Derivations and Filters

On how derivations cannot explain everything…

The case of Dutch infinitives and how they argue for the need of filters that act on representations (complexity filters)
The basic idea

Heads are ‘sensitive’ to Specs --> Heads ‘cooccur’ with Specs

EPP feature: need a Spec with a certain feature content (drives the derivation: Spec may be vacated by further movement)

Heads impose size restrictions on the (overt) “molecule” that fits in their Spec.

--> Complexity filters (K&Sz, 2000)
Filters and individual grammars

Take H, H.

H has general property Attract Z; Surface realization is variable across languages: patterns in primary data.

Stored + analyzed primary data: generalizations over primary data: lexicon. --> Filters

Z: overt category;

-- z is fine in this configuration (and also in other configurations?)

-- z is too far down (regardless of Y, or sensitive to Y)

-- z must occur exactly in this configuration

-- z cannot dominate overt material (z is most deeply embedded)
Verbal complexes .....  

*Koopman and Szabolsci (2000): Same derivations underly different surface strings:*

Dutch (climbing):

VM V1 V2 V3

(dat ik) Marie *op zal willen* *bellen*  
(that I) Mary *up will want-inf call-inf*

German: (inversion)

VM V3 V2 V1

(dass ich) Maria *anrufen können will*  
(that I) Mary *up-call-inf can-inf want*

Dutch: (English order)

V1 V2 VM V3

dat ik Marie *zal willen opbellen*  
that I Mary *will want-inf up-call-inf*
• The different surface orders are derived from essentially the same structures by essentially the same (ph) overt (XP remnant) movements (worked out for Hungarian, Dutch and German, but the claim is that this holds universally)

• Different word order and surface constituency follows from the way in which overt material gets carried along (“pied-piped”) in the derivation. (“split and splice”)
  • restructuring predicates have a universal “semantic” property:
    – they always must “combine” with the same category that we call VP+ (op bel)
    – but they differ in their c-selection properties and in size restrictions they impose on their environment (expressed by filters)

• There are certain asymmetries (crosslinguistic and language internal) that cannot be explained by the derivations per se. (Dutch infinitives) These are to be explained in terms of filters
• Link with language acquisition
• Some background: --the players and the structure...
  (simplified and incomplete)

- Every VP is dominated by VP+
  * VP+ is where complex Vs are formed
- Every VP+ is dominated by LP(xp)
  * Stacks: moving XPs to LPs/stacks
    create remnant VP+/VP
    (this is where DP, PP, CP projections are “grown” (Sportiche, 1998, etc, Kayne..))
- Infinitival M is introduced in InfP
  * InfP attracts some projection containing V
- InfP is dominated by PredP
  * VP+ is licensed in PredP
- All infinitivals are CPs
  * A projection containing InfP moves to CP to “type” the CP
Complex predicate formation....
The driving force behind the derivations

Cases of ‘complex predicate’ formation: (VM; different types of small clauses)

a. VP+
   ┌─ VM
   │   home
   │    in the room
   │    president
   └─ VP
       ┌─ go
       │   remain
       │    elect

b. restructuring predicates form a particular type of complex predicate---> form a complex predicate with VP+
Restructuring predicates must form complex predicates (attract \(<vp+>\) --> (-->a carrier of vp+ must move to VP+))

NB: in all previous accounts of verb raising, V is attracted, not a bigger predicate)

- 1. VP+ extracts out of its complement and moves to VP+ of the restructuring V:

- 2. VP+ pied-pipes another category (XP, CP)

-->underlies English orders: (..wil want swim)

--> surface restructuring effects depend on the size of the pied-piped constituent.
Looking at the distribution of overt material: size of complexity within VP+ is varying.

- Inversion:
- Climbing

-->underlies English orders: (..wil want swim)

-->(cp needs to be licensed and undergoes further movement out of Spec, VP+)

--> surface restructuring effects depend on the size of the pied-piped constituent.
At the end of the derivation, looking at positions with overt material, the internal “complexity” of VP+ will vary, depending on the derivation.

A. Variations in internal complexity:
- **Inverted structures are internally the most complex** (they have InfP within them)
- **Climbing structures are slightly less complex** (they lack InfP)
- **English orders are the least complex** (they have no overt material in Spec, VP+)

*Question: How to measure complexity? number of cyclic nodes, (not just nodes), and orientation*

B. Internal complexity varies with the length of the derivation:
inverted structures and climbing structures will continue to grow in complexity with the length of derivation, but English orders will not;
A consequence of the mechanics of the derivation: at the end of the derivation, the internal “complexity” of VP+ will vary, depending on the derivation.

