Non-identical pronoun doubling as rescue by PF spell out

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This paper proposes a novel account of non-identical pronoun doubling in Dutch long-distance A-bar dependencies – specifically wh-questions and restrictive relative clauses – that features the pronoun wat in the higher clause and the pronoun wie or die in the lower clause. Assuming that A-bar pronouns have internal structure, I argue that such non-identical doubling is the result of subextraction of part of the pronoun, namely the operator in its specifier position. This operator is subextracted from the A-bar pronoun in the lower SpecCP and spelled out in its final landing site, the higher SpecCP. The subextracted operator is spelled out as wat by default – wat being the most underspecified A-bar pronoun in Dutch. The A-bar pronoun that is left behind by subextraction is spelled out as well (as wie or die), for reasons of recoverability and in order to overcome an otherwise illicit step in the derivation: rescue by PF spell out.¹

1. Introduction

In Standard Dutch long-distance wh-questions (wh-Qs) and restrictive relative clauses (RCs), an interrogative/relative pronoun (henceforth A-bar pronoun, following van Kampen 1997 and later work) introduces the higher clause, whereas the finite declarative complementizer dat ‘that’ introduces the lower clause. This is illustrated in (1) and (2) for a long-distance root wh-Q that questions a person (wie ‘who’), and for a long-distance RC with the common gender human antecedent man ‘man’ respectively.²

(1) Wie denk je dat het gedaan heeft?
   who think you that it done has
   ‘Who do you think has done it?’ [Standard Dutch]

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¹This paper is an abridged version of parts of chapter 2 from my Ph.D. thesis (Boef forthcoming).
²I follow common practice and gloss the element die as relative pronoun (RP), but this in no way means that I take a clause that is introduced by die to always be a RC, nor does it mean that I take die to only be able to function as a relative pronoun.
(2) Dat is de man die ik denk dat het gedaan heeft.
that is the man RP I think that it done has
‘That is the man who I think has done it.’ [Standard Dutch]

It is well known that colloquial Dutch allows doubling of the A-bar pronoun (cf. Barbiers et al. 2009; Boef 2012 a.o.). The higher as well as the lower clause of a wh-Q or RC can be introduced by an A-bar pronoun, as illustrated for identical doubling in (3) and (4).3,4

(3) Wie denk je die het gedaan heeft?
who think you who it done has
‘Who do you think has done it?’ [colloquial Dutch]

(4) Dat is de man die ik denk die het gedaan heeft.
that is the man RP I think RP it done has
‘That is the man who I think has done it.’ [colloquial Dutch]

I take all long A-bar dependencies to be derived by successive-cyclic movement via SpecCP of the A-bar pronoun. I thus assume a direct dependency approach for wh-Qs (cf. McDaniel 1989; Barbiers et al. 2009 a.o.) and a Head External Analysis for RCs (cf. Quine 1960; Chomsky 1977; Smits 1988; Borsley 1997 a.o.; see Webelhuth 2011; Boef 2012, forthcoming for a recent overview of arguments in favor of this claim). I assume that for linearization purposes, all copies but the highest copy of the A-bar pronoun must delete at PF, cf. Nunes (2004).5 This is illustrated in (5) – where strikethrough indicates PF deletion/non-realization – and exemplified by the Standard Dutch examples in (1) and (2).

(5) \[ [CP \text{pronoun}_1 \ldots [CP \text{pronoun}_r \ldots \text{pronoun}_s \ldots ] ] \] no doubling

I assume that in certain cases the intermediate copy of the A-bar pronoun in the embedded SpecCP may escape this linearization requirement, as a consequence of which it can be

3The doubling data in this paper are taken from the SAND corpus (Barbiers et al. 2005, 2008) and from two large scale online questionnaire studies: the Meertens Panel Questionnaire (MPQ) data (cf. Boef forthcoming for details).

4As the MPQ data show that the doubling patterns in long-distance embedded wh-Qs – e.g. Ze vroeg wie jij denkt dat het gedaan heeft ‘She asked who you think has done it’ – are identical to the doubling patterns in root wh-Qs (as attested in the SAND corpus), I will not distinguish between the two constructions in this paper. For ease of exposition, all doubling patterns will be presented in root wh-Qs.

5Nunes (2004) argues that every link in a movement chain is computed for linearization in accordance with Kayne’s (1994) Linear Correspondence Axiom (LCA). According to the LCA a node A precedes a node B if and only if A asymmetrically c-commands B; in which asymmetric c-command is defined as follows: X asymmetrically c-commands Y if and only if X c-commands Y and Y does not c-command X (Kayne 1994:4). Under the assumption that two copies of one and the same element count as identical for linearization purposes (i.e. they are non-distinct), it follows that it is impossible to linearize structures containing identical copies, because an element intervening between two copies should simultaneously follow and precede the same element, which is logically impossible. Nunes (2004) accounts for the observation that in most cases the highest copy in a movement chain gets pronounced by arguing that in the standard case the copy with the most formal features checked gets phonetically realized, i.e. the choice for which copy in a movement chain is pronounced is governed by economy considerations.
spelled out, in addition to the head of the chain (cf. Nunes 2004; Barbiers et al. 2009 for details). This results in *identical doubling*, as illustrated in (6) and exemplified by the colloquial Dutch examples in (3) and (4).

\[(6) \quad [CP \text{pronoun}_1 \ldots [CP \text{pronoun}_1 \ldots \text{pronoun}_1 \ldots ]]\]

multiple copy spell out: *identical doubling*

This paper is not in the first place concerned with *identical* pronoun doubling, but rather with *non-identical* pronoun doubling involving the A-bar pronoun *wat* ‘what’ in the higher clause and the ‘real’ A-bar pronoun *wie or die* in the lower clause. This is illustrated in (7) and (8) for a root *wh-Q* that questions a person and for a RC with the neuter gender human antecedent *meisje* ‘girl’ respectively.\(^6\)\(^7\) In the realm of non-identical doubling involving *wat*, I am only concerned with RCs to the neuter gender human antecedent *meisje*. The reason for this is that neuter antecedents independently allow *wat* as a relative pronoun, whereas *wat* as a relative pronoun hardly ever occurs with common gender human antecedents like *man* ‘man’.\(^8\)

\[\text{(7) } \text{Wat} \text{ denk je } \text{wie/die} \text{ het gedaan heeft?}
\text{ what think you who/RP it done has}
\text{‘Who do you think has done it?’} \quad \text{[colloquial Dutch]}\]

\[\text{(8) } \text{Dat is het meisje } \text{wat} \text{ ik denk } <\text{die/??wie}> \text{ het gedaan heeft.}
\text{ that is the girl what I think RP/who it done has}
\text{‘That is the girl who I think has done it.’} \quad \text{[colloquial Dutch]}\]

