Chapter 15

Extraposition and word order: Evidence from Wolof

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In this paper I use data from Wolof, among other languages, to describe and analyze a word order constraint on extraposition—a form of rightward displacement. Specifically, I show that extraposition of a constituent from a nominal phrase can only apply when that constituent's non-displaced position is at the right edge of the nominal phrase. Since the analysis of extraposition is a point of disagreement in current syntactic theory, I discuss how this constraint can be derived under several different approaches to extraposition.

1 Introduction

In this paper, I use fieldwork data from Wolof[1] (Niger-Congo) to explore the limitations of *extraposition*—a variety of rightward displacement generally applicable to relative clauses and other constituents classified as adjuncts of NP.[2]

[1]All Wolof data reported here, unless otherwise cited, comes from my fieldwork at the Massachusetts Institute of Technology in 2018 with three speakers from the Dakar area of Senegal. Fieldwork elicitation sessions consisted of asking speakers to translate test sentences from English into Wolof (both orally and in writing), and to rate the acceptability of pre-prepared Wolof test sentences.

[2]Here I am concerned with rightward displacement of adjunct phrases like relative clauses. Arguments are capable of rightward displacement (for instance, via Heavy NP Shift and Right Node Raising in English) but previous literature has shown that rightward displacement of adjuncts and arguments are likely attributable to different derivations (Fox & Nissenbaum 1999, Nissenbaum 2000, Overfelt 2015, 2016, a.o.). Since I have not had the opportunity to research rightward argument displacement in Wolof, I do not discuss this here.

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Extraposition of this form is highly productive in Wolof, English, and many other languages. Here I will focus on relative clause extraposition, illustrated in (1):

(1) Relative clause extraposition
   a. Wolof
      Gis-naa [**ab fas** t_2] démb [**wu nga sopp**]$_2$.
      see-1SG a horse yesterday that you like
      'I saw a horse yesterday that you like.'
   b. *English*
      I bought [**a book** t_1] yesterday [**that someone recommended to me**]$_1$.

There are a variety of proposals about the mechanisms that derive extraposition (Akmajian 1975, Guéron 1980, Culicover & Rochemont 1990, Borsley 1997, Büring & Hartmann 1997, Asakawa 1979, Bianchi 2000, Nissenbaum 2000, Fox 2002, Sheehan 2010, Overfelt 2015, Reeve & Hicks 2017). See Baltin 2006 for a general overview. Research on extraposition has observed that its properties are generally unlike those of leftward movement of the more familiar sort, even once we abstract away from the fact that extraposition happens to involve rightward rather than leftward displacement. However, the empirical complexity of extraposition has made its exact nature a topic of continuous debate.

This paper has two goals. The first is to use data from Wolof, along with previous observations from relevant literature, to make salient a word order constraint that is unique to extraposition. The second goal is to discuss how this constraint relates to the proposals under debate in current research about how extraposition is achieved.

In §2 below, I use data from Wolof to demonstrate the constraint on extraposition defined in (2):

(2) Right Edge Extraposition Constraint (REEC)
   Only an XP that appears at the right linear edge of a given DP is available for rightward extraposition from that DP. Thus, if other material in that DP appears to the right of that XP, XP cannot extrapose.

The predictions of the REEC can be schematized as in (3) below. While §3 will overview the competing analyses of extraposition, for the moment, assume for presentational simplicity that extraposition is rightward phrasal movement. The REEC states that extraposition of some constituent XP from DP is legal if XP originates at the right linear edge of DP (3a), but not if XP originates deeper inside of DP (3b), in which case XP would need to cross over some content in DP (here α) in the process of extraposing:

(3) a. Extraposition from right linear edge of DP
✓ [$_{DP}$ D N α XP] ... XP

b. *No extraposition from linear interior of DP*
* [$_{DP}$ D N XP α] ... XP

A constraint of this nature has been discussed by a few previous works (Nissenbaum 2000, Jenks 2011, 2013a,b, Fox & Pesetsky 2009), but has otherwise received little attention. The fact that the REEC holds in Wolof, as §2 will show, provides important cross-linguistic support for its existence.