How does it vary?

*Internal structural complexity of the remnant grows with the length of the derivation (as measured by the cycles), but only in inversion and climbing cases, not in English orders.* (will be shown in the following slides)

**Does UG care? (should we linguists care?)**

Are there phenomena that are sensitive to internal structural complexity? How can we tell if UG would care? What would we expect to find?

→ we should find that grammaticality depends on length of the derivation, (not on some other variable *morphology, prosody, semantics*...).
n our way to show different complexities of VP+. 

The difference between inverted orders and climbing orders: 

introducing one more important player: InfP. *InfP+ is 2 projections: InfP and InfP+ (because of doubly filled C filter; this is non-essential at this point)*
Some projection containing V will move to InfP+; There is variation as to the size of this constituent: *VPor VP+ (Dutch) VP+ (German)*
The most complex VP+...inversion (anrufen können müß)

Way down below: VP+ to InfP… (VP+ to InfP always underlies inverted infinitives)
--At the end of cycle one: merge kon; check CP(inf)(kon selects for an infinitival CP)

--Merge VP+ --> VP+ pied-pipes InfP+ to VP+

NB: specifier extraction from Spec, CP
--Merge VP+ --> VP+ pied-pipes InfP+ to VP+
Move Maria to stackP
Move VP+ to PredP (VP+ pied-pipes InfP+)

This VP+ is no longer active
(vp+ can be used once)
--InfP+ to CP. End of second cycle...
--The tensed clause:
merge muss; check infinitival CP; merge VP+ attract vp++
(extract from Spec, CP)
--VP+ in the tensed clause in inverted cases: maximally complex (in particular InfP is within the structure)
On complexity in the climbing order: ... *Mary op zal wil bellen*
Merge infinitival morphology -en (inf); projection of V (in climbing order: VP) moves to InfP+

This VP movement creates a remnant VP+
Merge PredP; VP+ is licensed in PredP-> Movement of remnant VP+ to PredP
Merge StackP/LP(dp)
Move DP *Mary* to LP(dp) <stack>
• Merge CP
  --> CP must be typed as infinitival CP
The derivation continues: second cycle, merge wil. Wil checks infinitival CP
Back to VP+:

wil attracts a VP+ constituent (a constituent with a vp+ feature)
• **VP+ extracts from PredP**

Can it extract from PredP yes:  
- VP+ is a full specifier  
--landing site is closest attractor;  

**Question:** Why doesn’t it pied-pipe a bigger constituent?  
--> theory of pied-piping and interaction with filters.  
(see file on language variation)
Inflect *wil*: Merge InfP+.
Move VP to InfP-->
creates remnant VP (which will be attracted by another restructuring predicate.)

A nice remnant VP+...
In the climbing case: Internal complexity of VP+ (at the end of derivation, wherever VP+ ends up):

Finish cycle, Merge another restructuring predicate V; project VP+; remnant VP+ moves to VP+, remnant VP (zal) moves out etc…

Derived complexity of VP+: “less” complex than inverted structures : 3 VP+, no InfPs
In the climbing case: 3-1-2. Internal complexity of VP+ (at the end of derivation, wherever VP+ ends up:)

```
     VP+
    /    \
   VP+    VP+
   |      |    zal
  op   wil
       bel
```

*zal willen bellen*
--VP+ in inverted cases is maximally complex: (3 overt VP+, 2 and 2 InfPs) (in particular InfP is within the structure)
-VP+ in the English order does not grow in internal complexity: there is simply no overt material in VP+ (so it is constant, and should not be sensitive to length of derivation)

*Second cycle:*

```
   VP+
     /     \
    CP     VP
   /  \      /  \
  VP+  wil  opbellen
```

-->... wil opbellen
--VP+ in the English order does not grow in internal complexity: there is simply no overt material in VP+

Third cycle:

 schön

-->... zal willen opbellen

Crosslinguistic: there are restrictions on inversion (mirror orders) and climbing orders, but not (or rarely)on English orders.
A consequence of the mechanics of the derivation: at the end of the derivation, the internal “complexity” of VP+ will vary, depending on the derivation.

How does it vary?

