1 Introduction

1.1 Traditional analysis of do-support


(1) A relation between V and T (HM, Affix Hopping etc) is established:

\[
\begin{align*}
\text{TP} & \quad \text{T} \quad \left[ \text{VP} \quad \text{V} \quad \ldots \right] \\
\rightarrow & \quad \text{no do-support}
\end{align*}
\]

(2) The relation between V and T, cannot be established:

\[
\begin{align*}
\text{TP} & \quad \text{T} \quad \left[ \text{VP} \quad \text{V} \quad \ldots \right] \\
\rightarrow & \quad \text{this violates some constraint} \rightarrow \text{do-support is the repair}
\end{align*}
\]

Pieces of the traditional analysis:

i. Some operation fails to apply
ii. Some constraint induces a violation in (2) (e.g. affixal properties of T)
iii. An insertion mechanism supplies T with do.

1.2 Claims

Do-support is not triggered by failure of some operation

The usual operation is established, but is later altered.

Do-support is not triggered by idiosyncratic requirements of particular heads

Positions in which do can be inserted are predictable from independent factors.

Section 2 Analysis: Do is inserted in split head chains.

Section 3 Do-support is not triggered by failure of Head Movement or Lowering.

Section 4 Do-support is not triggered by idiosyncratic requirements of particular heads.

Section 5 A formal implementation of chain splitting and do-insertion.

2 Analysis: Do is inserted in split head chains

- Heads in the clausal spine form a head chain

- A head chain is pronounced as an inflected verb in the highest *-position.

French declarative clause

\[
\begin{align*}
\text{TP} & \quad \text{T*} \quad \left[ \text{vp} \quad \text{v} \quad \left[ \text{vp} \quad \text{V} \quad \ldots \right] \right]
\end{align*}
\]

English declarative clause

\[
\begin{align*}
\text{TP} & \quad \text{T} \quad \left[ \text{vp} \quad \text{v*} \quad \left[ \text{vp} \quad \text{V} \quad \ldots \right] \right]
\end{align*}
\]

English interrogative clause

\[
\begin{align*}
\text{CP} & \quad \text{C*} \quad \left[ \text{TP} \quad \text{T} \quad \left[ \text{vp} \quad \text{v*} \quad \left[ \text{vp} \quad \text{V} \quad \ldots \right] \right] \right]
\end{align*}
\]

- **Parameter**: Some languages require integrity of head chains: they have a special Y

- In Y-languages head chains may split if they’re integrity is disrupted.

(3) Split-by-deletion

(4) Split-by-intervention

\[
\begin{align*}
\text{CP} & \quad \text{C} \quad \text{T} \quad \text{vP} \quad \text{VP} \quad \text{V} \quad \ldots \\
\text{Deletion splits the chain at deleted XP}
\end{align*}
\]

\[
\begin{align*}
\text{CP} & \quad \text{C} \quad \text{T} \quad \text{vP} \quad \text{VP} \quad \text{V} \quad \ldots \\
\text{Intervention splits the chain at vP}
\end{align*}
\]

English Danish Monnese

<table>
<thead>
<tr>
<th>Split by deletion</th>
<th>✓</th>
<th>✓</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Split by intervention</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Orphan chain

A head chain that becomes dissociated from a lexical verb due to splitting.

Do is inserted in orphan chains and surfaces where the verb normally would.

1 The precise mechanism of head chain formation is orthogonal. Possibilities include agreement, head movement or a mirror-theoretic complementation line. We implement is as Generalized Head Movement, discussed in section 5

2 (by heads & specifiers, not adjuncts: Bobaljik 1995)
3 Do-support is not due to failure of Head Movement or Lowering

The traditional view makes a wrong prediction
A head is stranded if it’s affixal but cannot combine with V (by HM, Lowering)
WRONG PREDICTION: a language with V-to-T movement should not have do-support.

3.1 Monnese has both V-to-T movement and do-support

Both auxiliaries and lexical verbs move to T and precede adverbs (Benincà & Poletto 2004:59):

(5) l à semper tfakolà he have.3SG always spoken ‘He’s always spoken.’
(6) l tfakolà semper he speak.3SG always ‘He always speaks.’

→ The affixal requirement of T is always satisfied by verb-movement.

Additionally, Monnese has T-to-C (Benincà & Poletto 2004:63-68)

(7) kwal è -t tjerkà fora? wh have.2SG -you searched out ‘What have you chosen?’
(8) ke fe -t majà? do.2SG -you eat.INF ‘Do you not eat the apple?’

(10) l tfakolà mia he speak.3SG not ‘He doesn’t speak.’
(11) fe -t mia majal ‘l pom? do.2SG -you not eat.INF the apple ‘Do you not eat the apple?’

