Morphology III: Incremental vs Realizational Theories

Early vs Late Insertion (Part II)

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Incremental vs Realizational Theories

- In the previous set of slides, we have seen how *Late Insertion* models work:
  - ↪ The syntax applies on the basis of abstract heads and features.
  - ↪ After the syntax is complete, some algorithm provides the syntactic output representation with phonological features.
- This architecture straightforwardly derives the Principle of Phonology-Free Syntax.

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  - ↪ There are two logical solutions to this issue:

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2. Lexical theories could assume what one might call an Early Insertion-model and say something extra about why the PPFS holds.
   - ↪ Possibly, syntactic rules and phonological features are simply incompatible to begin with.

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- According to Stump (2001), models of morphology can be divided into two camps as to whether the individual morphemes participating in word formation actually contribute features to the word as a whole.
  - Incremental theories: Word Formation (esp. inflection) is information increasing. Affixes actually contribute information to the word as a whole
  - Realizational theories: Word Formation (esp. inflection) is only realizing features that are independently available on the word.

- In Distributed Morphology, insertion of exponents does not actually contribute features. The features are already there.

(1) [+Past] ↔ /ed/

↪ In (1), the exponent /ed/ *realizes* the features that are independently available. It does not bear the features themselves.

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↪ In (1), the exponent /ed/ *realizes* the features that are independently available. It does not bear the features themselves.

- In Paradigm Function Morphology, affixes are not stored in the lexicon but rather the result of a *realization rule* that attaches a phonological exponent to a stem in a given context:

(2) $RR_{2,\{T:Past\},V}(\langle X,\sigma\rangle) = \langle Xed,\sigma\rangle$

↪ Again, these rules simply realize independently available features. They do not introduce features themselves.

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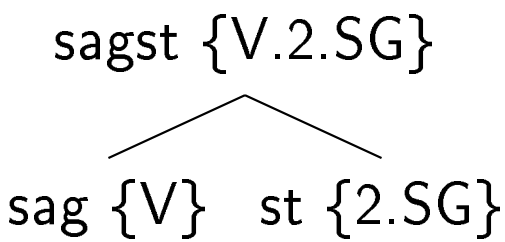
- Consider the following toy example:

(3) Lexical entries:
st {2.SG}
sag {V}

(4)



- Only the addition of the /st/-affix gives us a second person singular verb.

The Choice of Early Insertion Models

Early Insertion models can choose between an incremental and a realizational perspective whereas Late Insertion models are trivially forced to adopt a realizational perspective.

- Incremental Early Insertion models: Minimalist Morphology
- Realizational Early Insertion model: Paradigm Function Morphology
- Realizational Late Insertion model: Distributed Morphology
- Incremental Late Insertion model: logically impossible

- Why are incremental Late Insertion-models logically impossible?

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  - ↪ But if the actual exponents provide the abstract features in the first place, then the syntax does not have the features it requires to proceed.
- In other words: Incremental theories are necessarily Early-Insertion theories. Realizational theories can either be Early-, or Late-Insertion models.

An argument for Incremental theories

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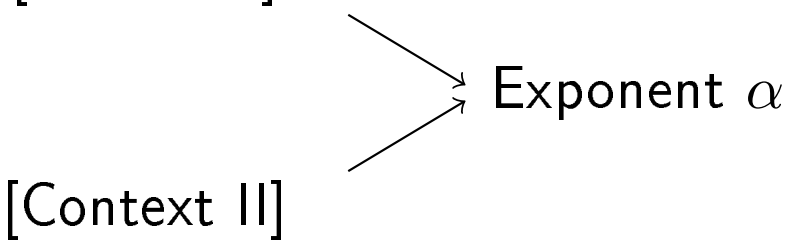
- In fact, it seems that whenever there is a mismatch between syntax and morphology, these differences may become visible:
  - ↪ In the following, we will construe an argument for an incremental theory building on the mismatch known as syncretism.

- Syncretism is (remember the very first session) a n-to-one mapping of syntactic context to morphological exponent.