The opposite patterns of (7) and (8) – namely doubling patterns in which *wat* surfaces in the lower clause, whereas *wie* or *die* introduces the higher clause – are not or only very marginally attested (see Boef forthcoming for details). This is illustrated in (9) and (10).

\[\text{(9) } <??\text{Wie/??die}> \text{ denk je } \text{wat} \text{ het gedaan heeft?}
\text{ who/RP think you what it done has}
\text{INTENDED: ‘Who do you think has done it?’}\]

\[\text{(10) } ??\text{Dat is het meisje die ik denk } \text{wat} \text{ het gedaan heeft.}
\text{ that is the girl RP I think what it done has}
\text{INTENDED: ‘That is the girl who I think has done it.’}\]

\(^6\)The construction in (7) with a *wh*-pronoun in the lower clause (i.e. *wat-wie*) is traditionally referred to as ‘partial *wh*-movement’ or ‘*wh*-scope marking’ (cf. Lutz et al. 2000; Felser 2001; Fanselow 2006 for an overview of different analyses of *wh*-scope marking).

\(^7\)The data regarding non-identical doubling in RCs with the neuter gender human antecedent *meisje* are not completely clear (see Boef forthcoming for details and discussion). Especially the status of doubling pattern *wat-wie* is somewhat unclear, as indicated by ?? in (8) (this pattern seems to be only marginally attested, which is most likely due to the observation that *wie* is not commonly used as a relative pronoun to the antecedent *meisje*). Therefore, I will not further be concerned with this doubling pattern (nor with its mirror image *wie-wat*). Needless to say, further empirical research is necessary in order to determine the exact status of non-identical doubling patterns in RCs (with the antecedent *meisje*).

\(^8\)There seems to be a matching requirement between the RC head and the pronoun in the left periphery of the RC.
I will argue that the internal structure of A-bar pronouns includes an operator – located in the specifier of the pronoun – that can move up by itself, and becomes PF visible when it does so. I will refer to this scenario as subextraction of the operator (i.e. the lack of pied piping of the full pronoun; subextraction and pied piping are two sides of the same coin). The subextracted operator is spelled out in its final landing site as wat ‘what’ – wat being the most underspecified A-bar pronoun in Dutch (cf. Postma 1994; Bennis 1995 a.o.). Since deletion of the pronoun that is left behind by subextraction of the operator in the lower SpecCP would lead to a recoverability problem, it needs to be spelled out. I argue that in doing so, a violation of the Condition on Extraction Domain (CED, Huang 1982) or the Freezing Principle (Wexler & Culicover 1980) is circumvented. This particular means to salvage an otherwise illicit step in the derivation (cf. van Craenbroeck & van Koppen 2008), I will refer to as rescue by PF spell out – the logical counterpart of rescue by PF deletion (Bošković 2011). Seeing as spell out of the pronoun subsumes spell out of the operator (i.e. I take A-bar pronouns to spell out phrases, cf. Weerman & Evers-Vermeul 2002; Barbiers et al. 2009 a.o.), the intermediate chain link will surface as a full pronoun, as illustrated in (11).

\[
\text{(11) } \left[ \text{CP operator}_1 \ldots \left[ \text{CP pronoun}_1 \ldots \text{pronoun} \ldots \right] \right]
\]

subextraction plus double spell out: non-identical doubling

The organization of this paper is as follows. The next section makes explicit my assumptions about the internal structure and feature specification of the relevant A-bar pronouns (wat, wie and die). Section 3 proceeds with the analysis of non-identical doubling by presenting my assumptions about the notions subextraction and lexicalization, and section 4 focuses in detail on the nature of the rescue by PF spell out mechanism. As my analysis of doubling in Dutch long-distance A-bar dependencies builds and improves on the analysis of doubling in Dutch long-distance root wh-Qs as proposed by Barbiers, Koeneman & Lekakou (2009), section 5 briefly discusses this analysis of doubling and shows why it does not extend to cover doubling in RCs, in contrast to my analysis. Finally, section 6 gives a summary and concludes the paper.

2. The internal structure of A-bar pronouns

I follow a large body of literature and assume that pronouns have internal structure (e.g. Cardinaletti 1994; Ritter 1995; Wiltschko 1998; Cardinaletti & Starke 1999; Koopman 1999; Harley & Ritter 2002; Déchaine & Wiltschko 2002; Wiltschko 2002; Rooryck 2003; van Koppen 2005), and that pronouns spell out phrases/non-terminals (cf. Weerman & Evers-Vermeul 2002; Neeleman & Szendröi 2007; Barbiers et al. 2009 a.o.). The structure of the relevant A-bar pronouns (wat, wie and die) that I assume is given in (12).
(12) The structure of A-bar pronouns

\[
\begin{array}{c}
DP = \text{wat, wie, die} \\
\text{operator} D' \\
D^0 \Phi P \\
\Phi^0 \text{NP} \\
\emptyset
\end{array}
\]

Taking A-bar pronouns to be DPs is compatible with the fact that in RCs the gap inside the RC – where the relative pronoun arguably originates under a Head External Analysis of RCs – acts as a DP (see e.g. Borsley 1997). The fact that wat, wie and die may all function as relative pronouns thus suggests that they are indeed DPs. Further evidence in favor of the claim that A-bar pronouns are DPs, comes from binding. That is, if A-bar pronouns are pro-DPs in the sense of Déchaine & Wiltschko (2002), they should function as R-expressions with respect to binding. This prediction is borne out, as illustrated in (13) for the A-bar pronoun die: die is subject to Condition C (13a), and it does not allow for a bound variable interpretation (13b).\(^9\)

(13) a. Jan, denkt dat waarschijnlijk die\(_{i/j}\) de wedstrijd zal winnen.
   ‘Jan thinks that probably that the game will win’

b. Iedere jongen, denkt dat die vrouw die\(_{i/j}\) aantrekkelijk vindt.
   ‘Every boy thinks that that woman finds him attractive.’