In §3, I will discuss how the REEC relates to the varying analyses of extraposition under debate in the literature. First, I show that this constraint can be captured by a theory which combines the proposal that extraposition is extraction from DP (Ross 1967, Akmajian 1975, Guéron 1980, Guéron & May 1984, Büring & Hartmann 1997, Reeve & Hicks 2017) with the word-order-centric theory of successive-cyclic movement in Fox & Pesetsky (2005a,b) and much following work. An account of this variety has been sketched by Jenks (2011, 2013a,b), which this paper aims to strengthen and contextualize in greater detail. Second, I argue that the REEC cannot be captured by a theory in which extraposition involves base generation of the extraposed phrase outside of DP, which a number of works have argued is at least one option for achieving extraposition (Culicover & Rochemont 1990, 1997, Koster 2000, Sheehan 2010, Reeve & Hicks 2017).[3] Finally, I discuss a relevant proposal about extraposition from Nissenbaum 2000, in the context of a theory in which extraposition involves late merger (Lebeaux 1988, 1991) after covert movement of the DP that extraposition appears to have exited (Fox & Nissenbaum 1999, Nissenbaum 2000, Fox 2002, Johnson 2012, Overfelt 2015). While Nissenbaum's approach makes the right predictions, it raises conceptual problems for which I discuss some potential ways of resolving.

It is beyond the scope of this paper to provide a decisive analysis of extraposition. However, by providing new cross-linguistic support from Wolof for the REEC, this paper clarifies the unique empirical character of extraposition, while also making salient the challenges that remain for a unified analysis of this phenomenon.

[3]These works vary in whether they posit that extraposition is always, or only sometimes, a result of base generation outside of DP. I argue that if a constraint like (2) in fact holds cross-linguistically (a proposal supported by the Wolof data, but in need of further study) a base generation derivation is never available.

2 Evidence for the REEC from Wolof and beyond

In this section I present the evidence from Wolof for the REEC. The syntax of Wolof is primarily head-initial, though it shows variance in the head directionality of determiners, which will be an important aspect of the facts I discuss here. I will set the details of Wolof syntax aside, since mere word order is for the most part all that we need to be aware of for the purposes of this paper. Here we will see many relative clauses, whose complementizers take on a wide variety of forms in Wolof depending on the characteristics of the NP that the relative clause is construed as modifying. For more information about complementizer agreement in Wolof, and Wolof syntax more generally, see Torrence 2012, 2013 and references therein.

Relative clause extraposition is productive in Wolof, though as far as I am aware, this fact has not been examined in previous literature. Some initial illustrative pairs of examples are shown in (4):

(4) Wolof relative clause extraposition

a. Lekk-naa [**gato** [**bu nex lool(u)**]] démb.
ate-1SG cake that tasty very yesterday
'I ate a very tasty cake yesterday.' (Unextraposed)

b. Lekk-naa [**gato** t_1] démb [**bu nex lool(u)**]$_1$.
ate-1SG cake yesterday that tasty very
'I ate a very tasty cake yesterday.' (Extraposed)

c. Sacc-naa [**xar** [**bu ndaw**]] tey.
stole-1SG sheep that small today
'I stole a small sheep today.' (Unextraposed)

d. Sacc-naa [**xar** t_1] tey [**bu ndaw**]$_1$.
stole-1SG sheep today that small
'I stole a small sheep today.' (Extraposed)

e. Gis-naa [**kër** [**gu yaatu**]] démb.
see-1SG house that big yesterday
'I saw a big house yesterday.' (Unextraposed)

f. Gis-naa [**kër** t_1] démb [**gu yaatu**]$_1$.
see-1SG house yesterday that big
'I saw a big house yesterday.' (Extraposed)

In (4) above we see extraposition from bare NPs. Extraposition is also possible from DPs containing pre-nominal material, as we see for indefinite determiners and numerals in (5) below. Since Wolof relative clauses follow N, just as in languages like English, the fact that extraposition is possible here is not surprising: in these situations extraposition does not "cross" any material in DP, and so the REEC is satisfied.