The chain doesn’t split in other sentence types:

(12) V-to-T: no intervention
(13) Aux: no integrity constraints

⇒ Monnese has do-support despite having V-to-T movement
A possible defense of the traditional view: There is no V-to-T in (8)
⇒ A new problem arises: V-to-T is precluded by T-to-C – a countercyclic derivation

3.2 Monnese do-support arises due to Split-by-intervention

Monnese is like French: it has T*
Monnese is like English: it has V

⇒ V-to-T movement does not preclude do-support (See also Bjorkman 2011).

3 In the absence of *-positions, head chains are pronounced in the highest position by default.
4 Do-support is not an idiosyncratic requirement of particular heads

_Do can surface in C, T, or v, or in multiple positions, in a predictable way_

4.1 Mainland Scandinavian (MSc): Do in C or v

Position of do follows from independent parameters on verb position

(14) Finite verb positions in Danish:

\[
\text{CP} \rightarrow \text{C* TP} \rightarrow \text{T} \rightarrow \text{vP} \rightarrow \text{VP} \rightarrow \ldots \rightarrow \text{V} \rightarrow \text{v* T} \rightarrow \text{C*}
\]

Verb position in V2

(15) Om morgenen _drikker_ Peter _oftes_ kafe. in the.morning drinks Peter _often_ coffee
‘Peter often drinks coffee in the morning.’ Danish (Vikner 1995:47)

(16) Vi ved _at_ Peter _oftes_ _drikker_ kafe om morgenen. we know that Peter _often_ drinks coffee in the.morning
‘We know that Peter often drinks coffee in the morning.’ Danish (Vikner 1995:47)

(17) Do surfaces in those same positions under VP ellipsis & Split-by-deletion:

\[
\text{CP} \rightarrow \text{C* TP} \rightarrow \text{T} \rightarrow \text{vP} \rightarrow \text{VP} \rightarrow \ldots \rightarrow \text{V} \rightarrow \text{v* T} \rightarrow \text{C*}
\]

The orphan chain, v-T-C, contains both pronunciation positions.

5 ⇒ No need to stipulate that v and C in Danish have affixal properties.
⇒ do appears in those positions because and when other verbs do.

4.2 English: Do in C or T

Surface position of do follows from site of split

Verb typically surfaces in v:

(20) Mary _often_ _drinks_ coffee.

In VP ellipsis & Split-by-deletion, do surfaces in C or T, since v is not in the orphan chain:

(21) Did Mary \( \Delta_{vP} \)?

(22) Mary _did_ \( \Delta_{vP} \)

Orphan chain: C-T
With **Split-by-intervention**, *do* also surfaces in C or T:

(23)

![Diagram of CP and TP with do in V2]

(24) **Did Mary wash the car?**

(25) Mary **did not** wash the car.

### 4.3 VP ellipsis under auxiliaries: *Do* in *v*

Both English and MSc have a low pronunciation position for the main verb (in non V2):

(26) $[\text{TP } \text{T} [\text{VP } \text{v}^* [\text{VP } \text{V} \ldots ]]]$

- vPE in English deletes that position
- VPE in MSc does not $\rightarrow$ *do* can surface low

(27) VPE can also result in *do* under auxiliaries:

![Diagram of T-Aux chain]

**Auxiliary forms its own chain: T-Aux**

**Lexical chain: v-V**

$\rightarrow$ **after splitting: v**

$\Rightarrow$ **do-support in v**

In **MSc**:

(28) Nu **fisker** jeg ikke **efter en partner**. Men hvis jeg **havde gjort** $\Delta_{VP}$, havde jeg ... now fish I not after a partner but if I **had done** had I 'I'm not looking for a new partner. But if I had, I would . . .'

Danish (Houser et al. 2011:271)

In **British English (BrE)**:

(29) Kim isn’t **running for office** now, but she **has done** $\Delta_{VP}$ in the past.

(Thoms & Sailor 2018:1)


### 4.4 *Do* in both *T* and *v* in the same sentence


(30) John said he would help, but he **doesn’t usually do** $\Delta_{VP}$. (Chalcraft 2006:5)

**Orphan chain after VPE: T-v**

**Orphan chains by intervention:**

i) T  

ii) v

**do-support in each orphan chain**

(31) **INTERIM SUMMARY:**

a. Some languages are prone to chain splitting ($\forall$)

b. *Do*-support arises due to splitting of a **successfully formed chain**.

c. Splits may be caused by deletion and/or intervention (language-specific)

d. Within split chains, *do* appears as a verb normally would.