[Corver & van Koppen 2008:10]

Suggestive evidence in favor of the DP status of wh-pronouns in Dutch comes from the categorial matching effect in free relative clauses (FRCs, cf. Groos & van Riemsdijk 1981; van Riemsdijk 2006 a.o.). This effect requires the categorial status of the wh-phrase in the left periphery of the FRC to be identical to the categorial status of the whole FRC as required by the matrix clause. This is illustrated by the paradigm in (14). The adjective verliefd ‘in love’ selects for a PP and only in case the wh-phrase introducing the FRC is a PP is the structure grammatical: (14a) vs. (14c). Similarly, the verb kussen ‘to kiss’ selects for a DP and only when the wh-phrase in the left periphery of the FRC is a DP is the structure grammatical: (14b) vs. (14d). In the sentences in (15), the FRC as a whole acts as a DP, i.e. it occurs in a position otherwise restricted to a DP argument. Following the logic above, this means that the wh-phrase introducing the FRC must be a DP as well.

\(^9\)The binding theoretic status of wh-pronouns cannot be tested.
(14)  a. Jan is verliefd [\(PP\) [\(PP\) op wie] Kees verliefd is t\(PP\)].
Jan is in love on who Kees in love is
‘Jan is in love with who(ever) Kees is in love.’
b. Jan wil kussen [DP [DP wie] Kees kust t\(DP\)].
Jan wants kiss who Kees kisses
‘Jan wants to kiss who(ever) Kees kisses.’
c. *Jan is verliefd [\(PP\) [DP wie] Kees kust t\(DP\)].
Jan is in love who Kees kisses
d. ?*Jan wil kussen [DP [PP op wie] Kees verliefd is t\(PP\)].
Jan wants kiss on who Kees in love is

(15) a. Ik eet [DP wat jij eet].
I eat what you eat
‘I eat what(ever) you eat.’
b. Jan interviewt [DP wie Kees interviewt].
Jan interviews who Kees interviews
‘Jan interviews who(ever) Kees interviews.’

A-bar pronouns have a DP layer in which (in)definiteness is expressed and a PhiP layer in which phi-features are expressed. Moreover, A-bar pronouns contain an operator that is the driving force behind movement to the left periphery. This operator is located in the SpecDP position, cf. Szabolcsi (1994) a.o. who argues that the specifier of DP is an operator position. This fits in perfectly with the often noted parallelism between DP and CP (cf. Szabolcsi 1987, 1994; Cardinaletti & Starke 1999; Haegeman & Üröldi 2010 amongst many others), as SpecCP is the designated position for operator movement in the clausal domain.

As regards the feature specification of the A-bar pronouns \(wat\), \(wie\) and \(die\), I oversimplify a bit, because the precise feature specifications (and lexicalization possibilities) of these pronouns are irrelevant in the context of this paper (but see Boef forthcoming for details). I take the observation that these pronouns can have more than one function and may appear in more than one syntactic configuration – e.g. \(wie\) can function as a relative pronoun \(and\) as an interrogative pronoun – to mean that these A-bar pronouns are morphosyntactically \(underspecified\) (i.e. I assume an underspecification approach to ‘multipurpose pronouns’, cf. Postma 1994; Rooryck 2003 a.o.). More specifically, I assume – following existing literature – that \(wat\) is completely underspecified (cf. Postma 1994; Bennis 1995; Barbiers et al. 2009), and that whereas pronouns \(wie\) and \(die\) are fairly underspecified as well, they are (at least) specified as \(human\). Pronouns \(wie\) and \(die\) are crucially \(not\) in a subset/superset relation (in contrast to what is assumed by Barbiers et al. 2009, cf. section 5). I furthermore assume that all A-bar pronouns contain an operator. A \(late\ insertion\) model of morphology (e.g. \(Distributed\ Morphology\), cf. Halle & Marantz 1993, Halle & Marantz 1994, Harley & Noyer 1999) – according to which phonological and morphological information becomes available only \(after\) the syntactic component finished the derivation – can account for the observation that (for some speakers) pronouns \(wie\)
and die are interchangeable in RCs with a human antecedent and in wh-Qs that question a person: both pronouns are equally compatible with the structure (containing a [human] feature) that has to be lexicalized. Only in the higher clause of a wh-Q can pronoun die (and non-wh-pronouns more generally) not occur. I argue this is due to a wh-requirement on the introduction of wh-Qs.

3. Subextraction and spell out

Following in part a proposal by Barbiers et al. (2009), I assume that syntactic copying can be partial (cf. section 5, and see also Cheng 2000 a.o.). That is to say, instead of copying a full constituent (full copying), the syntactic operation copying may also target a subconstituent and (re)merge it in a higher position. In the structure of A-bar pronouns as proposed above, this means that copying can either target the whole DP or a subpart of it, namely the operator in SpecDP. Put differently, seeing as the operator is the driving force behind movement to the left periphery, either it moves by itself (subextraction) or it pied pipes the entire DP. The reason why both DP and the operator in SpecDP can be the target for copying, is that in their position in the lower SpecCP, they are equally local to the higher SpecCP (cf. equidistance, Chomsky 1995). Since spell out of a copy in thematic base position is impossible (for whatever reason, cf. Nunes 2004; Thoms 2010 o.a. for some discussion on wh-copies), subextraction of the operator from an A-bar pronoun in base position leads to a recoverability problem. Subextraction of the operator thus only targets elements in SpecCP (cf. infra for some discussion).

At the point at which the operator inside the pronoun at the edge of the lower CP domain needs to move up, two possibilities emerge: either the whole pronoun (containing the operator that triggers movement) moves up (pied piping), or only the operator itself moves up (subextraction). The two possible chains that we are left with are given in (16).

\[
\text{(16) a. } [CP \text{ pronoun}_1 \ldots [CP \text{ pronoun}_1 \ldots \text{ pronoun}_1 \ldots ] ] \\
\text{full copying} \\
\text{b. } [CP \text{ operator}_1 \ldots [CP \text{ pronoun}_1 \ldots \text{ pronoun}_1 \ldots ] ] \\
\text{subextraction}
\]

As was pointed out in the introduction to this paper, the chain in (16a) can result either in the spell out of the highest chain link (no doubling), or in the spell out of the highest and the intermediate chain link (identical doubling, cf. Nunes 2004; Barbiers et al. 2009). This is repeated here in (17).

