Abstract

Huybregts (2009) makes the claim that hybrid Ā-chains in Irish favor derivational theories of syntax over representational ones such as HPSG. In this paper, we subject this assertion to closer scrutiny. Based on a new technical proposal, we will reach the conclusion that, in principle, both derivational and representational accounts can accomodate hybrid dependencies. Thus, no argument against either approach can be made on the basis of the Irish data, disconfirming Huybregts's (2009) claim.

1   Introduction

Modern Irish is one of the world's languages exhibiting morphological reflexes of unbounded dependencies. The form of complementizers is conditioned by whether they are within the range of a non-local dependency or not.[1] In addition to marking the presence vs. absence of a dependency, the complementizers in Modern Irish track the type of the dependency involved. Complementizers occurring within the range of a dislocation are distinct from those falling in the domain of a resumption dependency. This paper focuses on the interaction of these complementizer patterns and their theoretical ramifications. As already observed by McCloskey (1979), a single non-local dependency spanning several clauses may lead to different forms of the respective complementizers. Thus, one complementizer may occur in one form (say, the dislocation-dependent one), while the next higher one shows up in another form (the resumption-based one), although they are in the domain of just one dependency, spanning both clauses. We will refer to such dependencies as *hybrid* (McCloskey 1979 uses the term "mixed"), as they seem to consist of chaining together of two smaller dependencies of distinct types.

In a recent comparison of derivational and declarative approaches to syntax, Huybregts (2009) makes the claim that the hybrid dependencies found in Irish are unproblematic for derivational approaches to syntax such as the Minimalist Program (Chomsky, 1995, *et seq.*) but are not readily accommodated in representational frameworks like HPSG. If this argument is correct, the Irish data provide evidence against declarative frameworks.

The purpose of this paper is to subject Huybregts's (2009) claim to closer scrutiny. We will demonstrate it to be incorrect. The paper is structured as follows: Section 2 lays out the empirical facts that the discussion is based on. Section 3 illustrates the derivational approach to the Irish complementizer system proposed by

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[1]We will assume here without discussion that the reflex is situated at the complementizer. For a discussion of alternatives, see Lahne (2009) and references cited there. Lahne (2009) also provides an in-depth analysis of the morphological aspects of the alternation.

McCloskey (2002). Our own analysis couched within HPSG is developed in section 4. Section 5 provides the conclusion.

2   Irish Ā-chains

Complementizers in Modern Irish appear in one of the three guises in (1), depending on their environment. If crossed by a dislocation dependency, the form of the complementizer is *aL*. Complementizers in the range of a resumption dependency appear as *aN*. Finally, complementizers not affected by any nonlocal dependency take the form *go*. The distribution of the three types in the domain of uniform chains is schematized in (2), where 't' designates a trace, and 'pro' an empty resumptive pronoun. Examples are provided in (3).[2,3]

(1)   *Three types of complementizers*
    a.   aL   (A-bar, dislocation)
    b.   aN   (A-bar, resumption)
    c.   go   (declarative)

(2)   *Uniform chains*
    a.   [$_{CP}$ aL ... [$_{CP}$ aL ... t]]
    b.   [$_{CP}$ aN ... [$_{CP}$ aN ... pro]]
    c.   [$_{CP}$ go ... [$_{CP}$ go ...]]

(3)   a.   an tainm *a* hinndeadh dúinn *a* bhí _ ar an áit
        the name *aL* was.told   to.us *aL* was   on the place
        'the name that we were told was on the place'
    b.   an bhean *a* raibh mé ag   súil *a* bhfaighinn uaithi   é
        the woman *aN* was I   hope prog *aN* get.COND from.her it
        'the woman that I was hoping that I would get it from her'
    c.   Dúirt mé [$_{CP}$ *gu*-r   shíl   mé [$_{CP}$ *go* meadh   sé ann   ]]
        said I   *go*-PAST thought I   *go* would.be he there
        'I said that I thought that he would be there.'

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[2]'L' and 'N' are common abbreviations for a complex cluster of phonological properties (McCloskey, 1979). As for the gloss, the preposition *uaithi* 'from.her' in (3b) agrees with the empty resumptive pronoun.

[3]While (3) gives examples for relative clause formation, the dislocation and resumption strategies are also attested in constituent questions, clefts, and so on. (ia,b) give examples for dislocation and resumption in *wh*-movement contexts, respectively:

(i)   a.   Céacu ceann a   dhíol tú?
        which one   aL sold   you
        'Which one did you sell?'
    b.   Céacu ceann a   bhfuil dúil   agat   ann?
        which one   aN is   liking at.you in.it
        'Which one do you like?'

Relative pronouns in Irish are always phonologically empty. We accept the widely held position that there are covert resumptive pronouns in Irish (McCloskey and Hale, 1984; McCloskey, 2002; Vaillette, 2002).[4] Our goal is not to develop a reanalysis of the Irish data but to investigate whether under the interpretation of the data presupposed by Huybregts (2009) an argument against HPSG can be constructed.

Importantly, the different markings of the complementizer may interact. If there is a single dependency of either type which involves more than one clause, then not only the uniform complementizer marking in (2) is possible, but mixing of different complementizers is attested as well (McCloskey, 2002). This gives rise to *hybrid* dependencies, as illustrated in (4). Examples are provided in (5).

(4) *Hybrid chains*

    a. [$_{CP}$ aN ... [$_{CP}$ aL ... t]]   (Pattern 1)

    b. [$_{CP}$ aL ... [$_{CP}$ aN ... pro]]   (Pattern 2)

    c. [$_{CP}$ aN ... [$_{CP}$ go ... pro]]

(5) a. rud   *a* raibh coinne   aige *a* choimhlíonfadh __ an aimsir
        thing *aN* was expectation at.him *aL* fulfill.COND   the time
        'something that he expected time would confirm'

    b. aon duine *a* cheap sé *a* raibh ruainne tobac   aige
        any person *aL* thought he *aN* was scrap   tobacco at.him
        'anyone that he thought had a scrap of tobacco'

    c. achan rud   *a* rabh dóchas aca   *go* dtiocfadh   sé
        every thing *aN* was hope   at.them *go* come.COND it
        'everything that they hoped (that it) would come'

In (5) a single non-local dependency emerges as the result of two local dependencies of different types. Thus, in, e.g., (5a) the lower clause contains a dislocation dependency (as evidenced by the complementizer *aL*), whereas the higher clause involves a resumption dependencies (marked by *aN*). The crucial observation is that both combine to yield a single dependency crossing both clauses.