(5)



- Syncretisms come in various forms, sometimes with clearly defined distributions (as in (6)) sometimes with less clearly defined distributions (as in (7)):

(6) Palatinate German Present tense of *lawre* (speak):

1sg	law-ɐ
2sg	law-ɐʃ
3sg	law-ɐt
1pl	law-ɐn
2pl	law-ɐn
3pl	law-ɐn

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(7)
a. [1.SG.Pres] ↔ /ɐ/
b. [2.SG.Pres] ↔ /ɐʃ/
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- We will talk about underspecification in detail in the next session. For now, this working definition should be enough.

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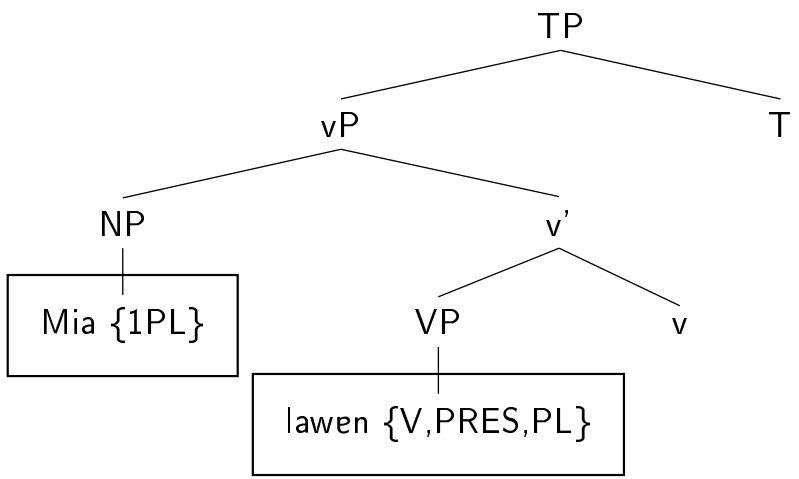
- Thus, depending on whether we adopt an incremental Early-Insertion model or a realizational Late-Insertion model, the syntax has different features at its disposal:
  - ↪ In an Early-Insertion model, the word has an underspecified feature set.
  - ↪ In a Late-Insertion model, the word has a fully specified feature set.

- Let us illustrate this with the Palatinate German case:
  - ↪ In an incremental Early Insertion-model, a verb with a plural ending /en/ has no person features since the affix does not provide any.
  - ↪ In a simply checking account as discussed two weeks ago, this is not a problem. A first person plural subject can check the features on the verb, as can a second person subject, etc.

- Feature Distribution in an incremental model:

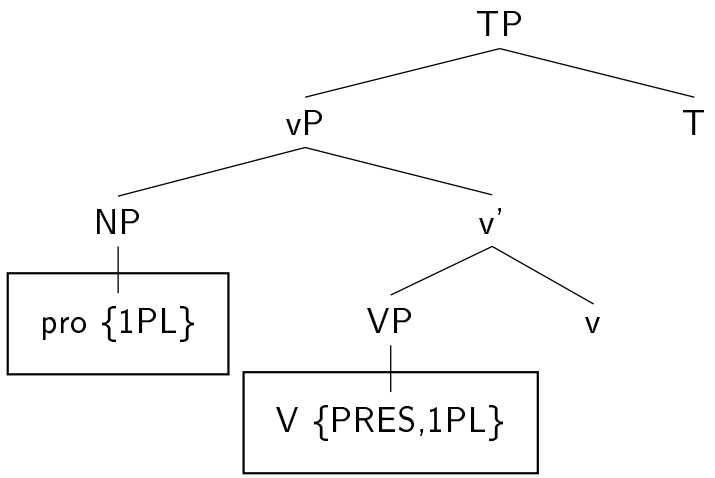
(8)



- The verb has a feature set which corresponds to what it exponent expresses.