\[
\text{(17) a. } [CP \text{ pronoun}_1 \ldots [CP \text{ pronoun}_1 \ldots \text{ pronoun}_1 \ldots ] ] \\
\text{no doubling (}= (5)) \\
\text{b. } [CP \text{ pronoun}_1 \ldots [CP \text{ pronoun}_1 \ldots \text{ pronoun}_1 \ldots ] ] \\
\text{identical doubling (}= (6))
\]

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10 Where equally local is formulated as follows: Y and Z are equally local to X if and only if (i) X c-commands both Y and Z, and (ii) the set of nodes that c-command Y is identical to the set of nodes that c-command Z (van Koppen 2005:14).
As for the linearization or spell out of the chain in (16b), I assume that the operator becomes PF visible when extracted (cf. Barbiers et al. 2009 and references cited therein). More specifically, when the operator is subextracted from the A-bar pronoun, it is spelled out as *wat*, because *wat* is the most underspecified A-bar pronoun in Dutch: it only contains an operator (cf. *supra*). Assuming that a single lexical item *wat* may spell out a full DP as well as an operator, suggests that lexicalization is governed by some sort of *Superset Principle*. The Superset Principle, as formalized in the Nanosyntax framework by Starke (unpublished work) and Caha (2007), is given in (18).

(18) *The Superset Principle* (Caha 2007:3, cf. Ramchand 2008a,b)  
The phonological exponent of a Vocabulary Item is inserted into a node if the item matches all or a superset of the grammatical features specified in the node. Insertion does not take place if the Vocabulary Item does not contain all features present in the node. Where several Vocabulary Items meet the conditions for insertion, the item containing less features unspecified in the terminal morpheme must be chosen.

According to the Superset Principle, a Vocabulary Item can thus spell out a syntactic structure that is smaller than itself. Put differently, the formulation of the Superset Principle in (18) entails that all syntactic features and syntactic structure should be lexicalized (*exhaustive lexicalization*; only features of the lexical entries might be ignored). Whenever a feature of a lexical entry does not match a feature in the syntactic structure, this feature is referred to as being *underassociated*. The Superset Principle thus gives a handle for understanding the observation that one and the same pronoun can occur in different syntactic environments (multipurpose pronouns): features in the lexical entry of the pronoun can be underassociated in certain contexts, but the lexical entry of the pronoun itself is invariant. There is thus no need to stipulate multiple lexical entries for a single pronoun.

The Superset Principle is inherently incompatible with an *underspecification* approach to syntactic features. Elements that can have more than one function and may appear in more than one context cannot be *underspecified*, but need to be *overspecified*. For example, being able to occur with singular as well as with plural antecedents, does not mean being underspecified for number, but rather being specified as [singular] *and* as [plural] (i.e. *overspecification*). We thus need an alternative mechanism of Vocabulary Item insertion that is compatible with an underspecification approach to multipurpose pronouns (cf. *supra*). More specifically, we need a mechanism that selects the Vocabulary Item that matches the *most features* in the feature bundle to be lexicalized (cf. the *Subset Principle*, standardly assumed in the Distributed Morphology framework, see footnote 12), while at the same time allows features/structure of the Vocabulary Item to not match features/structure in the syntactic structure (cf. *underassociation* and the Superset Principle). Such a principle should look something like (19).

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11The Nanosyntax approach to language was initiated by Michal Starke and further developed at the University of Tromsø, cf. the collection of papers in Svenonius et al. (2009), and see http://nanosyntax.auf.net/blog/.  
12Notice that (19) basically is the Subset Principle (i) *minus* the condition that *insertion does not*
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The Closest Match Principle

The phonological exponent of a Vocabulary Item is inserted into a node if the item matches \textit{one or more} of the grammatical features specified in the node. Where several Vocabulary Items meet the conditions for insertion, the item that matches the \textit{greatest number} of features specified in the node and that contains the \textit{smallest number} of features unspecified in the node must be chosen.

Whereas all A-bar pronouns contain an operator, as a result of which all of them are \textit{possible} lexicalizations of the operator, the Closest Match Principle will select \textit{wat} as the most optimal realization of the operator: \textit{wat} has the least features \textit{underassociated} in its lexical entry (\textit{least junk}). Put differently, the Closest Match Principle chooses \textit{wat} as the best match for the operator.

In addition to the operator in the higher SpecCP, the copy of the A-bar pronoun in the embedded SpecCP needs to be spelled out as well for reasons of \textit{recoverability}, i.e. the features present in the intermediate copy need to be spelled out.\textsuperscript{13} As spell out of the A-bar pronoun \textit{subsumes} spell out of the operator – recall that pronouns are assumed to spell out phrases – this intermediate copy will always surface as a full pronoun. This is illustrated in (20).

\begin{equation}
\begin{array}{c}
\text{[CP operator}_1 \ldots \text{[CP pronoun}_1 \ldots \text{pronoun}_1 \ldots ]
\end{array}
\end{equation}

\text{non-identical doubling (= (11))}

We thus have an account for the grammatical doubling patterns involving \textit{wat} in a long-distance \textit{wh}-Q that questions a person and a long-distance RC with a human antecedent that independently allows \textit{wat} as a relative pronoun, i.e. \textit{meisje} ‘girl’. We start out with a DP structure containing an operator and the feature [human]. This DP moves up to the lower SpecCP, from which the operator subextracts and moves to the higher SpecCP. The operator higher up is spelled out as \textit{wat}, and the DP in the lower CP domain is spelled out as \textit{wie} or \textit{die}: both lexical items match the [human] feature equally well. This is abstractly illustrated in (21).

\begin{equation}
\begin{array}{c}
\text{[CP operator} \ldots \text{[CP DP[operator, [human]]} \ldots \\
\text{wat} \\
\text{wie/die}
\end{array}
\end{equation}

\begin{equation}
\text{take place if the Vocabulary item contains features not present in the morpheme and plus the idea that non-terminal nodes can be lexicalized as well (cf. Caha 2007 for discussion) – recall that I assume A-bar pronouns to spell out non-terminals.}
\end{equation}

\text{(i) The Subset Principle (Halle 1997)}

The phonological exponent of a Vocabulary Item is inserted into a morpheme in the terminal string if the item matches all or a subset of the grammatical features specified in the terminal morpheme. Insertion does not take place if the Vocabulary Item contains features not present in the morpheme. Where several Vocabulary Items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

\text{\textsuperscript{13}Notice that this ‘multiple’ spell out is not in violation of the LCA (Kayne 1994, and see footnote 5), as the copies are not (featurally) identical (operator vs. DP).}
The ungrammaticality of the patterns in (9) and (10), here repeated as (22) and (23) – in which *wat* introduces the lower clause and *wie* or *die* introduces the higher clause – can be accounted for in two ways. In the first scenario, these sentences involve full copying and double spell out, in which case their ungrammaticality is explained by the fact that *wat* cannot spell out a DP that contains an operator and the feature [human]: *wat* is not specified as [human] (i.e. the insertion of *wat* is blocked by *die* or *wie*, which are specified as [human]). In the second scenario, these sentences are a violation of the Inclusiveness Condition (Chomsky 1995:228), which states that outputs cannot contain anything beyond their inputs: the feature [human] is added to the operator in the course of the derivation. Notice furthermore that pattern *die-wat* in (9)/(22) is ruled out by the fact that *die* cannot satisfy the *wh*-requirement on the introduction of *wh*-Qs.