(5) Wolof extraposition compatible with pre-nominal material

a. Gis-naa [**ab** fas [**wu nga sopp**]] démb.
see-1SG a horse that you like yesterday
'I saw a horse that you like yesterday.' (Unextraposed)

b. Gis-naa [**ab** fas t_1] démb [**wu nga sopp**]$_1$.
see-1SG a horse yesterday that you like
'I saw a horse yesterday that you like.' (Extraposed)

c. Sacc-naa [**ñaar-i xar** [**yu ndaw**]].
stole-1SG two sheep that small
'I stole two small sheep.' (Unextraposed)

d. Sacc-naa [**ñaar-i xar** t_1] tey/démb [**yu ndaw**]$_1$.
stole-1SG two sheep today/yesterday that small
'I stole two small sheep today/yesterday.' (Extraposed)

Wolof demonstratives and definite determiners follow N as well as any co-occurring relative clauses. Assuming that these elements are head-final instances of D, we indeed expect them to occur to the right of relative clauses, given the common proposal that relative clauses are merged to the NP, structurally below D (Quine 1960, Stockwell et al. 1973, Partee 1975, Heim & Kratzer 1998, a.o.). We see this fact in (6) below, as well as the fact that placing a relative clause after post-nominal D is unacceptable:

(6) Wolof relative clauses must precede head-final D

a. Sacc-naa xar [**bu ndaw**] **bi**.
stole-1SG sheep that small the
'I stole the small sheep.'

b. * Sacc-naa xar **bi** [**bu ndaw**].
stole-1SG sheep the that small
'I stole the small sheep.'

c. Lekk-naa gato [**bu nga indi**] **bi**.
eat-1SG cake that you brought the
'I ate the cake that you brought.'

d. * Lekk-naa gato **bi** [**bu nga indi**].
eat-1SG cake the that you brought
'I ate the cake that you brought.'

Given the REEC, we expect head-final D to block relative clause extraposition. Since head-final D intervenes between the original position of the relative clause (speaking in terms of an extraction analysis for convenience) and the right edge of DP, extraposition would have to cross over that D, thus violating the REEC. Such examples are indeed unacceptable (7):[4]

(7) No extraposition with post-nominal determiner/demonstrative in Wolof

a. Gis-naa [fas [**wu nga sopp**] **wi/wee**] démb.
see-1SG horse that you like the/that yesterday
'I saw the/that horse that you like yesterday.' (Unextraposed)

b. * Gis-naa [fas t_1 **wi/wee**] démb [**wu nga sopp**]$_1$.
see-1SG horse the/that yesterday that you like
'I saw the/that horse yesterday that you like.' (Extraposed)

c. Sacc-naa [juroom-i xar [**yu ndaw**] **yii/yee**] tey.
stole-1SG 5 sheep that small the/these today
'I stole the/those five small sheep today.' (Unextraposed)

d. * Sacc-naa [juroom-i xar t_1 **yii/yee**] tey [**yu ndaw**]$_1$.
stole-1SG 5 sheep the/these today that small
'I stole the/those five small sheep today.' (Extraposed)

[4] A reviewer notes that seemingly head-final determiners could actually be head initial, but involve movement of NP to a pre-D position. This is a possibility that I cannot rule out here. If this is the case, it could be that extraposition is banned in the presence of post-nominal determiners due to the well-known difficulty of movement out of moved elements (often termed "freezing": see Corver 2017 for a recent overview). In particular, if extraposition simply involves extraction of the extraposed element from NP, and if NP moves to spec-DP (thus deriving the post-nominal position of the relevant determiners) before extraposition can apply, then extraposition from NP would be bled by prior movement of NP. Two issues with this analysis are that it relies on a particular stipulation about the order of operations, as well as the assumption that extraposition is indeed extraction. As discussed in §3, there are reasons to think that extraposition at least some of the time does not involve extraction from NP. Finally, regardless of how post-nominal determiners in Wolof are in fact derived, their interaction with extraposition continues to fit the REEC, which as I discuss in §2.1 has cross-linguistic support, for which this issue about Wolof syntax is not relevant in any case.