Focussing on the patterns 1 and 2 in (4a,b), Huybregts (2009) claims that the Irish hybrid dependencies cannot be accounted for in representational frameworks of syntax and hence constitute evidence against them. We will demonstrate this claim to be incorrect by devising an HPSG analysis of the patterns 1 and 2 of (4). An LFG account of the same data has been independently proposed by Asudeh (2004, ch. 6).[5]

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[4]To give just one example, dislocation and resumption dependencies differ in that only the latter may cross strong islands. This can be seen by looking at the form of the complementizers. Dependencies marked by *aL* may not cross island boundaries, while *aN*-marked ones may. The form of the complementizer can thus be taken as a diagnostic of the nature of the dependency involved, even though the bottom of the two dependency types may be indistinguishable.

[5]We are indebted to Peter Sells for making us aware of Asudeh's account.

3 A Minimalist analysis of hybrid chains

Before turning to the HPSG account, let us consider a derivational approach to hybrid dependencies. Huybregts (2009) explicitly refers to the proposal of McCloskey (2002) as a benchmark for theoretical accounts of the data laid out in the previous section. To assess his claim that representational theories are less adequate than derivational ones when it comes to hybrid dependencies, we will model our HPSG analysis after McCloskey's (2002) to ease comparison. Some familiarity with the derivational approach suggested by McCloskey (2002) will thus help to evaluate Huybregts's (2009) claim.

McCloskey's (2002) analysis, based on Chomsky (2000, 2001), proposes three types of C in Irish, each conforming to one overt complementizer (cf. (6)). By assumption, movement and resumption structures differ with respect to the specification of the C head. Resmption dependencies are established by merging an operator in Spec,CP which binds a resumptive pronoun as a varialbe. Merging of this operator is brought about by an EPP-feature on C (cf. (6b)). Movement dependencies, on the other hand, are the result of a C head bearing an OP(ERATOR)- and an EPP-feature, as in (6c). The OP-feature undergoes AGREE with an element lower in the structure. The EPP-feature yields movement of this element to Spec,CP. If no dependency is established with C, C bears neihter an OP- nor an EPP-feature (see (6a)).

(6) *Featural make-up of C in Irish*
    a. go $\leftrightarrow$ C[$\varnothing$]
    b. aN $\leftrightarrow$ C[EPP]
    c. aL $\leftrightarrow$ C[EPP,OP]

McCloskey (2002) assumes movement to take place successive-cyclically through the specifier of each intermediate CP. Resumption, by contrast, may, but need not, apply successive-cyclically. As we will see later, if resumption is formed successive-cyclically, pattern (2b) emerges; if not, pattern (4c) results.

To accomodate hybrid chains, McCloskey (2002) assumes that both *wh*-phrases and resumptive pronouns are pronouns ('*pro*'). Importantly, one and the same *pro* can serve both as an operator and as resumptive pronoun within a derivation. A relevant derivation for pattern 1 of (4) is sketched in (7), where *op* designates an operator, viz. a relative pronoun which binds a resumptive.

(7) [$_{CP}$ aL … [$_{CP}$ aN … pro]]
    ① [$_{CP}$ C$_{[EPP]}$ … pro] $\rightarrow$ Merge *op*
    ② [$_{CP}$ op_i aN … pro_i] $\rightarrow$ Merge higher C
    ③ [$_{CP}$ C$_{[EPP,OP]}$ … [$_{CP}$ op_i aN … pro_i]] $\rightarrow$ Move *op*
    ④ [$_{CP}$ op_i aL … [$_{CP}$ t_i aN … pro_i]]

The lower C head comprises an EPP-feature, which triggers the merging of an operator in its specifier. This operator binds the resumptive pronoun. Morphologically,

C's EPP-property leads to its being spelt out as *aN*. Subsequently, the matrix C head, bearing an EPP- and an OP-feature, is merged. Its OP-feature enters into an Agree-relation with *op*. C's EPP-feature then moves *op* into the specifier of the matrix C. Thus, a movement dependency is formed. Bearing both an OP- as well as an EPP-feature, C has the form *aL*. In a nutshell, then, chain hybridization is brought about by a hybrid operator, which acts as the head of a resumption chain and the tail of a movement chain, thus linking both dependencies with each other.[6]

The reverse dependency switch in pattern 2 of (4) is accounted for by the same reasoning: An operator in the embedded clause moves into the specifier of the lower CP, triggered by an Agree-relation and resulting in the complementizer *aL*. The higher Spec,CP is then filled by a second operator, binding the lower one. As no movement takes place to the highest C, *aN*-marking ensues. This derivation is schematized in (8).[7]

(8) $[_{CP}$ aN ... $[_{CP}$ aL ... t $]]$

    ① $[_{CP}$ C$_{[EPP,OP]}$ ... op_i $]$ $\rightarrow$ Move *op*

    ② $[_{CP}$ op_i aL ... t$_i$ $]$ $\rightarrow$ Merge higher C

    ③ $[_{CP}$ C$_{[EPP]}$ ... $[_{CP}$ op_i aL ... t$_i$ $]]$ $\rightarrow$ Merge *op*

    ④ $[_{CP}$ op_i aN ... $[_{CP}$ op_i aL ... t$_i$ $]]$

In both derivations, there is an element (*op*) which may terminate one dependency while at the same time initiating another dependency, thereby chaining them together. Crucially, both dependencies can be of a different type, i.e. *op* may be a binder and a bound element at the same time.

4   Two implementations in HPSG

As far as we can tell, the existing literature on long-distance dependencies in HPSG has not yet addressed the issue of hybrid dependencies (see, however, Vaillette 2002 for a treatment of uniform chains in Irish within HPSG). We will demonstrate in this section that existing analyses may nevertheless be conservatively extended to include hybridization. Thus, for the data set under discussion there exists no principled difference between derivational approaches and HPSG and thus no reason to disregard representational approaches to syntax.