(22) </*Wie/*die*> denk je *wat* het gedaan heeft? 
who/RP think you what it done has

INTENDED: ‘Who do you think has done it?’

(23) ?*Dat* is het meisje *die* ik denk *wat* het gedaan heeft.
that is the girl RP I think what it done has

INTENDED: ‘That is the girl who I think has done it.’

At this point, one might object that subextraction of the operator from DP violates well-established constraints on movement. More specifically, subextraction as in (20) constitutes a violation of the *Condition on Extraction Domain* (CED, Huang 1982) or the *Freezing Principle* (Wexler & Culicover 1980, cf. also Corver 2006), according to which a phrase that has undergone movement becomes an island for extraction. In order to obviate such a locality violation one might delete the copy that induces the violation: *rescue by PF deletion* (cf. Bošković 2011). However, since deletion of the offending copy in (20) (i.e. the copy of the pronoun in the lower SpecCP) would lead to a recoverability problem, this copy needs to be spelled out. I argue that as a result of the spell out of the offending copy, a violation of the CED/Freezing Principle is ameliorated. Put differently, the copy of the pronoun in the lower SpecCP in (20) acts as an *intrusive* resumptive pronoun (Sells 1984) in the sense that it obviates a CED/Freezing Principle violation. I call this mechanism *rescue by PF spell out* – the logical counterpart of *rescue by PF deletion*. See section 4 for details.

In sum, I claim that pronoun doubling involving an instance of *wat* in the higher clause of a long-distance *wh*-Q or RC is the result of subextraction of the operator from an A-bar pronoun in the embedded SpecCP. This operator is spelled out as *wat*, and the pronoun from which it is extracted is spelled out as *die* or *wie*, for reasons of recoverability and in order to obviate a violation of the CED/Freezing Principle.

4. Rescue by PF spell out

Ross (1969) was the first to argue that ellipsis may ameliorate island effects, as illustrated in (24) for sluicing. The example in (24a) shows that movement of *which one of my*
friends violates the Complex NP Constraint (CNPC), giving rise to ungrammaticality. The example in (24b), on the other hand, shows that in case the category containing the island violation is deleted under ellipsis, the sentence becomes fine.

(24)  a. *She kissed a man who bit one of my friends, but Tom does not realize which one of my friends she kissed a man who bit.
    b. ?She kissed a man who bit one of my friends, but Tom does not realize which one of my friends. [Ross 1969:276, cited in Bošković 2011:2]

Bošković (2011) proposes to extend the application domain of the rescue by PF deletion approach to all kinds of locality of movement violations. Most importantly for present purposes, Bošković argues that next to ellipsis, copy deletion may ameliorate island violations as well; this accounts for Chomsky’s (1995, 2001) generalization that traces do not count as interveners for relativized minimality effects. To illustrate this claim, consider the sentences in (25), which show experiencer blocking in Italian. Sentence (25a) shows that movement of Gianni across a Maria yields a relativized minimality violation (both are A-specifiers). Sentence (25b) shows that when the copy that induces the violation is deleted, the sentence becomes grammatical. Island violations are indicated by a *; if a * remains in the final structure, the sentence is ungrammatical.

(25)  a. *Gianni_1 sembra a Maria* [t_1 essere stanco].
     Gianni seems to Maria to be ill
     ‘Gianni seems to Maria to be ill.’
    b. A Maria_2, Gianni_1 sembra a Maria_2* [t_1 essere stanco].
     to Maria Gianni seems to Maria to be ill
     ‘To Maria, Gianni seems to be ill.’ [Italian, Bošković 2011:4]

As mentioned in the previous section, I propose an operation that ameliorates movement violations at PF by means of spell out: rescue by PF spell out. More specifically, I take non-identical doubling involving wat ‘what’ in long-distance A-bar dependencies to be the result of subextracting the operator from the pronoun in the embedded CP domain. This subextraction is a violation of the CED and/or the Freezing Principle. Seeing as deletion of the offending copy (rescue by PF deletion) is not an option because it would give rise to a recoverability problem, I suggest that the copy is spelled out instead. By spelling out the full A-bar pronoun (that contains a copy of the subextracted operator), a violation of the CED/Freezing Principle is repaired. Doubling in constructions in which the operator subextracts from an A-bar pronoun is thus predicted to be obligatory. This prediction is borne out, as illustrated in (26).

(26)  Wat_1 denk je *(wie_1) het gedaan heeft?
     what think you who it done has
     ‘Who do you think has done it?’ [colloquial Dutch]

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14 Locality of movement thus needs to be partly representational, as locality violations may be ameliorated at PF. Put differently, at least some aspects of locality of movement need to be attributed to PF (cf. also Pesetsky 1998 a.o. for a PF theory of locality).
A similar proposal has been made by van Craenenbroeck & van Koppen (2008) for first conjunct clitic doubling (FCCD) in southern Dutch dialects. In a FCCD sentence the first conjunct of a coordinated subject is doubled by a clitic, as illustrated in (27).

\[(27) \ldots \text{omda-ge} \quad \text{gou} \quad \text{en ik makannern gezien emmen} \]

\[
\quad \text{because-you}_{\text{CLITIC}} \text{ you}_{\text{STRONG}} \quad \text{and I each other seen have} \\
\quad \text{‘... because you and I saw each other’} \quad \text{[Wambeek Dutch]} \\
\]