*Internal structural complexity of the remnant grows with the length of the derivation (as measured by the cycles), but only in inversion and climbing cases, not in English orders.*

Does the grammar care?

Are there phenomena that are sensitive to internal structural complexity? How can we tell if UG would care? What would be expect to find?

→ we should find that grammaticality depends on length of the derivation, (not on some other variable morphology, prosody, semantics...).

*Yes, when we look at grammars of individual speakers we see that complexity is relevant: The case of Dutch infinitives...*
Dutch (restructuring) Infinitives.

- An asymmetry in Dutch restructuring infinitives.

Inversion in Dutch is possible in extremely restricted environments: (PredP= the node that attracts VP+)

(1) a. \([\text{PredP} \ [\text{VP}+[\text{CP}e]] \ [\text{wil}]] \ [\text{zwemmen} \ \text{V1}_f \ \text{Vinf}]
  
  wants swim

b. \(\ldots [\text{PredP} \ [\text{VP}+[\text{InfP}[\text{VP}+\text{zwemmen}]] \ \text{wil}] \ \text{wil} \ \text{V2}_\text{inf} \ \text{V1}_f
  
  \ldots \ \text{swim-inf} \ \text{want}

(2) The inverted infinitives have all the properties that equivalently inverted infinitives have in Hungarian or in German: they can be topicalized.

  Topicalization of infinitives = PredP topicalization.

  (PredP is a focusable category, (with DP, PP, AP). InfP, CP etc are not).

(3) \(\text{ZWEMMEN} \text{kan} \ \text{hij} \ \text{niet}

  swim-inf \ \text{can} \ \text{he} \ \text{not}

  ‘He cannot SWIM’
Dutch InfPs can be pied-piped by VP+, and VP+ may contain an overt InfP at the end of the derivation.
But: There are well-known, quite curious, and so-far unexplained restrictions on inversion of infinitives (which do not hold for other VP+s (i.e. other categories of small clauses: *this has been noted before for participles but not for other forms of small clauses*))

Restriction:

Infinitives may invert iff they are in a V1 V2 environment, where V1 is a tensed restructuring V, and V2 is a bare infinitive.

What is curious about this (apart from the categorial asymmetry)

-- Only in V1 V2, but not in V1 V2 V3 environments:
-- only in tensed clauses, not in infinitivals
--- only of bare infinitivals, not of te-infinitivals
Inversion of infinitives is only possible in tensed clauses, not in infinitival clauses.

In tensed clauses: inversion is fine

(1) a. .. zwemmen kan/kan zwemmen \( V_{inf} V_f V_f V_{inf} \)
    swim-inf can/can swim-inf

In infinitivals inversion is impossible: (infinitival clauses contain \textit{te}).

b. het is belangrijk [om \( \text{te kunnen} \) zwemmen] \( \text{te V1 V2} \)

c. het is belangrijk. om \*zwemmen te kunnen \* \( \text{V2 te V1} \)
    it is important to be-able-inf swim-inf/ \*swim-inf to be- able
Infinitives are exceptional in this respect: all other VP+ categories (including participles) can invert in *te*-infinitives, showing they can roll-up as VP+ remnants to a position preceding *te*

(1)  
  a. (om Jan) **op bellen te bellen** (PP)  
      om John up to call  
  b. (om de kamer) **schoon maken te maken** (AP)  
      (om the room) clean to make  
  c. (om) **naar Venetie varen te varen** (PP)  
      (om) to Venice to go-by-boat  
  d. **zwemmen willen te willen** (*InfP)  
      swim-inf to want-inf  
  e. **gezwommen hebben te hebben** (PartP)  
      ge-swim-en have to have-inf  
  f. **te willen zwemmen** (te V1 V2)  
      to want-inf swim-inf
Second restriction:
V2 must be a bare infinitive, and cannot be a te-infinitive.