We will suggest two possible implementations, one based on lexical traces as chain initiators (Gazdar et al., 1985; Pollard and Sag, 1994), the other couched within a trace-less framework as proposed by Bouma et al. (2001). As a general background assumption, we follow Vaillette (2002), in taking resumption dependencies to involve INDEX sharing. Dislocation is construed as LOCAL sharing,

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[6]Moving the pronoun in (7) instead of merging *op* is excluded because movement requires an AGREE-relation.

[7]McCloskey (2002) assumes that the EPP- and OP-feature on the embedded C have to be checked by the same element (*op* in (8)). This excludes a possible derivation in which *op* undergoes AGREE with C but a second element (e.g., a resumptive pronoun) is merged in the C's specifier.

as is standard. Interestingly, resumption and dislocation instantiate both types of unbounded dependencies identified by Pollard and Sag (1994): Resumption is a *weak* nonlocal dependency, while dislocation is a *strong* dependency.[8] To accommodate hybrid dependencies, a switching between different types of dependencies is necessary.

We will depart from Vaillette (2002) w.r.t. the question how resumption and dislocation dependencies should be represented. Vaillette (2002) assumes that the former involves percolation of a RESUMP-feature, while the latter involves the familiar SLASH-feature. In contrast, we will assume that both dependencies are construed via (differently valued) SLASH-features. The reasons for doing so are the following: First, as dislocation and resumption differ in whether they involve sharing of INDEX or LOCAL, stipulating in addition that their construal is achieved by the distinct features SLASH vs. RESUMP does not seem to contribute anything. Such a move seems to only state twice that there is a difference between resumption and dislocation, rendering this part of the theory redundant. The second reason is a conceptual one. One may capitalize on the fact that there are exactly two types of dependencies distinguished by the Irish complementizers.[9] In McCloskey's (2002) account, movement/dislocation is brought about by internal MERGE (i.e., move), while resumption results from AGREE. As MERGE and AGREE are the two fundamental operations in Minimalist syntax, an adherent of McCloskey's (2002) analysis might argue that the state of affairs in Irish receives a natural explanation in that it directly mirrors the basic operational inventory of Minimalist syntax. An HPSG account making use of a RESUMP-feature to encode one dependency and a second feature SLASH to encode another leaves it as an idiosyncratic property of Irish that its complementizers are sensitive to only two types of dependencies. After all, any number of features can be stipulated, so the co-existence of two features does not have any privileged status. If, on the other hand, the distinction between resumption and dislocation is represented only in the distinction between INDEX and LOCAL sharing—as we assume here—, then the situation in Irish receives an account along much the same lines as in the Minimalist reasoning above: Since sharing of the INDEX and LOCAL values are the *only* possible ways of forming nonlocal dependencies in HPSG, each of the Irish complementizers tracks down one mode of dependency formation. Thus, an account dispensing with the distinction between RESUMP and SLASH is immune to the conceptual criticism advanced above. Third, Borsley (2010) argues on the basis of the closely related language Welsh (which, incidentally, does not seem to have hybrid chains) that traces and resumptive pronouns behave alike for a variety of diagnostics. This leads him to conclude that both dependencies involve the SLASH mechanism. As there is no compelling reason to invoke a RESUMP feature in addition to SLASH in Irish, we take this to be an interesting convergence.

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[8]A distinction equivalent to INDEX vs. LOCAL sharing in LFG is used by Asudeh (2004).

[9]We are grateful to Robert Levine (p. c.) for raising this issue and discussing its ramifications with us.

4.1 Implementation 1: Switching by designated elements

4.1.1 The system

The first account we would like to propose is modelled fairly closely after McCloskey (2002). Switching between different dependencies is accomplished by traces and resumptive pronouns, which, in virtue of their LOCAL specification, may terminate dependencies and, as a consequence of their NONLOCAL value, initiate another dependency at the same time. These elements, reminiscent of the operators in McCloskey's (2002) analysis, act as linkers between the two dependencies. The specifications of resumptive pronouns and traces are given in (9). The resumptive pronoun in (9a) initiates a resumption dependency because of its INDEX-valued SLASH-feature. Analogously, the trace (9b) triggers a dislocation dependency because of its LOCAL-valued SLASH feature.

(9) a. *Resumptive pronoun*

$$
\begin{bmatrix}
\text{SYNSEM} & \begin{bmatrix} \text{LOCAL} & \begin{bmatrix} \text{CATEGORY} & \begin{bmatrix} \text{HEAD} & pron \end{bmatrix} \\ \text{CONTENT} & \begin{bmatrix} \text{INDEX} & \boxed{1} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\
\text{NONLOCAL} & \begin{bmatrix} \text{INH} & \begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{INDEX} & \{\boxed{1}\} \end{bmatrix} \end{bmatrix} \\ \text{TO-BIND} & \begin{bmatrix} \text{SLASH} & \{\} \end{bmatrix} \end{bmatrix}
\end{bmatrix}
$$

b. *Trace*

$$
\begin{bmatrix}
\text{SYNSEM} & \begin{bmatrix} \text{LOCAL} & \boxed{1} \end{bmatrix} \\
\text{NONLOCAL} & \begin{bmatrix} \text{INH} & \begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{LOCAL} & \{\boxed{1}\} \end{bmatrix} \end{bmatrix} \\ \text{TO-BIND} & \begin{bmatrix} \text{SLASH} & \{\} \end{bmatrix} \end{bmatrix}
\end{bmatrix}
$$

The percolation of the two types of dependencies is regulated by the *Nonlocal Feature Principle* (Pollard and Sag 1994, 164; also cf. Levine and Sag 2003).

(10) *Nonlocal Feature Principle*
For each nonlocal feature, the INHERITED value on the mother is the union of the INHERITED values on the daughters minus the TO-BIND value on the head daughter.

Finally, resumption and dislocation dependencies are terminated by means of the head-filler rules in (11). (11a) ends a resumption dependency (i.e., INDEX sharing); (11b) terminates a dislocation dependency (LOCAL sharing).