Van Craenenbroeck & van Koppen (2008) analyze FCCD as follows. Part of the DP in the first conjunct of the coordination subextracts (namely PhiP) and is spelled out higher up as a clitic (\textit{ge}), whereas the DP left behind by movement is spelled out as a strong pronoun (\textit{gou}). However, subextraction from the first conjunct of a coordination violates the Coordinate Structure Constraint \textit{(CSC; Ross 1967:161)}, according to which extraction (out) of a conjunct in a coordinate structure is impossible. Van Craenenbroeck & van Koppen (2008) assume that this violation can be salvaged by spelling out the pronoun in the first conjunct. Doubling is then predicted to be obligatory, because the pronoun in the first conjunct acts as an intrusive resumptive pronoun that obviates the CSC violation. This prediction is borne out, as illustrated in (28).

\[(28) \ldots \text{omda-ge} \quad ^\star \text{(gou)} \quad \text{en ik makannern gezien emmen} \]

\[
\quad \text{because-you}_{\text{CLITIC}} \text{ you}_{\text{STRONG}} \quad \text{and I each other seen have} \\
\quad \text{‘... because you and I saw each other’} \quad \text{[Wambeek Dutch]} \\
\]

Additional evidence in favor of the claim that spell out may rescue an otherwise illicit step in the derivation (i.e. a violation of the CED/Freezing Principle), comes from the famous \textit{wat voor} construction in Dutch. In case of doubling, this construction – just like pronoun doubling involving \textit{wat} – seems to involve subextraction from SpecCP.\footnote{It is beyond the scope of this paper to engage in an analysis of the \textit{wat voor} \textit{(split) construction} besides assuming it involves subextraction (but see e.g. Bennis 1983, 1995; Corver 1991; Bennis et al. 1998; den Dikken 2006; Leu 2008 a.o.).} The pattern of \textit{wat voor} split in (29) shows that subextraction from the embedded SpecCP position is only licensed when the whole copy in the embedded SpecCP position is spelled out: (29b) versus (29c). Put differently, the full XP in (30) is spelled out after subextraction of the operator.\footnote{For ease of exposition, I abstract away from the presence of the spurious indefinite article \textit{een ‘a/an}’ in the \textit{wat voor} construction (in the structure in (30)).} This seems to provide additional evidence in favor of the rescue by PF spell out approach to doubling.

\[(29) \quad \text{a. } [\text{Wat voor boeken}]\text{ denk je } [\text{dat hij heeft gelezen}]? \\
\quad \text{what for books think you that he has read} \\
\quad \text{‘What kind of books do you think that he read?’} \quad \text{[Standard Dutch]} \\
\quad \text{b. } \text{Wat}\text{ denk je } [[\text{wat voor boeken}]\text{ hij heeft gelezen}]? \\
\quad \text{what think you what for books he has read} \\
\quad \text{‘What kind of books do you think that he read?’} \quad \text{[colloquial Dutch]} \]
Just like with doubling involving A-bar pronouns, subextraction of the operator is not possible from base position (recall that *wh*-phrases cannot be spelled out in base position). If it were, double spell out (of the operator in the highest SpecCP and the A-bar pronoun in base position) would be required for recoverability reasons, and the construction in (31) would be grammatical, contrary to fact.

(31) *Wat denk je [dat hij [wat voor boeken] heeft gelezen]?
what think you that he what for books has read

Similarly, subextraction of the operator (and double spell out) is impossible from the subject in SpecTP. This is illustrated by the sentences in (32): subextraction of the operator from the subject in SpecTP leads to ungrammaticality (32a), whereas subextraction of the operator from the subject in SpecCP is attested (32b). More generally, subextraction of the operator (and subsequent double spell out) is only possible from SpecCP, i.e. subextraction of the operator is only possible from an A-bar position.\(^\text{17}\) At this point, I have no insight to offer as to why this is the case.

(32) a. *Wat denk je [dat [wat voor jongens] dit boek hebben gelezen]?
what think you that for boys this book have read
b. Wat denk je [[wat voor jongens] dit boek hebben gelezen]?
what think you what for boys this book have read
‘What kind of boys do you think read this book?’ [colloquial Dutch]

I assume that PF spell out is only licensed in case PF deletion would lead to a recoverability problem. Interestingly, it is possible to subextract the A-bar pronoun *wat* from the *wat voor XP* in its thematic base position.\(^\text{18}\) Since this subextraction does not lead to

\(^{17}\) As pointed out to me by an anonymous reviewer, it is also conceivable that subextraction of the operator is in fact possible from a non-A-bar position (like SpecTP) but that for some reason the repair strategy at PF (in terms of spell out) cannot apply to an element in a non-A-bar position. However, if first conjunct clitic doubling (FCCD) is an instance of rescue by PF spell out (cf. van Craenenbroeck & van Koppen 2008, and see main text), it cannot be the case that rescue by PF spell out is restricted to A-bar positions. This suggests that the claim that subextraction of the operator is only possible from an A-bar position holds true. Future research should reveal why an operator can only subextract from an element in an A-bar/operator position.

\(^{18}\) It is well known that the *wat voor XP* construction (as in (30)) allows subextraction of its specifier (*wat*), in violation of the Left Branch Condition (cf. Bennis 1983, 1995; den Besten 1985; Corver 1991, 2003 a.o.). I have no insight to offer as to why this is the case.
a recoverability problem (i.e. recoverability is ensured by spelling out the A-bar pronoun *wat* in the higher SpecCP and spelling out *voor XP* in base position), we thus predict that subextraction of the A-bar pronoun from base position does not lead to spell out of the full constituent from which subextraction takes place. This prediction is borne out, as illustrated by (33). Notice that subextraction from base position does not constitute a violation of the CED/Freezing Principle, as a result of which (33) is perfectly grammatical.

(33)  **Wat** denk je [dat hij [voor boeken] heeft gelezen]?

what think you that he for books has read

‘What kind of books do you think that he read?’  

[Standard Dutch]

Unlike subextraction of pronoun *wat* from direct object base position, subextraction of pronoun *wat* from subject position (SpecTP) is severely degraded (or ungrammatical), as illustrated in (34) (cf. Bennis 1995:32).

(34)  ?* **Wat** denk je [dat [voor jongens] dit boek hebben gelezen]?

what think you that for boys this book have read

‘What kind of boys do you think have read this book?’