(1) a. … probeert te zwemmen 
tries to swim-inf
V1f [te V2]

b. *… te zwemmen probeert 
*to swim+inf tries *
V1f [te V2]

Third restriction:
• No inversion of infinitives in V1 V2 V3 environments:

(1) a. zal willen zwemmen (V1 V2 V3)
will want-inf swim-inf

b. *zal zwemmen willen *(V1 V3 V2) (OK in Hungarian/German)
will swim-inf want-inf

c. *zwemmen willen zal *V3 V2 V1 (OK in German)
swim-inf want-inf will

d. *zwemmen zal willen*(V3 V1 V2) (OK in Hungarian, German IPP)
swim-inf will want-inf

The exclusion of d, (V3 V1 V2), is all the more curious, since all other VP+s in Dutch can climb as remnants: (=pattern of Hungarian neutral clauses) (shown in next slide)
All other VP+s in Dutch can climb as remnants: (=pattern of Hungarian neutral clauses)

(1)  

a. ..[PredP[VP+ [VP+ [VP+ [PredP[VP+] zal]]] zal]] zal bellen (PP)  
up will call-inf

b. ..[PredP[VP+ [VP+[aardig [PredP[VP+] zal]]]] zal vinden (AP)  
nice will find-inf

c. ..[PredP[VP+ [VP+[naar huis [PredP[VP+] zal]]] zal gaan (PP)  
to home will go-inf

d. .. [PredP[VP+ [VP+[ [piano [PredP[VP+] zal]]] zal spelen (NP)  
piano will play

| e. *..[PredP[VP+ [InfP[VP+[zwemmen [PredP[VP+] zal]]]] zal willen ( *InfP)  
swim-inf will want-inf |

f. ..[PredP[VP+ [PartP[VP+ [gezwommen [PredP[VP+] zal]]] zal hebben (PartP)  
ge-swim-en will have-inf|
• Restriction not on category (infinitives may invert).
• not on morphology (-en)
• not because of prosody::

An aside on prosodic accounts: (Broekhuis and Broekhuis & Den Besten): “two infinitives before the finite verb is excluded by prosodic constraints of Dutch: inverted infinites must carry primary stress, and only one primary stress is possible” (*zwemmen kunnen wil)

→ this type of account will only work if there is physically more than one infinitive before the finite verb (i.e.*c =zwemmen willen zal). It will not carry over to d (*zwemmen zal willen), nor to c). (*zwemmen te willen).

Broekhuis and den Besten propose a different account to exclude these cases (basically parsing should universally exclude(*zwemmen te willen) ; This will not work given Hungarian (swim will want) and German (swimmen zu mussen and swimmen hat mussen) (NB: these infinitives are not focused)
The ungrammaticality of *zwammen te kunnen is surprising given the system of Dutch. Dutch has inversion, and VP+/VP splitting which yields remnant VP+ climbing; infinitives are therefore expected to “climb” (move as remnant VP+), just as any other category.

The behavior of infinitives is not only surprising from a Dutch internal point of view, but also from a crosslinguistic point of view (in Hungarian, or German, infinitives do invert, and remnant move (in German zu-infinitives, or in IPP contexts).

Hungarian neutral clauses (no categorial asymmetry):
   a. apart will-I want begin take the radio
   b. stupid-dat will-you begin find the movie
   c. newspaper-acc will-I want begin read now
   d. in the room will- I want begin remain
   e. swim(inf) will- I want begin

<table>
<thead>
<tr>
<th>German</th>
<th>Dutch</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. an ruf zurufen</td>
<td>op bel te bellen ‘up to call’</td>
</tr>
<tr>
<td>b. sauber mach zu machen</td>
<td>schoon mak te maken ‘clean to make’</td>
</tr>
<tr>
<td>c. Klavier spiel zu spielen</td>
<td>piano spel te spelen ‘piano to play’</td>
</tr>
<tr>
<td>d. gehen műs zu müssen</td>
<td>*[InfP gaan moet] te moeten ‘go to must’</td>
</tr>
<tr>
<td>e. gelachen hab zu haben</td>
<td>gelachen heb te hebben</td>
</tr>
</tbody>
</table>
Questions: Why do infinitives invert in Dutch in certain environments, but not in others. What is so special about infinitives…

Distribution of infinitives follows from a filter on derived complexity that applies specifically to infinitives at the end of the derivation (modulo a hypothesis on te, which seems independently supported).

This seems to be a quirk of the system, rather than something that asks for a principled theoretical interpretation. (Different dialects of Dutch/West-Germanic do differ w.r.t. the filter)

The (old) question how the language learner deduces that there are such filters and how one can do so using only positive evidence (stay tuned).
The restrictions on inversion of infinitives are to be handled by a language specific filter that restricts the internal complexity of certain projections (VP+ or PredP?) at the end of the derivation: This filter is unviolable.