Analogously, extraposition cannot cross a post-nominal quantifier (8):

(8) No extraposition with post-nominal quantifier in Wolof

a. Sacc-naa [xar [**yu ndaw**] **yëpp**].
stole-1SG sheep that small all
'I stole all the small sheep.' (Unextraposed)

b. * Sacc-naa [xar t_1 **yëpp**] tey [**yu ndaw**]$_1$.
stole-1SG sheep all today that small
'I stole all the small sheep today.' (Extraposed)

c. Lekk-naa [mango [**yu rëy**] **yëpp**] démb.
eat-1SG mango that big all yesterday
'I ate all the big mangos yesterday.' (Unextraposed)

d. * Lekk-naa [mango t_1 **yëpp**] démb [**yu rëy**]$_1$.
eat-1SG mango all yesterday that big
'I ate all the big mangos yesterday.' (Extraposed)

The facts shown above give some evidence for the REEC, but this is not all the evidence that Wolof provides. Additional evidence for this constraint can be found by examining further facts about potential positions for demonstratives in Wolof. Importantly, this language allows normally head-final demonstratives to appear in an initial position in the DP when focused, as (9) demonstrates:

(9) Fronted focused demonstrative in Wolof[5]
Gis-naa [(**yii**) góór [**yu njool**] (**yii**)].
see-1SG (THESE) men that tall (these)
'I saw these/THESE men who were tall.'

As (10) below shows, when head-final demonstratives are "fronted" in this way and thus do not linearly intervene between a relative clause and the right linear edge of the DP, relative clause extraposition is permitted. This is precisely what we expect, given the REEC.

(10) Fronted focused demonstrative in Wolof permits extraposition

a. Lekk-naa [**bii** gato [**bu nex lool**]] tej.
ate-1SG THIS cake that tasty very today
'I ate THIS very delicious cake today.'

[5] I use smallcaps to indicate focus.

b. Lekk-naa [**bii** gato t_1] tej [**bu nex lool**]$_1$.
ate-1SG THIS cake today that tasty very
'I ate THIS very delicious cake today.'

c. Gis-naa [**yii** góór t_1] démb [**yu njool**]$_1$.
see-1SG THESE men yesterday that tall
'I saw THESE men yesterday who were tall.'

d. Gis-naa [**bii** muus t_1] demb [**bu rey lool**]$_1$.
saw-1SG THIS cat yesterday that big very
'I saw THIS cat yesterday that was very big.'

e. Indi-nga [**bii** mango t_1] demb [**bu rey lool**]$_1$.
brought-2SG THIS mango yesterday that big very
'You brought THIS mango yesterday that was very big.'

If the instances of D in Wolof that are normally head-final were incompatible with extraposition for some independent reason aside from their head-final position, then we would expect extraposition to continue to be illicit even when such elements are fronted to a DP-initial position. However, if such elements are normally incompatible with extraposition purely because they cause a REEC violation, then we predict that the fronting of such elements out of the right linear edge of the DP should make extraposition possible. We have seen that the latter of these predictions is correct. This indicates that what we are seeing here is specifically a constraint on linear word order.[6]

2.1 Other evidence for the REEC

The constraint that I have termed the REEC has been noticed by a small amount of previous research. As far as I know, the first observations in this vein come

[6]A reviewer notes that in examples like those in (10) where the demonstrative precedes the noun, some Wolof dialects allow duplication of the noun class marker in such a way that may suggest the presence of additional syntactic complexity, thus opening up the potential for alternative analyses. The reviewer also suggests that these examples could involve something like NP ellipsis rather than extraposition (presumably involving two syntactic instances of the relevant NP and ellipsis of only one, creating the appearance of a displaced relative clause). If there is any possibility of such an alternative analysis, the same would be applicable to all examples of Wolof extraposition I have shown. However, I do not currently have any data that clarifies this point. Notice, however, that regardless of the exact analysis of extraposition assumed (several possibilities for which are discussed in §3 below), the Wolof facts shown here do fit the REEC, which I show in the next subsection has cross-linguistic support.