The degraded grammaticality (or ungrammaticality) of (34) is in fact predicted: because subextraction of the A-bar pronoun from the *wat voor XP* in SpecTP does not lead to a recoverability problem (cf. supra), PF spell out cannot apply to salvage the CED/Freezing Principle violation that is caused by subextraction from derived position. The difference in grammaticality between subextraction of the A-bar pronoun from the direct object base position (33) and subextraction of the A-bar pronoun from the derived subject position (34) is thus explained in terms of the presence or absence of a CED/Freezing Principle violation. Similarly, the observation that it is impossible to subextract the A-bar pronoun from the *wat voor XP* in SpecCP, as illustrated in (29c), can be explained as follows: it constitutes a violation of the CED/Freezing Principle that cannot be overcome by PF spell out, because recoverability is ensured by spelling out the A-bar pronoun *wat* higher up and the *voor XP* lower down.

So, I take PF deletion to be more economical than PF spell out (cf. Nunes 2004 a.o.): only when PF deletion cannot apply due to the lack of recoverability (deletion upon

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19As pointed out to me by Hans Bennis, some speakers accept the sentence in (i). This is expected by my analysis of doubling: after subextraction from the complex *wa*-phrase in thematic base position, the A-bar pronoun successive-cyclically moves up to the higher SpecCP. If only the head of the movement chain of the A-bar pronoun in this construction is spelled out (i.e. the copy of the A-bar pronoun in the highest SpecCP), we get the construction in (33). However, if multiple copies of the movement chain of the A-bar pronoun are spelled out (i.e. the copy of the A-bar pronoun in the higher SpecCP and the copy of the A-bar pronoun in the lower SpecCP), we get the construction in (i). Alternatively, the construction in (i) can be derived by first subextracting the A-bar pronoun from the *wat voor XP* from thematic base position, and then subextracting the operator from the A-bar pronoun in the embedded SpecCP.

(i)  **Wat** denk je [wat hij voor boeken heeft gelezen]?

what think you what he for books has read

‘What kind of books do you think that he read?’  

[colloquial Dutch]
recoverability), PF spell out can apply. This means that rescue by PF spell out can only salvage a derivation that involves subextraction, because only in that case can PF deletion lead to a recoverability problem (but this is not necessary, cf. supra). The only way to repair a derivation in such cases is to spell out the phrase from which an element has subextracted.

5. An alternative account of doubling: Barbiers, Koeneman & Lekakou (2009)

My analysis of doubling in long-distance A-bar dependencies is highly inspired by the analysis of Barbiers, Koeneman & Lekakou (2009) (henceforth BKL) regarding doubling in Dutch long-distance root *wh*-Qs. That is to say, many aspects of BKL’s analysis of doubling also feature prominently in my analysis of doubling. However, whereas BKL’s analysis does not carry over to doubling in RCs, my analysis provides a unified account of the doubling patterns in RCs and *wh*-Qs.

BKL start from the assumption that all attested patterns of pronoun doubling in Dutch, which are given here in (35) for root *wh*-Qs, are instances of long-distance movement via SpecCP plus multiple copy spell out (cf. Nunes 2004).

(35) a. *Wie* denk *je wie* ik gezien heb?
who think you who I seen have
‘Who do you think I have seen?’

b. *Wie* denk *je die* ik gezien heb?
who think you RP I seen have
‘Who do you think I have seen?’

c. *Wat* denk *je wie* ik gezien heb?
what think you who I seen have
‘Who do you think I have seen?’

d. *Wat* denk *je die* ik gezien heb?
what think you RP I seen have
‘Who do you think I have seen?’

(36) a. *Wie* denk *je wat* ik gezien heb?
who think you what I seen have

b. *Die* denk *je wie* ik gezien heb?
RP think you who I seen have

c. *Die* denk *je wat* ik gezien heb?
RP think you what I seen have

Based on the patterns in (35) and their ungrammatical counterparts in (36), BKL put forward the generalization that in a syntactic movement chain, the higher chain link can never be more specified than a lower chain link (Barbiers 2006). This generalization
follows from the following assumptions: (i) pronouns have internal structure and spell out phrases/non-terminals (cf. Weerman & Evers-Vermeul 2002; Neeleman & Szendrői 2007), (ii) syntactic copying can optionally be partial (cf. Cheng 2000 a.o.), and (iii) PF spell out is all or nothing, i.e. there is no partial spell out at PF (in contrast to the scattered deletion approach, cf. Čavar & Fanselow 1997; Nunes 2004). The specific structure BKL assume for the Dutch pronouns die, wie and wat is given in (37). As I will show that this structure cannot be correct – i.e. wie and die are not in a subset/superset relation – I will not go into the argumentation BKL provide to argue for this particular structure.

(37) a. \[DP = \text{die}\]
   \[\text{D} \quad \text{PhiP} = \text{wie}\]
   \[\text{Phi} \quad \text{QP} = \text{wat}\]

b. \[\text{wie} = \text{wat} + \text{phi-features}\]

c. \[\text{die} = \text{wie} + \text{definiteness}\]

BKL assume that identical doubling is the result of full copying of the pronoun and spell out of multiple copies in the movement chain of this pronoun. Non-identical doubling on the other hand, is the result of partial copying. Partial copying may target a subpart of the structure in (37), resulting in the spell out of the subextracted element in the higher CP and the spell out of the full copy lower down, for reasons of recoverability (notice that full spell out of the lower copy is also ensured by the assumption that PF spell out is all or nothing, cf. supra). More specifically, starting out with a DP, partial copying may target PhiP, giving rise to the wie-die pattern as can be seen in (38a), or it may target QP, giving rise to the wat-die pattern as illustrated in (38b). The wat-wie pattern is the result of partial copying targeting the QP part of a PhiP, as illustrated in (38c).

(38) a. \[CP [\text{PhiP} [\text{QP}]] \ldots [CP [DP [\text{PhiP} [\text{QP}]]] \ldots [DP [\text{PhiP} [\text{QP}]]] \ldots ] = \text{wie} \quad \text{die}\]

b. \[CP [\text{QP}] \ldots [CP [DP [\text{PhiP} [\text{QP}]]] \ldots [DP [\text{PhiP} [\text{QP}]]] \ldots ] = \text{wat} \quad \text{die}\]

c. \[CP [\text{QP}] \ldots [CP [\text{PhiP} [\text{QP}]] \ldots [\text{PhiP} [\text{QP}]] \ldots ] = \text{wat} \quad \text{wie}\]

The ungrammatical doubling patterns in (36) are cases of full copying and adding structure and features during the course of the derivation, in violation of the Inclusiveness Condition. This is abstractly illustrated in (39).