(11) *Head-Filler Rules*

a. (i) $X \rightarrow \begin{bmatrix} \text{LOC} \mid \text{CONT} \mid \text{INDEX} & \boxed{1} \end{bmatrix}, \text{CP} \begin{bmatrix} \text{INH} \mid \text{SLASH} \mid \text{INDEX} & \left\{ \boxed{1}, \dots \right\} \\ \text{TO-BIND} \mid \text{SLASH} \mid \text{INDEX} & \left\{ \boxed{1} \right\} \end{bmatrix}$

(ii) $\begin{bmatrix} \text{DTRS} & \begin{bmatrix} \text{FDTR} \mid \text{SS} \mid \text{LOC} \mid \text{CONT} \mid \text{INDEX} & \boxed{1} \\ \text{HDTR} \mid \text{SS} \mid \text{NLOC} & \begin{bmatrix} \text{INH} \mid \text{SLASH} \mid \text{INDEX} & \left\{ \boxed{1}, \dots \right\} \\ \text{TO-BIND} \mid \text{SLASH} \mid \text{INDEX} & \left\{ \boxed{1} \right\} \end{bmatrix} \end{bmatrix} \end{bmatrix}$

b. (i) $X \rightarrow \begin{bmatrix} \text{LOC} & \boxed{1} \end{bmatrix}, \text{CP} \begin{bmatrix} \text{INH} \mid \text{SLASH} \mid \text{LOC} & \left\{ \boxed{1}, \dots \right\} \\ \text{TO-BIND} \mid \text{SLASH} \mid \text{LOC} & \left\{ \boxed{1} \right\} \end{bmatrix}$

(ii) $\begin{bmatrix} \text{DTRS} & \begin{bmatrix} \text{FDTR} \mid \text{SS} \mid \text{LOC} & \boxed{1} \\ \text{HDTR} \mid \text{SS} \mid \text{NLOC} & \begin{bmatrix} \text{INH} \mid \text{SLASH} \mid \text{LOC} & \left\{ \boxed{1}, \dots \right\} \\ \text{TO-BIND} \mid \text{SLASH} \mid \text{LOC} & \left\{ \boxed{1} \right\} \end{bmatrix} \end{bmatrix} \end{bmatrix}$

(9), (10) and (11) condition the proper initiation, percolation, and termination of resumption and dislocation dependencies. The next step in our analysis is to give representations for the three complementizers in (1) that appropriately constrain their distribution. (12) provides the representations for *aL*, *aN* and *go*. The effect of (12a) is that *aL* is valid only if its VP sister contains a non-empty SLASH|LOCAL value, viz. if *aL* is crossed by a dislocation dependency. Conversely, *aN* is allowed by (12b) only if the VP's SLASH|INDEX value is a non-empty set, i.e. if *aN* is within the domain of a resumption dependency. Finally, *go* is illicit only if not in the domain of a dependency involving either LOCAL or INDEX sharing.[10]

(12) a. *Lexical entry of 'aL'*

$\begin{bmatrix} \text{PHON} & \langle aL \rangle \\ \text{SYNSEM} & \begin{bmatrix} \text{HEAD} & \text{C} \end{bmatrix} \\ \text{SUBCAT} & \left\langle \begin{matrix} \text{VP} \\ \begin{bmatrix} \text{INH} \mid \text{SLASH} \mid \text{LOC} & \textit{neset} \\ \text{INH} \mid \text{SLASH} \mid \text{INDEX} & \textit{eset} \end{bmatrix} \end{matrix} \right\rangle \end{bmatrix}$

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[10]As shown by the third pattern in (4), *go* may in fact appear within the range of a resumption dependency. This is at odds with the specification in (12c). We will ignore this problem for now but return to it in section 4.5.

b. *Lexical entry of 'aN'*

$$
\begin{bmatrix}
\text{PHON} & \langle aN \rangle \\
\text{SYNSEM} & \begin{bmatrix} \text{HEAD} & \text{C} \end{bmatrix} \\
\text{SUBCAT} & \left\langle \begin{bmatrix} \text{VP} \\ \text{INH}|\text{SLASH}|\text{LOC} & \textit{eset} \\ \text{INH}|\text{SLASH}|\text{INDEX} & \textit{neset} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

c. *Lexical entry of 'go'*

$$
\begin{bmatrix}
\text{PHON} & \langle go \rangle \\
\text{SYNSEM} & \begin{bmatrix} \text{HEAD} & \text{C} \end{bmatrix} \\
\text{SUBCAT} & \left\langle \begin{bmatrix} \text{VP} \\ \text{INH}|\text{SLASH}|\text{LOC} & \textit{eset} \\ \text{INH}|\text{SLASH}|\text{INDEX} & \textit{eset} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

As the last ingredient, a device is necessary to switch between different dependencies. No new elements have to be stipulated for that purpose. The lexical representations of resumptive pronouns and traces in (9), repeated in abbreviated forms as (13) below, may terminate one dependency and at the same time initiate another one. Crucially, these dependencies need not be of the same type, thus accounting for hybrid chains.

(13) *Dependency switchers* (= (9))

a.
$$
\begin{bmatrix}
\text{LOC} & \boxed{1}\begin{bmatrix} \text{CONT} & \begin{bmatrix} \text{INDEX} & \boxed{2} \end{bmatrix} \end{bmatrix} \\
\text{NLOC} & \begin{bmatrix} \text{INH} & \begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{INDEX} & \{\boxed{2}\} \end{bmatrix} \end{bmatrix} \end{bmatrix}
\end{bmatrix}
$$

b.
$$
\begin{bmatrix}
\text{LOC} & \boxed{2}\begin{bmatrix} \text{CONT} & \begin{bmatrix} \text{INDEX} & \boxed{1} \end{bmatrix} \end{bmatrix} \\
\text{NLOC} & \begin{bmatrix} \text{INH} & \begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{LOC} & \{\boxed{2}\} \end{bmatrix} \end{bmatrix} \end{bmatrix}
\end{bmatrix}
$$

(13a) is the normal resumptive pronoun (9a). Because of its LOCAL and INDEX specifiation it may terminate resumption and dislocation dependencies. Furthermore, as its NONLOCAL|INH|SLASH|INDEX value is non-empty, it starts a resumption dependency. In the same vein, the lexical trace in (13b) = (9b) may terminate resumptions and dislocation dependencies and launches a dislocation dependency, in virtue of its non-empty NONLOCAL|INH|SLASH|LOCAL value.