from Nissenbaum 2000, who argues based on the contrast between English adjectives and relative clauses in (11) that only rightmost constituents of DP can be extraposed. As we see here, while adjectives and relative clauses are both presumably adjuncts, the former originate preceding N and cannot extrapose, while the latter originate after N and can extrapose. PP adjuncts of NP, which also originate post-nominally, can extrapose as well (11e).

(11) Left/right asymmetry in extraposition: relative clause versus adjective
   a. I saw [a **man** t_1] yesterday [**who was very tall**]$_1$.
   b. * I saw [a t_1 **man**] yesterday [**very tall**]$_1$.
   (Adapted from Nissenbaum 2000, pg. 208, ex. 33)
   c. I saw [a **dog** t_1] yesterday [**that was wearing a blue collar**]$_1$.
   d. * I saw [a t_1 **dog**] yesterday [**extremely large and intimidating**]$_1$.
   e. I saw [a **dog** t_1] yesterday [**with a silly hat on**]$_1$.
   (My examples)

Since the adjective undergoing attempted extraposition in (11b) is phonologically small, we might posit that this example is unacceptable due to a prosodic problem. This is a reasonable hypothesis, given that another rightward displacement phenomenon, Heavy NP Shift, is well-known to be unacceptable if the shifted nominal does not have enough phonological weight. To rule out this hypothesis, I have included example (11d), in which we see that an increase in phonological weight does not make adjective extraposition acceptable. This is what we expect, if what we are really dealing with here is a word order restriction.

Nissenbaum 2000 also shows (citing personal communication from Danny Fox) that in Hebrew, which has post-nominal adjectives, adjective extraposition is possible. This fact is also noted by Fox & Pesetsky 2009, who report that while extraposition of an originally post-nominal adjective or modifier succeeds in Hebrew (12a-12b), extraposition of an originally pre-nominal modifier does not (12c):

(12) Left/right extraposition asymmetry in Hebrew
   a. ? Yosef ra?a [**iša** t_1] etmol [**gvohaa beyoter**]$_1$.
   Yosef saw woman yesterday tall in-more
   'Yosef saw a very tall woman yesterday'
   b. ? Yosef ra?a [**anašim** t_1] etmol [**rabim me?od**]$_1$.
   Yosef saw people yesterday many-PL a_lot
   'Yosef saw very many people yesterday'

c. * Yosef ra?a [t_1 **anašim**] etmol [**harbe me?od**]$_1$.
Yosef saw people yesterday many a-lot
'Yosef saw very many people yesterday'
(Fox & Pesetsky 2009, ex. 6-7)

Fox & Pesetsky 2009 go on to show (reporting an observation they credit to Alex Grosu) that, in English, adjective extraposition from the compound quantifier phrase *someone* is possible. This is expected, since adjectives originate on the right side of this variety of DP, as we see in (13a). I observe that the same pattern holds for adjectives with analogous quantifier phrases, as (13) illustrates:[7]

(13) Post-nominal adjectives of certain quantifiers can extrapose
a. I saw [**someone / somebody** [**quite tall**]] yesterday.
b. ? I saw [**someone / somebody** t_1] yesterday [**quite tall**]$_1$.
c. Mary met [**everyone / everybody** [**somewhat interesting**]] just now.
d. ? Mary met [**everyone / everybody** t_1] just now [**somewhat interesting**]$_1$.
e. I talked to [**nobody** / **no one** [**particularly unusual**]] tonight.
f. ? I talked to [**nobody** / **no one** t_1] tonight [**particularly unusual**]$_1$.