The complexity filter on PredP (PredP is the node that attracts VP+)

What are the good cases? What are the bad cases? Certain InfP can survive in PredP, others cannot. Assume the visible cases (=cases in primary data) are the maximal ones allowed. This turns out to be sufficient

Dutch: Complexity filter on InfP in PredP. (no-complex InfP in PredP)

At the end of the derivation, PredP may not contain an InfP in a structure more complex than the following, where InfP is a “light” InfP)
How does this filter explain the restrictions?

- excludes climbing in V1 V2 V3 sequences:
  If you invert more than one step, you add structural complexity by virtue of the fact that each restructuring verbs attracts vp+:
  - also excludes inversion (since these structures are even bigger (two InfP)
  - allows any other remnant category (these don not contain InfP)
Continued: How does this filter explain the restrictions?:

- the filter allows any other big remnant VP+ category in PredP (as long as these do not contain InfP!)

Diagram:

```
PredP
  VP+
    PredP
      VP+
        VP+
          (wil)
          (wil)
          PP: op bel .. wil kunnen bellen
          AP: schoon mak .. wil kunnen maken
          NP piano speel .. wil kunnen spelen
```
Predicts that infinitives that may not invert do not show PredP type behavior -> they may not topicalize:

infinitives which invert, topicalize;
infinitives which may not, may not topicalize either:

(1)  ZWEMMEN kan hij niet  \textit{OK: zwemmen kan}
    \begin{itemize}
    \item swim-inf can he not
    \item ‘He cannot SWIM’
    \end{itemize}

(2)  ?*ZWEMMEN zal hij zeker niet willen/kunnen/moeten  \textit{*zwemmen zal willen}
    \begin{itemize}
    \item swim will he certainly not want-inf/ be-able-inf/have-to-inf
    \end{itemize}

(1)  a.  *dat hij te zwemmen probeert
    \begin{itemize}
    \item that he to swim-inf tries
    \end{itemize}

    b.  *te ZWEMMEN probeert hij niet (equivalent=good in German)
    \begin{itemize}
    \item to swim-inf tried he not
    \end{itemize}

(1)  a.  hij vergat [  te willen komen]
    \begin{itemize}
    \item he forgot to want-inf come-inf
    \end{itemize}

    b.  * hij vergat [komen te willen] \textit{(no inversion in te-infinitives)}
    \begin{itemize}
    \item he forgos come-inf to want-inf
    \end{itemize}

    c.  *KOMEN vergat hij vast te willen
    \begin{itemize}
    \item come forgets he certainly to want-inf
How does the complexity filter capture the restrictions on the on inversion with te-infinitives?

Analysis of Te-infinitives

- Basic idea:
  - te involves a restructuring predicate (that is why a remnant VP+ is attracted to the left of te/zu); te (hence no inversion in te-infinitives, or of te-infinitives).
  - te keeps a bare infinitive to its right (Spec, teP + te movement) (hence no *Vinf te )=V2 V1))
  - te V1 V2 sequences will in fact be like sequences involving 3 restructuring predicates
    \[(te( V1) V2 V3)\]

the no-complex-InfP- in PredP filter will filter out inversion in te-infinitives, inversion of te-infinitives, and topicalization of te- infinitives in Dutch.

Since German lacks the filter, German should systematically differ from Dutch, as indeed seems to be the case.
Why does te/zu involve a restructuring predicate?
Restructuring predicates attract VP+. te/zu attract remnant VP+ to their left

Remnant VP+ te V-inf  Remnant VP+ te V-inf
(1)  a.  (om Jan) op te bellen  … op wil bellen
      om John up to call  …up wants call

      b.  (om de kamer) schoon te maken  …schoon wil maken
          (om the room) clean to make  …clean wants make

      c.  (om) naar Venetie te varen  .. naar Venetie wil varen
          (om) to Venice to go-by-boat…to Venice wants go-by-boat

      d.  (om) te zwemmen  .. wil zwemmen
          to swim-inf  want swim-inf

Differences with restructuring verbs:
(1)  a.  * zwemmen te  ..zwemmen wil
       swim to  --swim wants

       b.  *te opbellen  ..wil opbellen
           to upphone  .. wants upphone
→ *te* needs bare infinitive to its right, (*causes VP/VP+ split*);  
→ *te* attracts VP+ to its left (*it is a restructuring predicate*).

*A more elaborate structure:* NB: two VP+ with an InfP inside:

![Diagram of the sentence structure](image)