4.1.2 Example 1: aN ... aL

Having established the essential mechanisms of dependency formation, percolation and termination, we will illustrate the account on the basis of two examples instantiating patterns 1 and 2 of (4). Consider first the hybrid dependency in (14).

(14) rud   a   raibh dóchas láidir agam a   _ bhí fíor
     thing aN was   hope   strong at.me aL   was true
     'something that I strongly hoped was true'

The lower clause in (14) involves a dislocation, as is evident from the complementizer *aL*. The next higher clause involves resumption, marked by *aN*. Both dependencies combined yield an association of the (covert) relative pronoun with the trace in the lowest clause. Our analysis for the pattern in (14) is given in (15).

(15)

CP
$\left[\text{SLASH} \begin{bmatrix} \text{LOC} & \{\} \\ \text{IND} & \{\} \end{bmatrix} \right]$

- NP $\left[\text{LOC} \,|\, \text{IND} \quad \boxed{2} \right]$ — *rel*
- CP $\left[\text{SLASH} \begin{bmatrix} \text{IND} & \{\boxed{2}\} \end{bmatrix} \right]$
  - C — aN
  - VP $\left[\text{SLASH} \begin{bmatrix} \text{IND} & \{\boxed{2}\} \end{bmatrix} \right]$
    - V — raibh dóchas
    - láidir
    - agam
    - CP $\left[\text{SLASH} \begin{bmatrix} \text{IND} & \{\boxed{2}\} \end{bmatrix} \right]$
      - $\begin{bmatrix} \text{LOC} & \boxed{1} \begin{bmatrix} \text{CONT} \,|\, \text{IND} & \boxed{2} \end{bmatrix} \\ \text{NONLOC} & \begin{bmatrix} \text{INH} \,|\, \text{SLASH} \,|\, \text{IND} & \{\boxed{2}\} \end{bmatrix} \end{bmatrix}$ — (9a)/(13a)
      - CP $\begin{bmatrix} \text{INH} \,|\, \text{SLASH} \,|\, \text{LOC} & \{\boxed{1}\} \\ \text{TO-BIND} \,|\, \text{SLASH} \,|\, \text{LOC} & \{\boxed{1}\} \end{bmatrix}$
        - C — aL
        - VP $\left[\text{SLASH} \begin{bmatrix} \text{LOC} & \{\boxed{1}\} \end{bmatrix} \right]$
          - NP $\begin{bmatrix} \text{LOC} & \boxed{1} \\ \text{SLASH} \,|\, \text{LOC} & \{\boxed{1}\} \end{bmatrix}$ — (9b)/(13b)
          - V — bhí fíor

The lower clause in (15) contains a trace (9b), which initiates a dislocation dependency ([SLASH|LOCAL {□}]). The SLASH value is percolated upward in conformity with the Nonlocal Feature Principle (10). As a consequence, the VP sister of the complementizer contains a non-empty SLASH|LOCAL value. Consequently, out of the three complementizers in (12), only (12a) is licit, leading to selection of the *aL*-complementizer in the lower clause. The specifier of the lower CP is filled with a resumptive pronoun (9a). Because of its LOCAL tag □, it terminates the dislocation dependency. Note that this conforms to the head-filler rule in (11b). At the same time, the resumptive pronoun launches a resumption dependency ([SLASH|INDEX □]), which is itself percolated upward to the next higher C domain. Because the matrix VP node now contains a non-empty SLASH|INDEX, only the complementizer *aN* (12b) is valid. As the final step, the phonologically empty relative pronoun (*rel*) terminates the resumption dependency (by (11a)).[11]

As a result of the two formally distinct dependencies in (15) the INDEX value of the relative pronoun is, by transitivity, shared with the INDEX value of the trace in the lowest clause, a result of the fact that, because the resumptive pronoun (9a) in Spec,CP of the lower clause, the INDEX tag □ is construed as part of the LOCAL value □.
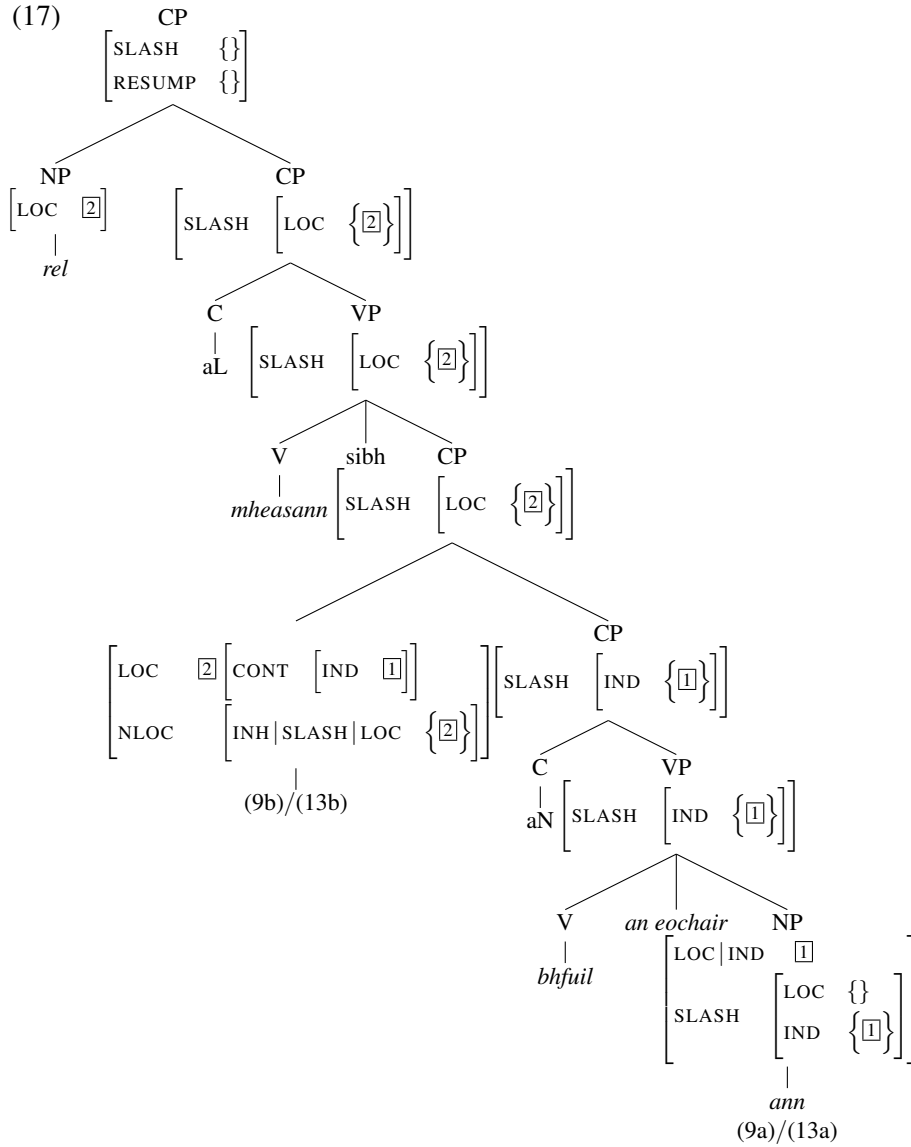
4.1.3 Example 2: aL . . . aN