The adjectives in (13) are unlikely to be reduced relative clauses, since if they were, they should be able to post-nominally merge in typical DPs as well, contrary to fact:

(14) No post-nominal adjectives in typical English DPs
a. * I saw a person **quite tall** yesterday.
b. * Mary met every person **somewhat interesting** just now.
c. * I talked to no people **particularly unusual** tonight.

[7]The extraposed adjectives in example (13) all include either an intensifier, or some other element relating to a degree. In my judgment, the absence of a degree-encoding item makes this variety of extraposition significantly degraded:

(i) a. * I saw **someone** today **tall**.
b. * Mary met **everyone** just now **interesting**.
c. * I talked to **nobody** tonight **unusual**.

For reasons yet to be examined contingent on the presence of a degree, note that the degree-encoding element in examples (11b/11d) and (12c) above does not facilitate extraposition in those contexts. This shows that word order is a primary constraining factor in any case.

Additional facts of a similar character are examined by Jenks 2011, 2013a,b, who investigates quantifier float in East Asian languages. Jenks focuses on Thai facts like (15), in which we see that a quantifier can be displaced to the right of the corresponding DP:

(15) Rightward quantifier displacement in Thai
Nák.rian ʔaan nàŋsŭ̆ŭ mûuawaannîi **thúk-khon**.
student read book yesterday every-CLF$_{\text{Person}}$
'Every student read a book yesterday.'
(Adapted from Jenks 2013b, ex. 1)

Jenks argues that in Thai, numeral quantifier float of this variety is extraposition, in contrast to the proposal for other languages like Korean and Japanese that Q-float is derived (at least in some cases) by stranding (Saito 1985, Ko 2014, Miyagawa 2017, a.o.). Jenks states that this form of rightward quantifier float is attested in languages that independently allow N < Q order such as Khmer, Tibeto-Burman, and Southwestern Tai, but not in those that only allow Q < N order such as Vietnamese, Chinese, Hmong-Mien, as well as North and Central Tai. Jenks suggests that this correlation may be a sub-case of Nissenbaum's original observation that extraposition is only possible for elements that originate at the right edge of the source DP. While Jenks does not consider data from all languages mentioned in great detail, and thus potentially conflates instances of Q-float that are not syntactically homogeneous, Jenks' observation is clearly in a similar vein to the REEC.

3 Comparing analyses of extraposition and the REEC

We have seen that Wolof provides clear evidence for the REEC—a word order constraint on extraposition for which there is some cross-linguistic support. In this section, I will examine how this constraint relates to the main analyses of extraposition proposed in the literature.

3.1 Extraposition as extraction

A number of works take extraposition to involve extraction from DP, at least some of the time (Ross 1967, Akmajian 1975, Guéron 1980, Guéron & May 1984, Büring & Hartmann 1997, Reeve & Hicks 2017). A simplified structure for such a derivation is shown in Figure 1 below.