- Feature Distribution in a realizational Late-Insertion model (after agreement):

(9)



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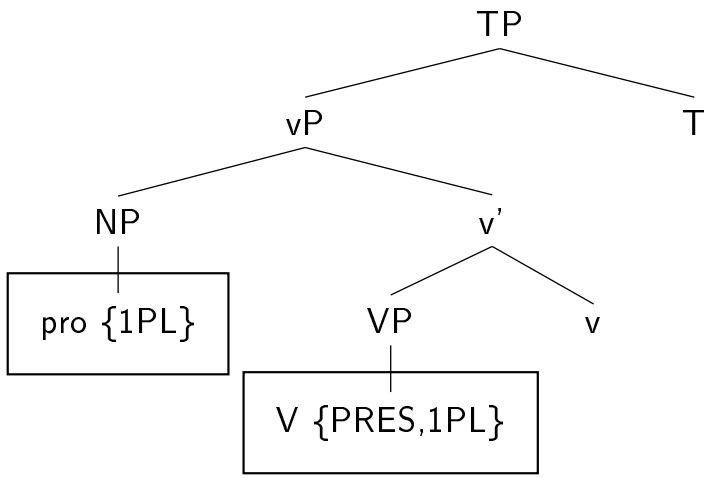

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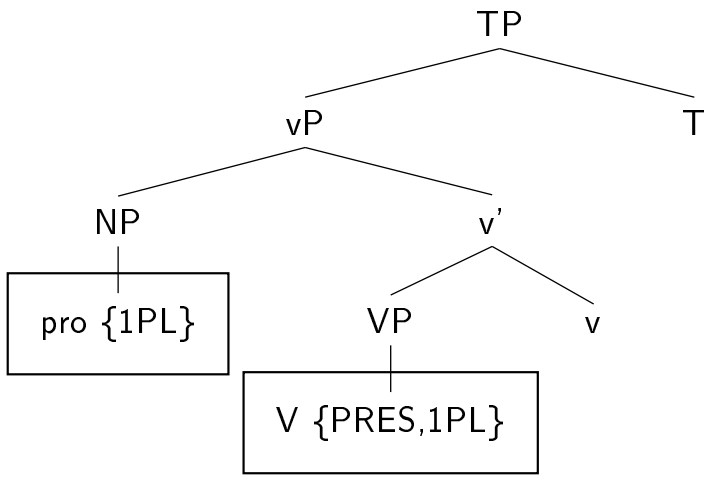

- The verb has a fully specified feature set. The mismatch between morphology will occur later (when the features are realized)
  - Note that a structure à la DM would look a little bit different (e.g. with the agreement features sitting in T) but for the sake of the argument, we can abstract away from that now.

- The relevant difference between the two models is the specification of the verbs in question:
  - ↪ In the incremental model, the verb has the specification its exponent actually corresponds to.
  - ↪ In the realizational (Late-Insertion) model, the verb has a full specification (possibly acquired via Agree) and the exponent is inserted later on.
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- But, it seems that, sometimes, syntax can see syncretism.

- The relevant configurations involve conflicting feature requirements.
- Such configurations are found when one exponent is intended to satisfy the requirements of multiple heads.
  - ↪ Such configurations can be found with free relatives, ATB-movement, parasitic gaps, etc.

- Consider the following abstract pattern:
  - ↪ Suppose we have two conjoined clauses, the verb in one of which assigns dative to its object and the verb in the other assigns accusative case:

(10) $[_{TP}$ ... Obj V $]$ & $[_{TP}$ ... Obj V $]$
dat acc

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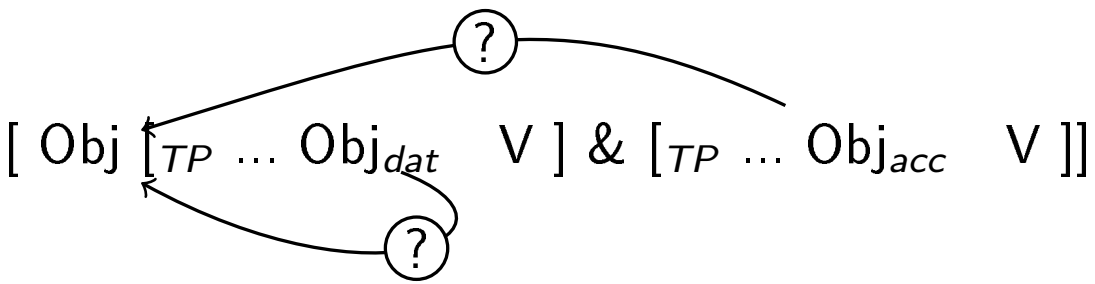
(11) 

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(11) [Obj $[_{TP}$ ... Obj_{dat} V] & $[_{TP}$ ... Obj_{acc} V]]
? ?