A reverse instance of a hybrid chain is given in (16). Here the lower clause involves a resumption dependency; hence the complementizer appears as *aN*. The higher clause invokes dislocation, visible by the complementizer form *aL*. We propose the analysis in (17). [12]

(16) an doras a   mheasann sibh a   bhfuil an eochair ann
      the door aL think   you aN is   the key   in.it
      'the door that you think the key is in'

---

[11]Of course, the relative pronoun has itself to be associated with the head noun *rud* 'thing'. We will abstract away from this step here, noting that it may be straightforwardly implemented by INDEX sharing along the lines proposed by Pollard and Sag (1994).

[12]Strictly speaking, *ann* 'in.it' is a PP containing the resumptive pronoun. For simplicity, the structure in (17) abstracts a way from this and treats it as an NP. Nothing hinges on this.

(17)

$$
\begin{array}{c}
\text{CP} \\
\begin{bmatrix} \text{SLASH} & \{\} \\ \text{RESUMP} & \{\} \end{bmatrix}
\end{array}
$$

NP $\begin{bmatrix} \text{LOC} & \boxed{2} \end{bmatrix}$ — *rel*

CP $\begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{LOC} & \{\boxed{2}\} \end{bmatrix} \end{bmatrix}$

C — *aL*

VP $\begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{LOC} & \{\boxed{2}\} \end{bmatrix} \end{bmatrix}$

V — *mheasann*

sibh

CP $\begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{LOC} & \{\boxed{2}\} \end{bmatrix} \end{bmatrix}$

$\begin{bmatrix} \text{LOC} & \boxed{2} \begin{bmatrix} \text{CONT} & \begin{bmatrix} \text{IND} & \boxed{1} \end{bmatrix} \end{bmatrix} \\ \text{NLOC} & \begin{bmatrix} \text{INH} \,|\, \text{SLASH} \,|\, \text{LOC} & \{\boxed{2}\} \end{bmatrix} \end{bmatrix}$

(9b)/(13b)

CP $\begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{IND} & \{\boxed{1}\} \end{bmatrix} \end{bmatrix}$

C — *aN* $\begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{IND} & \{\boxed{1}\} \end{bmatrix} \end{bmatrix}$

VP $\begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{IND} & \{\boxed{1}\} \end{bmatrix} \end{bmatrix}$

V — *bhfuil*

an eochair

NP $\begin{bmatrix} \text{LOC} \,|\, \text{IND} & \boxed{1} \\ \text{SLASH} & \begin{bmatrix} \text{LOC} & \{\} \\ \text{IND} & \{\boxed{1}\} \end{bmatrix} \end{bmatrix}$ — *ann*

(9a)/(13a)

In (17) the lower clause contains a resumptive pronoun (9a), which initiates a resumption dependency ([SLASH|INDEX $\boxed{1}$]). As a consequence, the VP node comprises a non-empty value of SLASH|INDEX, and hence only the complementizer *aN* is allowed. The specifier of the lower C is occupied by a trace (cf. (9b)), which terminates the resumption dependency and initiates a dislocation dependency ([SLASH|LOCAL $\boxed{2}$]). Consequently, only the complementizer *aL* may be used in the higher clause. Finally, a relative pronoun acts as the filler for the dislocation dependency.

As in the previous example, (17) involves two separate dependencies which, by transitivity, link properties of the filler of the higher dependency with the initiator of the lower dependency. Thus, in (17), the INDEX value of the relative pronoun is

shared with the resumptive pronoun in the lower clause, because the LOCAL value ② contains the INDEX value ① (by the trace (9b)).

4.2 Implementation 2: Generalized switching

The analysis proposed in the preceding section makes use of special elements in Spec,CP that act as switchers between different dependencies, fairly in line with McCloskey's (2002) original analysis. In this section, we will explore an alternative based on the trace-less framework suggested by Bouma et al. (2001). The basic idea is that a shift in dependency-type could in principle also be brought about by a modification of Bouma et al.'s (2001) mechanism of *Slash Amalgamation*. The fundamental difference to the analysis above is that there are no designated switching elements. Rather, the possibility of switching is hard-wired in the percolation mechanism itself.

In contrast to the analysis above, resumption and dislocation dependencies are not introduced by phonologically empty elements but by *Slash Amalgamation* (18), adapted from Bouma et al. (2001, 20). As (18b) restricts the PERC tag in (18a) to values of LOCAL or INDEX, PERC acts as a variable over LOCAL and INDEX. As a consequence of (18), the SLASH tag of a lexical head need not be of the same type as the one of its dependent. Thus, by (18b), ① and ② in (18a) might mismatch.

