
the people go in DET.ACC church
'The people are going into the church.'
b. Die Leute sitzen [in der Kirche]^{LOCATION}
the people sit in DET.DAT church
'The people are sitting in the church.'

>> C-selection and s-election are local, so is case-selection.

Consider the case assignment of ECM constructions.

- (29) Bill [^{PHASE}_{vP} expected [_{IP} her to get the job]]

In (29), the higher v assigns a case to *her*, the subject of a lower IP.

One can assume that the case-assigning

either within a phase (if *her* remains in IP),

or within the minimal domain (if *her* moves to Spec of vP).

In either sense, case-assigning must be local.

Thus, all instances of selection have to be implemented locally.

● Selection is saturation

If X selects Y, X is saturated by Y, in forming an acceptable combination (Branigan 2011: 12).

This kind of relation is also seen in semantics (e.g., type logic).

e.g. An element of the type <e, t> needs to be saturated by an element of the type <e>;

e.g. A gradable adjective needs to be saturated by a degree argument, in order to denote a property;

e.g. A collective predicate needs to be saturated by an argument that denotes a plural entity (also see Pustejovsky 1995: 3, 19).

In this sense, government case-dependency, as a kind of selection, should be treated as an instance of the more general saturation operation in both semantics and syntax.

5. Summary

Tracking the dependencies of dependencies

▶ Two generalizations:

● A. The dependency direction is the same for agreement and co-occurrence dependencies.

● B. The dependency direction is the same for government case relation and projection relation.

▶ Domain-specific and domain-neutral dependencies:

● The projection relation is syntactic.

● The co-occurrence relation is a general dependency in all components of language.

● Other dependencies can be cross-domain dependencies.

► Suggestions:

- Instead of merely trying to unify government with agreement, one can also try to unify operations in syntax with operations in other domains.
 - >> Agreement is an instance of the more general **Agree operation** in both **phonology** and syntax.
 - >> Government case-dependency is an instance of the more general **feature-saturation operation** in both **semantics** and syntax.
- the relation among co-occurrence, government, and selection:
 - co-occurrence is one condition of government
 - government case-dependency is a kind of selection, i.e., case-assignment is case selection.

This is just an endeavor to look at familiar facts from a new perspective, which might lead us to answer certain basic and natural questions.

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