**Pieces of the traditional analysis:**

i. Some operation fails to apply $\rightarrow X$ (Monnese)

ii. Some constraint, e.g., affixal properties of $T \rightarrow X$ (MSc, BrE, AmE)

iii. An insertion mechanism supplies $T$ with *do*. $\rightarrow$ coming up
5 Implementation of "do-insertion" (Arregi & Pietraszko, 2018)

- The appearance of do is not due to an insertion process
- Rather, do is a special spellout of the verb (an allomorph of V)\(^4\)
- The process triggering the defective allomorph of V is found elsewhere (triggering defective allomorphs of T)

5.1 Head Chains

(32) Two types of features:
   a. Syntactic: involved in structure building (e.g. Cat, Sel, EPP)
   b. Morphological: target of Vocabulary Insertion (e.g. tense, \(\varphi\))

(33) Syntactic and morphological features of T (an illustration)

\[
\begin{array}{c}
TP \quad \cdot \cdot \cdot \\
M: \text{Pst, 1sg}
\end{array}
\]

(34) Generalized Head Movement – an operation that relates syntactic head by unifying their morphological features (feature sharing)

(35) Generalized Head Movement (tree representation)

(36) Generalized Head Movement (bracket representation)

\[YP Y [XP X \ldots ] \Rightarrow YP Y [XP X \ldots ]\]

\(^4\) Different accounts which treat do as an allomorph of the verb (or v, rather) include Thoms 2011, Bjorkman 2011.
(42) **Orphan Assignment**
Assign \( \{O \} \) to morphological terminal \( X_m \) in a head chain that does not contain the syntactic terminal \( X \).

(43) Orphan Assignment in English negative sentences:

\[
[TP \; T \; \text{not} \; [vP \; V \; (VP \; \ldots \; )]] \rightarrow [TP \; T \; \text{not} \; [vP \; V \; (VP \; \ldots \; )]]
\]

\( V_m \rightarrow v_m \rightarrow T_m \)

- In the higher chain, \( V_m \) and \( v_m \) are orphan nodes
- In the lower chain, \( T_m \) is an orphan node

(44) John did not play\(^*\)ed.

The \( \{O\} \) feature may alter the spellout of nodes as it is present at Vocabulary Insertion:

(45) **English**

a. \( V \{O \} \rightarrow do \)
b. \( T \{O \} \rightarrow \varnothing \)

**Summary:**

a. \( do \) is not inserted
b. the node spelled out of \( as \; do \) is already there: the lexical \( V \)
c. its deficient spellout is due to Orphan Assignment, as process that targets other heads as well

5.3 **Orphan nodes versus absence of nodes**

- The traditional analysis of \( do \)-support in English doesn’t need defective nodes:
  - No relation between \( V \) and \( T \) → no \( T \) in \( V \) and no \( V \) in \( T \)
- There is evidence that the defective nodes are there:
  - \( T \): inflection doubling in Swedish (orphan \( T \) can have the usual pronunciation)
  - \( V \): V-stranding VP-ellipsis, verb doubling (occurrences of \( do \) in languages with \( \mathcal{V} \) correspond to occurrences of a full verb in languages without \( \mathcal{V} \))

\( \vdash \)

(46) **vP-fronting in English:** \( V \{O \} \) and \( T \{O \} \) both have special VIs

\[
[C P \; C^* \; [TP \; T \; \text{not} \; [vP \; V \; (VP \; \ldots \; )]]] \rightarrow [vP \; V \; (VP \; \ldots \; )]
\]

\( V_m \rightarrow v_m \rightarrow T_m \rightarrow C_m \)

**vP-fronting in Swedish:** only \( V \{O \} \) has a special VI

(47) och \( [vP \; \{*köra / körde\} \; \text{bilen}] \) gjorde han \( vP \) 

Swedish (Platzack 2012:281)

\[
[TP \; T \; \text{not} \; [vP \; V \; (VP \; \ldots \; )]] \rightarrow [vP \; V \; (VP \; \ldots \; )]
\]

\( V_m \rightarrow v_m \rightarrow T_m \rightarrow C_m \)

\( \text{drive.PST} \)

\( \text{he} \; \text{did} \)

In Swedish, there is no special VI for \( T \{O \} \rightarrow \) regular pronunciation

\( \vdash \)

Crosslinguistically, \( do \) alternates with a full lexical verb:

(48) **Do-support vP-ellipsis**

\[
\begin{array}{c|c|c}
\text{Language type} & \mathcal{V} & \mathcal{Y} \\
\hline
\text{VP ellipsis} & \text{do-support} & \text{V-stranding} \\
\text{VP fronting} & \text{do-support} & \text{V-stranding} \\
\end{array}
\]

(49) **Do-support vP-ellipsis**

a. Did you watch the game?

\( \vdash \)

b. \( [TP \; \text{I did} \; [vP \; \ldots \; ]] \).

(50) **Verb-stranding vP-ellipsis**

\( \text{(Polish)} \)

a. Oglądalaś mecz?

\( \vdash \)

watch.2sg game

b. \( [TP \; \text{Oglądalam} \; [vP \; \ldots \; ]] \).

\( \text{watched.1SG} \)

‘Did you watch the game?’

‘I did.’
6 Conclusion

- do-support is special: it doesn’t correlate with head-movement vs lowering:
  - This is easily done in a theory that unifies head movement and lowering under a single relation
- do-support is not special: we can predict the “insertion” sites
  - They overlap with independently evidenced spellout positions in a chain
- do is an instance of an orphan head – a more general phenomenon, observed with other heads (T) and even in languages without do-support

References