(18) *Slash Amalgamation*

a. $word \Rightarrow \begin{bmatrix} \text{LOC} & \begin{bmatrix} \text{DEPS} & \begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{PERC} & \{①, \dots\} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \text{SLASH} & \begin{bmatrix} \text{PERC} & \{②, \dots\} \end{bmatrix} \end{bmatrix}$

b. ① $\begin{bmatrix} \text{CONT} | \text{INDEX} & ② \end{bmatrix}$

$\vee$ ② $\begin{bmatrix} \text{CONT} | \text{INDEX} & ① \end{bmatrix}$

$\vee$ ① $=$ ②

Percolation along head projections is restricted by *Slash Inheritance* (19).

(19) *Slash Inheritance*

$hd\text{-}val\text{-}ph \Rightarrow \begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{PERC} & \{①, \dots\} \end{bmatrix} \\ \text{HD-DTR} & \begin{bmatrix} \text{SLASH} & \begin{bmatrix} \text{PERC} & \{①, \dots\} \end{bmatrix} \end{bmatrix} \end{bmatrix}$

The termination of dependencies as well as the representation of the complementizers are as in the analysis above (i.e., conditioned by (11) and (12)).

4.3 Comparison: Punctuated vs. uniform paths

The two conceivable approaches in sections 4.1 and 4.2 differ along a crucial dimension: The first implementation, making use of designated switching elements (viz., traces and resumptive pronouns), is *punctuated* in the sense of Abels and Bentzen (to appear): Switching is possible in distinguished positions only—those that allow to generate the appropriate element. In effect, switching is allowed only within the C domain, as only the specifier of C may host a trace or resumptive pronoun (apart, of course, from the lowermost position as complement of V). The second implementation (slash amalgamation), on the other hand, is *uniform*: Switching is in principle available at any phrasal level (by (18)). No projection is privileged in this respect over other projections. While both accounts are conceivable, the empirical facts in Irish favor the punctuated analysis.

Dislocation and resumption dependencies differ with respect to their locality (cf. fn. 4). Strong islands may be crossed by resumption, but are opaque for dislocation. If paths are uniform, the following representation is conceivable: An island boundary is crossed via a resumption dependency ([SLASH|INDEX ⒈]); immediately above the island boundary, but still below the next higher C head, the resumption dependency could be turned into a dislocation dependency ([SLASH|LOCAL ⒈]) and perlocated to the next C. This generates *aL* right above an island, which is incorrect. Only *aN* is possible in this environment.

We thus conclude that switching must not be permitted everywhere, but systematically restricted to a proper subset of all projections. Punctuated paths are therefore to be preferred empirically. This renders implementation 1 the superior one.

4.4 Double-flick chains

The two instances of hybrid chains discussed here involved exactly two clauses, each with its own dependency type (cf. (14), (16)). All examples discussed so far thus involve one instance of dependency switching. In principle, both analyses developed above allow for structures with a change from one type of dependency to another one and back again (20a,b). Empirically, it is not clear whether this is possible.

(20) *Double-flick chains*
    a. [$_{CP}$ aL ... [$_{CP}$ aN ... [$_{CP}$ aL ... t]]]
    b. [$_{CP}$ aN ... [$_{CP}$ aL ... [$_{CP}$ aN ... pro]]]

Regardless of the grammaticality status of the chains in (20), it is sufficient for our purposes to note that the same prediction is made under McCloskey's (2002) analysis. To see this, consider the abstract derivations in (21) and (22).

(21) *Derivation of (20a)*

① $[_{CP}\ op_i\ \text{aN}\ldots[_{CP}\ op_i\ \text{aL}\ldots\text{t}_i\ ]] \rightarrow$ ...
② $[_{CP}\ \text{C}\ldots[_{CP}\ op_i\ \text{aN}\ldots[_{CP}\ op_i\ \text{aL}\ldots\text{t}_i\ ]]] \rightarrow$ Move *op*
③ $[_{CP}\ op_i\ \text{aL}\ldots[_{CP}\ \text{t}_i\ \text{aN}\ldots[_{CP}\ op_i\ \text{aL}\ldots\text{t}_i\ ]]]$

(22) *Derivation of (20b)*

① $[_{CP}\ op_i\ \text{aL}\ldots[_{CP}\ \text{t}_i\ \text{aN}\ldots\text{pro}_i\ ]] \rightarrow$ ...
② $[_{CP}\ \text{C}\ldots[_{CP}\ op_i\ \text{aL}\ldots[_{CP}\ \text{t}_i\ \text{aN}\ldots\text{pro}_i\ ]]] \rightarrow$ Merge *op*
③ $[_{CP}\ op_i\ \text{aN}\ldots[_{CP}\ op_i\ \text{aL}\ldots[_{CP}\ \text{t}_i\ \text{aN}\ldots\text{pro}_i\ ]]]$

The first representation in (21) is the last representation of (8) above. Instead of terminating the dependencies, an additional clause is built on top of the CP. Movement of *op* targets the specifier of the highest CP, leading to *aL*-marking in the highest clause and thereby generating (20a). Analogous reasoning holds for (22), which is a straightforward continuation of (7).

The double-flick chains in (20) can thus be generated in representational and derivational frameworks alike. Regardless of their status, they do not distinguish between the two approaches. Hence, no argument for or against either account can be constructed on the basis of double-flick chains.

4.5 Points of divergence

The implementation proposed in section 4.1 is modelled on the basis of McCloskey's (2002) analysis outlined in section 3. Like McCloskey's (2002) derivational treatment, it makes use of special switching elements in Spec,CP that function as the head and the tail of dependencies. As argued in the previous section, the HPSG analysis accounts for the same set of data as McCloskey's (2002) account. Upon closer inspection, however, some non-trivial differences between the two accounts manifest themselves. In this section we will highlight two such discrepancies and argue that the empirical facts pose problems for both accounts.

Consider first the example (23). (23) contains a reason adverbial in Spec,CP. Interestingly, only *aN* is possible here; *aL* is ruled out.

(23) Cén fáth a-r / *a dúirt tú sin?
    what reason aN-PAST aL said you that
    'Why did you say that?'