↪ It seems that ATB-movement of elements with conflicting features is only allowed if the conflict is resolved via syncretism.

- Consider the following examples from French:

(12) *Paul l'a/lui-a [$\__{acc}$ frappé et $\__{dat}$ donné
Paul him$_{acc}$-has/him$_{dat}$-has _ hit and _ given
des coups de pieds].
some blows of foot
'Paul hit and kicked him.'

(13) Paul nous-a [$\__{acc}$ frappé et $\__{dat}$ donné des coups
Paul us$_{acc/dat}$-has _ hit and _ given some blows
de pieds].
of foot
'Paul hit and kicked us.'

Miller et al 1992

- In the 3rd person singular, the forms of the pronouns are different for the dative and the accusative.

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- It seems that the syntax knows about this difference as ATB-movement of the pronouns from their base-generation sites to a position above is only licensed if they are syncretic.

- A similar example comes from German ATB-movement:
  - ↪ German inanimate wh-pronouns are syncretic (*was*) throughout all cases but the animate ones are not (*wer*,*wen*,*wem*).

(14) *Wen/wem hat der Hans in der Stadt _ getroffen
who.ACC/who.DAT has the Hans in the city $\__{acc}$ met
und mit den Einkäufen _ geholfen?
and with the shopping $\__{dat}$ helped?
'Who did Hans meet in the city and help with their shopping?'
Hein & Murphy 2016

(15) Was für Frauen hat der Hans in der Stadt _
what.ACC/DAT for women has the Hans in the city $\__{acc}$
getroffen und mit den Einkäufen _ geholfen?
met and with the shopping $\__{dat}$ helped?
'Which women did Hans meet in the city and help with their shopping?'

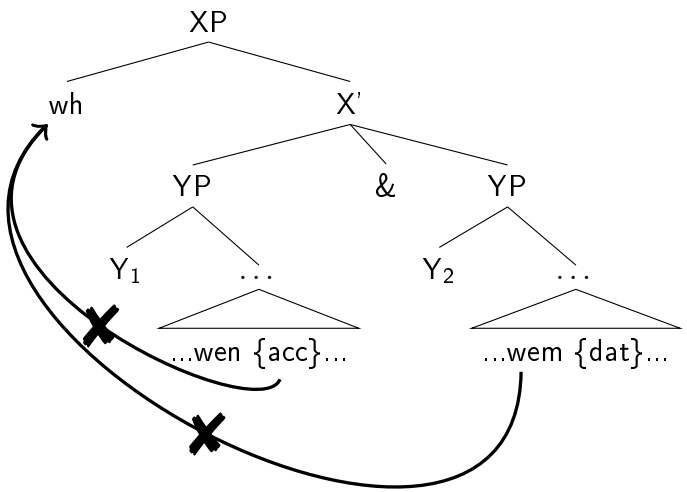
- In (14), the non-syncretic forms Wem/Wen cannot be ATB-moved to the preverbal position; i.e. they cannot be unified because they have conflicting features *and* conflicting exponents.
- In (15), ATB-movement is grammatical despite the conflicting features. The reason seems to be that conflicting features are tolerated iff they result in syncretic forms.

- Let us revisit in detail why this is an argument for incremental theories of inflection:
  - The German wh-pronouns are syncretic for all cases if they are inanimate.
  - In line with what we said above, we derive this by means of *underspecification*.
    - ↪ In an incremental theory, we can posit that inanimate wh-pronouns are not specified for case, animates are:

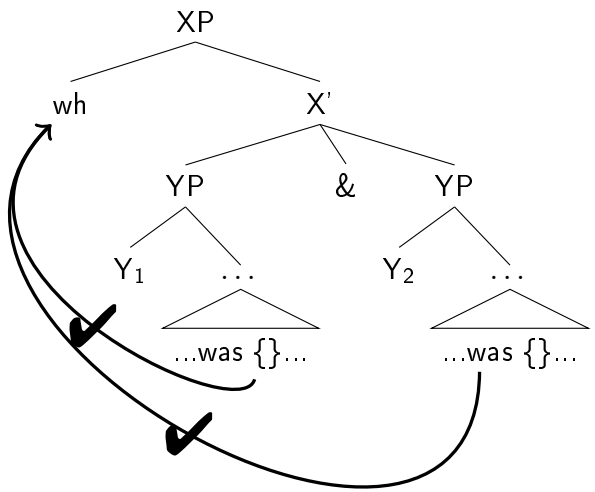
(16)
a. was [wh-pron,inanimate]
b. wer [wh-pron, animate, nominative]
c. wen [wh-pron, animate, accusative]
d. wem [wh-pron, animate, dative]

- And when these pronouns are inserted into a syntactic tree, the syntax has straightforward access to the features it requires to know whether ATB-movement is correct or not.

(17) ATB-blocked:



(18) ATB-allowed:



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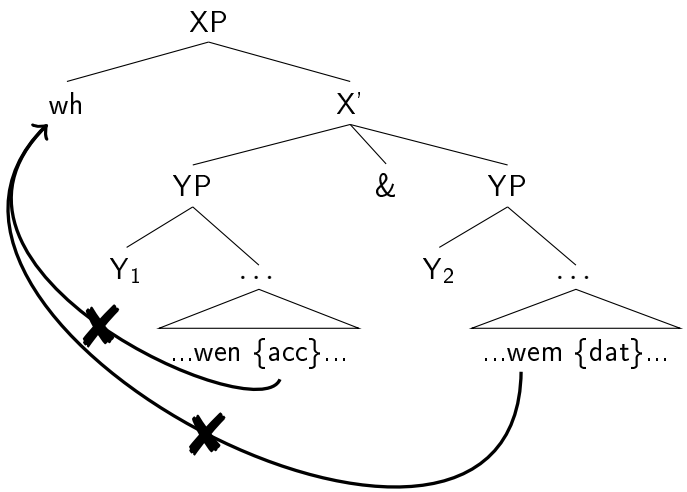

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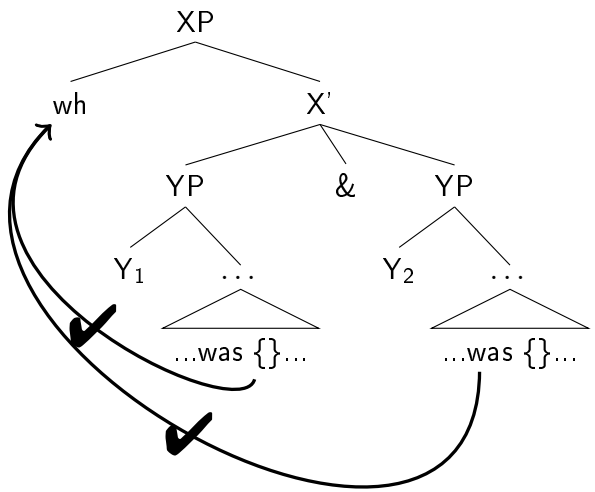

- In (17), ATB is blocked because the moved elements are distinct.
- In (18), ATB is ok since the items are identical (even if they are merged in different case frames).