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20What BKL refer to as partial copying, I refer to as subextraction. However, my subextraction is more restricted than BKL’s partial copying: it can only target the operator in SpecDP.
Non-identical pronoun doubling as rescue by PF spell out

(39) a. *$[CP [DP [\Phi P [QP]]] \ldots [CP [\Phi P [QP]] \ldots [\Phi P [QP]] \ldots ]]$  
   = die  
   = wie  

b. *$[CP [DP [\Phi P [QP]]] \ldots [CP [QP] \ldots [\Phi P [QP]] \ldots ]]$  
   = die  
   = wat  

c. *$[CP [\Phi P [QP]] \ldots [CP [QP] \ldots [\Phi P [QP]] \ldots ]]$  
   = wie  
   = wat  

It is evident that the analysis of BKL can elegantly account for all and only the attested patterns of pronoun doubling in long-distance root $wh$-Qs. However, BKL’s analysis of doubling in long-distance $wh$-Qs does not carry over to RCs. On the basis of the then available data (namely the SAND data; Barbiers et al. 2005, 2008), BKL (2009:3) assumed that doubling pattern die-wie was not attested in RCs, as illustrated in (40b). The absence of this doubling pattern is predicted by their analysis of doubling in long-distance $wh$-Qs – according to which die-wie is analyzed as a violation of the Inclusiveness Condition (cf. (39a)) – and thus seems to suggest that their analysis of doubling is not restricted to $wh$-Qs, but extends to RCs.

(40) a. Dit is de man wie ik denk die Jan gezien heeft.  
   this is the man who I think RP Jan seen has  
   ‘This is the man I think Jan has seen.’  
   [Drenthe Dutch]  

b. *Dit is de man die ik denk wie Jan gezien heeft.  
   this is the man RP I think who Jan seen has  
   [BKL 2009:3]

However, closer empirical investigation (MPQ studies) reveals that sentences like (40b) are in fact attested in the Dutch speaking language area (i.e. BKL incorrectly assigned a * to (40b)) – an empirical observation that cannot be accounted for by the analysis of BKL in its present form. This is illustrated in (41d).

(41) a. Dat is de man $[RC$ die ik denk [die het gedaan heeft]].  
   that is the man RP I think RP it done has  

b. Dat is de man $[RC$ wie ik denk [wie het gedaan heeft]].  
   that is the man who I think who it done has  

c. Dat is de man $[RC$ wie ik denk [die het gedaan heeft]].  
   that is the man who I think RP it done has  

d. Dat is de man $[RC$ die ik denk [wie het gedaan heeft]].  
   that is the man RP I think who it done has  
   ‘That is the man who I think has done it.’  
   [colloquial Dutch, MPQ data]

I propose that the doubling patterns in (41) are all cases of ‘identical’ doubling, i.e. full copying of the A-bar pronoun and multiple copy spell out. The interchangeability of wie and die in this environment I account for by arguing that in a RC with a common gender human antecedent like man ‘man’ (as well as in the lower clause of a long-distance
wh-Q, cf. supra) wie and die fit the antecedent equally well. More specifically, both wie and die can equally well spell out the human feature; wie and die are crucially not in a subset/superset relation, contra (37). The non-occurrence of doubling pattern die-wie in wh-Qs is independently accounted for by the wh-requirement on the introduction of wh-Qs (cf. supra). Put differently, unlike BKL, I argue that doubling pattern die-wie can be generated by the grammar (as can be seen by the grammaticality of (41d)), but that this pattern in independently ruled out in wh-Qs.

Similarly, the (marginal) occurrence of doubling pattern wat-die-wie in a long-distance wh-Q with multiple embeddings, as illustrated in (42), is problematic for the analysis of BKL. As wie is assumed to be a subpart of die (cf. (37)), in a single movement chain in which both wie and die surface, it should never be possible to find die in a higher clause than wie, as that would constitute a violation of the Inclusiveness Condition. Under my analysis of doubling, this doubling pattern is in fact predicted to exist, because die and wie can equally well spell out the human feature.

(42) **Wat** denk je **die** Jan zei **wie** het gedaan heeft?

'Who do you think Jan said has done it?' [colloquial Dutch, MPQ data]

6. Summary and conclusion

Building and improving on a proposal by Barbiers, Koeneman & Lekakou (2009) on doubling in long-distance root wh-Qs in Dutch, this paper proposed a novel account of non-identical pronoun doubling in long-distance A-bar dependencies, namely wh-questions and restrictive relative clauses. Following existing literature, I proposed that A-bar pronouns spell out phrases (DPs), and that their internal structure includes an operator that is located in the specifier of the pronoun (SpecDP). At the point in the derivation when the A-bar pronoun has reached the embedded SpecCP, two possibilities emerge: either the pronoun itself (pied piping) or the operator in its specifier (subextraction) moves up to the higher SpecCP. The latter scenario results in doubling: the operator higher up is spelled out (as wat) and the pronoun from which the operator subextracted needs to be spelled out as well (as wie or die), for recoverability reasons and in order to ameliorate the locality violation that is induced by subextraction of the operator from the pronoun in SpecCP (rescue by PF spell out). In short, my analysis takes non-identical doubling to be the result of subextraction and double spell out, and attributes variation in doubling to the availability of subextraction or pied piping (no/identical doubling vs. non-identical doubling), and different lexicalization options for the A-bar pronoun (wie or die).

Within the Minimalist Program (Chomsky 1995 *et passim*), syntactic principles are assumed to be invariable. Apparent syntactic (micro)variation therefore needs to be reduced to the lexicon/vocabulary (i.e. variation in morphosyntactic features) and/or the level of PF (i.e. variation in the lexicalization of a structure). As suggested by this paper, part of the microvariation regarding non-identical doubling cannot be reduced to the lexicon or PF. Rather, this variation must be accounted for in syntax, namely in terms of the
optionality of subextraction or pied piping. The observation that some (micro)variation needs to be accounted for in terms of the size of a constituent that moves/copies in syntax is not new (cf. Barbiers 2009; Barbiers et al. 2009). In fact, my proposal fits in nicely with other proposals that attribute syntactic variation to the so-called pied piping parameter, cf. Koster (2000); Koopman & Szabolcsi (2000) (see also Ross 1967; van Riemsdijk 1978).

Acknowledgements

An earlier version of part of this paper was presented at the OC colloquium in Nijmegen (Radboud University, November 2011). I thank the audience there, as well as the audience of ConSOLE XX in Leipzig, for helpful comments. I also thank an anonymous reviewer for valuable feedback on an earlier draft of this paper.

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