McCloskey (2002) accounts for this pattern by assuming, following Rizzi (1990), that reason adverbials are base-generated in Spec,CP. Thus, (23) does not contain a resumptive pronoun. Nevertheless, we receive *aN*-marking. Though apparently surprising, this observation in fact follows from McCloskey's (2002) analysis without further ado. The reason is that in McCloskey's treatment the complementizers *aL* and *aN* are not sensitive to the presence of a dislocation or resumption dependency *per se*. Rather, their distribution is conditioned by the structure-building EPP- and OP-features. Crucially, these features may also be active in structures not containing

dislocation or resumption dependencies. The C head in (23) contains an EPP-feature triggering MERGE of the reason adverbial in Spec,CP. The clause does not contain a resumptive pronoun but *aN* is nevertheless licit as a consequence of the bare EPP-feature on C.

This observation reveals a fundamental difference between McCloskey's (2002) account and ours. In our treatment, it is the dependencies themselves which condition the distribution of the complementizers. Empirically, however, neither conception is clearly favored over the other, as argued below. Both accounts thus have to resort to additional stipulations to accommodate the range of facts. Therefore, neither account is inherently superior.

Not all adjuncts behave like reason adverbs. Others, e.g., locatives, manner adverbials, and temporals allow both *aN* and *aL* in free alternation. Duratives and frequency adverbials are compatible only with *aL* (for examples see McCloskey, 2002, 208f.). Hence the following picture emerges: Some adjuncts allow both *aN* and *aL*, while others allow only the former and a third group only the latter. It appears that, regardless of the framework employed, these differences have to be merely stipulated. McCloskey (2002) is forced to stipulate that duratives and frequency adverbials may not bind a resumptive pronoun, while locative, manner adverbials, and temporals may do so. Likewise, it is a matter of stipulation that reason adverbials have to be base-generated in Spec,CP and may not, like other adverbials, target this position by movement.

In a similar vein, one may stipulate in the present framework that reason adverbials are licit only if they bind a resumptive pronoun. Conversely, duratives and frequency adverbials are licit in Spec,CP only if they head a dislocation dependency. Finally, locatives, manner adverbials, and temporals may use either strategy. While the emerging analyses subtly differ from McCloskey's (2002), all else being equal there is little reason to prefer one over the other.

The second point of difference between the analyses under discussion concerns the remaining hybrid pattern in (4c). The empirical generalization behind that pattern is that *aN* appears as the topmost complementizer, while all lower C heads are realized as *go* (McCloskey, 2002, 190). (24) exemplifies this pattern.

(24)   [CP aN ... [CP go ... pro]]
       fir   *ar* shíl   Aturnae an Stáit *go* rabh siad díleas do'n   Rí
       men *aN* thought Attorney the State *go* were they loyal to-the King
       'men that the Attorney General thought were loyal to the King'

At first glance, this pattern seems to support McCloskey's (2002) analysis. The reason is the same as above: For McCloskey (2002) it is not the resumption dependency itself that leads to *aN*-marking but rather the EPP-property of the C heads that merges with the operator. Under the assumption that resumption need not proceed successive-cyclically, only the highest clause may contain such an EPP-property, which binds the resumptive pronoun in the lowermost clause. Because all interven-

ing C projections thus do not contain any operator (in fact, no specifier at all), it is unsurprising that *aN* appears only in the highest clause.

No such account of (24) is forthcoming under the HPSG account suggested in section 4.1. Recall that in our treatment it is the resumption dependency itself that leads to *aN*-marking. Since in (24) the head noun obviously enters a resumption dependency with an element in the lowest clause, the crucial feature SLASH|INDEX has to be present on all intermediate heads, including all C heads. As a consequence, the HPSG system in section 4.1 does not generate (24), but only its alternative with *aN* occurring in all complementizer positions. It thus seems that McCloskey's (2002) analysis is preferable on empirical grounds.

This advantage of derivational approaches is, however, only apparent. According to the empirical generalization laid out by McCloskey (2002), if there is a *go* along the path of a resumption dependency, then only the highest complementizer may take the form *aN*. It is thus not possible to have a bottom-up sequence of complementizers involving, e.g., an arbitrary number of *go*'s, followed by one instance of *aN*, followed again by various *go*'s, and terminated by a second *aN*. However, given that certain elements may act as operators and variables at the same time—which, recall, is McCloskey's (2002) core assumption to account for hybrid chains—such a pattern is readily generated in the system of McCloskey (2002), but not in the HPSG analysis developed here. It thus emerges that both the Minimalist account as well as the HPSG analysis make predictions which are not borne out empirically, albeit in different directions. While McCloskey's (2002) analysis seems too permissive, the HPSG analysis is too restrictive. This is, after all, an interesting result. There is, however, no reason to prefer one framework over the other. Both are in need of additional stipulations to accomodate the properties of the hybrid chains of type (4c). The range of empirical facts is thus no more readily derived in one particular theory.

5   Conclusion

In this paper we have evaluated Huybregts's (2009) claim that hybrid dependencies in Irish favor derivational approaches to syntax over representational ones. We concluded that this claim is erroneous. Both McCloskey's theory and the analysis proposed here can account for hybrid chains. Therefore, no argument against either of the two families of approaches can be made on the basis of the Irish data. We have demonstrated the adequacy of HPSG to model the Irish facts by suggesting two analyses, one making use of punctuated paths, the other one employing uniform paths. Closer inspection reveals that hybrid chains favor analyses in terms of punctuated paths. This is an important result, however, it is orthogonal to the issue of derivational vs. representational accounts. All things equal, theories that are expressive enough to generate hybrid chains will also generate double-flick chains. Again, this property is shared by both representational and derivational accounts, and thus orthogonal to the distinction. We concluded the paper by identifying a

crucial difference between the derivational and representational accounts. As far as this point is concerned, the Minimalist analysis and the HPSG treatment make distinct empirical predictions. First of all, this makes it clear that the two accounts are not notational variants of each other, despite their resemblance. Second, we argued that neither predictions are fully borne out. Both accounts need additional assumptions in order to extended to patterns not considered here. By itself, no framework is empirically preferred. In sum, Huybregts's (2009) claim that the Irish data clearly favor derivational over representational syntactic frameworks cannot be upheld.

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