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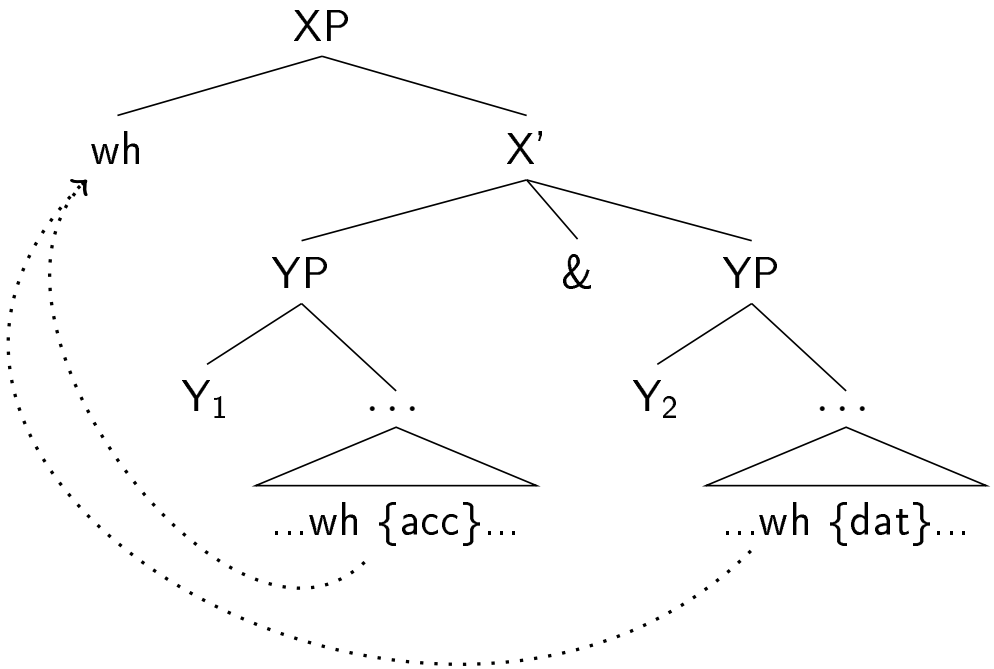
- In the syntax, one wh-phrase is marked with dative and one is marked with accusative.
- But whether that rules out ATB-movement is impossible to know at that point since it crucially depends on the exponent that realizes these case features:
  - ↪ If dative and accusative are syncretic, then ATB-movement is ok.
  - ↪ If dative and accusative are morphologically distinct, then ATB-movement is out.

(19) ATB-allowed???



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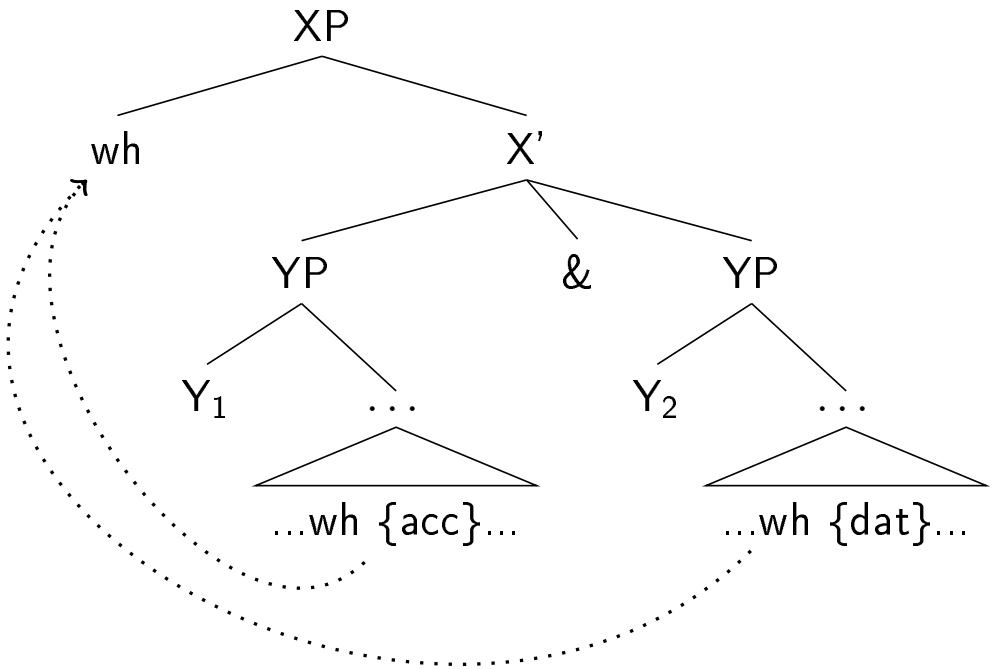

- At this point, we have no idea whether the forms will eventually turn out to be syncretic.
- How will we then know whether ATB-movement is blocked?