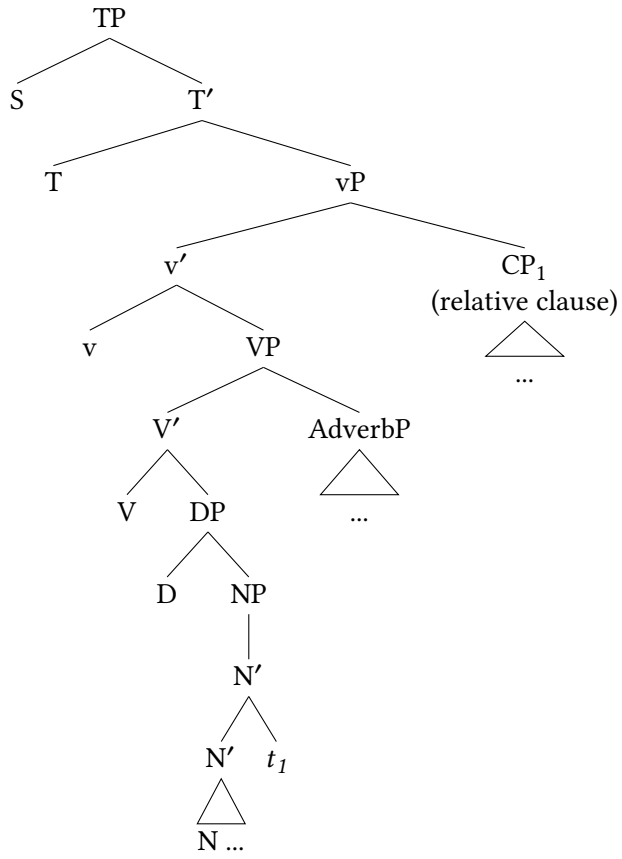

Figure 1: REEC-satisfying extraposition

The structure in Figure 1 would satisfy the REEC, since here the extracted relative clause is displaced from a structural position that corresponds to the right linear edge of DP. This sort of example, involving a head-initial determiner, matches the form of Wolof examples like (5b) above. We also saw in (8) above, for instance, that when D is head-final extraposition is banned in Wolof. Assuming an extraction analysis of extraposition, such an unacceptable example would have the form in Figure 2.[8]

[8]In Figure 1 and Figure 2 I have included an adverb phrase adjoined in VP, since all of the examples of extraposition we have seen above include an adverb which acts as a landmark to make extraposition evident (though the adverb itself is not causal factor in achieving extraposition).In Figure 1 and Figure 2 I have also assumed that the extraposing extraction lands in a right-adjoined specifier of vP, though nothing of significance hinges on the exact landing site for extraposition.

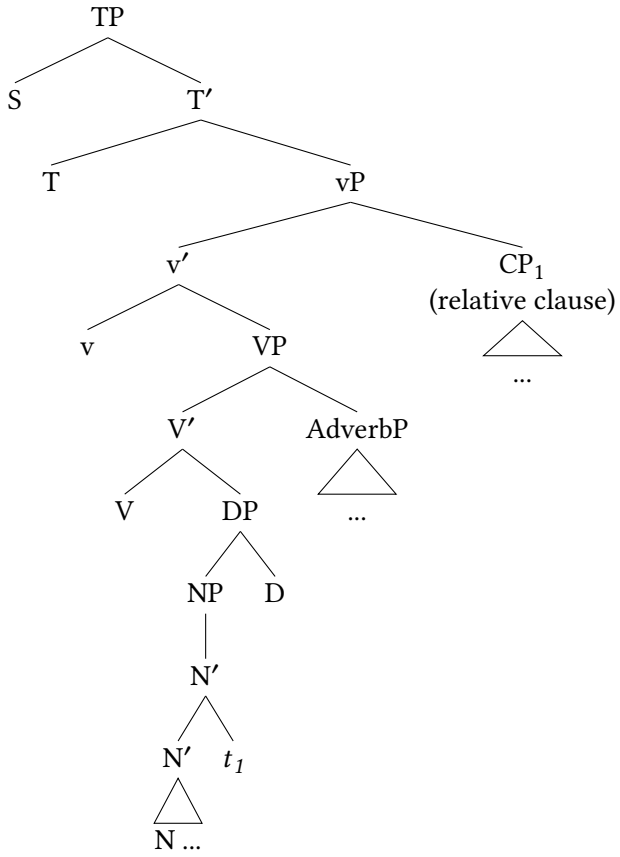

Figure 2: REEC-violating extraposition

While it is clear that Figure 1 obeys the REEC and Figure 2 violates it, the REEC is essentially a descriptive generalization which it is necessary to identify an explanation for. Describing explicitly how the REEC can be derived in the context of an extraction analysis of extraposition is what I do next.

3.1.1 Deriving the REEC under an extraction analysis

I argue that if extraposition in fact involves rightward extraction, we can explain the REEC by adopting the *Cyclic Linearization* (CL) theory of phases (Fox & Pesetsky 2005a,b, Ko 2014, Davis 2021, a.o.) as well as a few auxiliary assumptions that I will explain shortly. CL differs from the original theory of phases in Chomsky 2000, 2001 in a few important ways, so I will summarize Chomsky's theory before then describing CL.