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- But this information is definitely not available in a realizational Late-Insertion model.
- Incremental models where the wh-items wear this information on their sleeves straightforwardly derive this pattern.

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1. Possibly, it is not morphological syncretism/distinctness which allows or blocks ATB-movement but maybe it is the feature ±animate.
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➤ This solution is not convincing:

- ↪ First, that would be a very strange syntactic rule.
- ↪ Second, it does not carry over to French, where the difference is not in terms of animacy but between 1st person plural vs 3rd person singular.
- ↪ Third, it crucially misses a generalization about syncretism being the decisive factor. This pattern is found in many other languages including such as Polish, Russian.

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➤ In Hein & Murphy (2016), the features of a ATB-moved wh-phrases are unified (via set intersection) and then realized.

↪ With the mismatch, ungrammaticality arises as there is no Vocabulary Item that can faithfully realize the case features.

↪ But typically, realizational morphology does not require *faithfulness* in realization.

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- ↪ This line is taken in Hartmann, Konietzko & Salzmann (2016).
- ↪ They also show that syncretism does not always repair mismatches (e.g. in topicalization).
- ↪ But they also concede that the most straightforward explanations in terms of processing do not extend to all cases of mismatches (such as the ones above).
- ↪ Clearly, much more work needs to be done (empirically and psycholinguistically) and try to come up with a processing explanation for these case.

Further ways to classify theories

- Morphological theories can of course be classified in various other ways:
  - ↪ Apart from the *incremental* vs *realizational* distinction, Stump (2001) also introduces the *lexical-inferential* distinction:
    - Lexical theories are those which store affixes as independent elements in the lexicon (such as DM or Minimalist Morphology).
    - In inferential theories on the other hand, affixes are not stored in the lexicon. Rather stem-affix combinations are the result of grammatical rules applying to stems:

(20) $\mathrm{RR}_{2,\{T:Past\},V}(\langle \mathrm{X},\sigma\rangle) = \langle \mathrm{Xed},\sigma\rangle$

- An interesting read is also Stewart T. (2015): Contemporary Morphological Theories: A User's Guide. Edingburgh University Press
  - ↪ This book compares 13(!) different morphological theories
  - ↪ It classifies all of these theories on 5 different scales
  - ↪ And it applies all of them to two different empirical puzzles (nominal inflection of Scottish Gaelic and Georgian verbal inflection) and discusses their pros and cons.

The five (five point) scales are:

1. Morpheme-based vs Lexeme/Word-based
2. Formalist vs Functionalist
3. In grammar vs In lexicon
4. Phonological Formalism vs Syntactic Formalism
5. Incremental vs Realizational

- The first scale between *morpheme-based vs lexeme/word-base* theories centers around the question what the basic unit of morphology is. Do we want to account for word-forms or for morphemes and how they combine.
- The third scale (*In grammar vs In lexicon*) notes how big a part of morphology is simply listed in the lexicon and how much we want to derive by means of rules, constraints, operations, etc.
- The fourth scale (*Phonological Formalism vs Syntactic Formalism*) asks the question whether morphological theories use the terminology and the building blocks of syntax and or phonology.

- And just to give you an example of how that looks for Distributed Morphology:

(21) Scales for Distributed Morphology:

Morpheme-based	✔					Word/Lexeme-based
Formalist	✔					Functionalist
In grammar	✔					In lexicon
Phonological Formalism			✔			Syntactic Formalism
Incremental				✔		Realizational

- And for Paradigm Function Morphology:

(22) Scales for PFM:

Morpheme-based					✔	Word/Lexeme-based
Formalist	✔					Functionalist
In grammar					✔	In lexicon
Phonological Formalism			✔			Syntactic Formalism
Incremental					✔	Realizational

Conclusion:

- We have seen that unlike Late Insertion models, which are by definition realizational, Early Insertion models can be both realizational and incremental.

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- We also have seen an argument that Early Insertion models, and especially incremental models, are superior for cases where morphology actually seems to interfere with the grammaticality of syntactic derivations.
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- We have also seen some further ways to classify morphological theories such as the lexical-inferential distinction.