Much research has argued that movement paths are at least sometimes composed of multiple shorter paths connected by intermediate landing sites, in *successive-cyclic* fashion. See Chomsky 1973, 1986, Du Plessis 1977, McCloskey 2000, 2001, 2002, Sauerland 2003, Bruening 2001, Barbiers 2002, Torrence 2012, Abels 2003, Wiland 2010, Henry 2012, and many others. Chomsky 2000, 2001 and much following work argues that movement must pass successive-cyclically through the edges of phases (vP, CP) in order to escape *spell-out*—an operation endemic to phases. For this theory, after a phasal phrase is built, spell-out transfers the complement of that phrase to the interfaces of PF and LF, which respectively assign linear ordering to and interpret that content, among other processes. Chomsky proposes that spelled-out structure is inaccessible for the rest of the syntactic derivation (as defined by the Phase Impenetrability Condition) and that therefore a phrase moving from a phase's complement must reach the phase edge before spell-out, to avoid being trapped. Example (16) below shows this for *wh*-movement from a vP and CP.

(16) Successive-cyclic movement from vP and CP
What do they think [$\underline{\text{CP}_{\text{[Phase]}}}$ (*t*) that you will [$v\text{P}_{\text{[Phase]}}$ (*t*) ∅ eat (*t*)]] ?

In contrast, for the CL theory spell-out applies to entire phasal constituents, including their head and specifier(s). This hypothesis necessitates abandoning the Phase Impenetrability Condition, since in this system all movement from a phase is necessarily of material that has undergone spell-out within that phase. As such, for CL, successive-cyclic movement through phase edges does not occur because edges are exempt from phase-level spell-out. Rather, under this approach successive-cyclic movement through phase edges is motivated by the information-preserving property of spell-out, *Order Preservation*:

(17) Order Preservation
Information about linearization, once established at the end of a given Spell-Out domain, is never deleted in the course of a derivation.
(Fox & Pesetsky 2005a: pg. 6)

If Order Preservation holds, it is not possible to revise established ordering information to save derivations for which phase-by-phase spell-out has generated contradictory linearization instructions. Therefore, to avoid a crash at PF, syntax must be able to form a structure with linearization information that is consistent for all phases in the derivation in question. As the works on CL cited above argue, exiting a phase via its linear edge serves to prevent movement from yielding a

linearization contradiction: By passing through the linear edge of each phase exited, phase-exiting phrases are determined by spell-out to precede the content of each phase in question. This is ultimately consistent with a final representation where the moved material surfaces preceding the content of all phases that it has exited.

Although CL requires movement to be order preserving within each phase crossed, movement will not actually be surface-evidently order-preserving when it is successive-cyclic. However, another prediction of this reasoning is that movement will indeed be surface-evidently order-preserving when it is not able to be successive-cyclic. I argue that these considerations reveal an explanation for the REEC, provided we assume that DP is a phase (Heck & Zimmermann 2004, Bošković 2005, 2016, Newell 2008, Newell & Piggott 2014, Syed & Simpson 2017, Simpson & Park 2019) as well as a version of *anti-locality*—the hypothesis that movement must not be too short (Bošković 1997, 2005, Ishii 1999, Grohmann 2003, Abels 2003, 2012, Erlewine 2015, a.o.).

First let us consider the derivation for the REEC-violating structure in Figure 2 above, which contains a head-final determiner like many unacceptable examples of Wolof extraposition that we saw in the previous section. If DP is a phase, then when a head final DP is constructed as in Figure 3, it will then be spelled-out and assigned linear order as in (18):[9]

(18) Linearization:
N < CP < D

Next the vP is constructed and extraposition applies, as in Figure 4. When this vP spells-out, it determines how its contents are linearized with respect to the content of the previously constructed DP, as (19) shows.

(19) Linearization when DP spelled-out:
N < CP < D [as in (18) above]
Linearization information added at spell-out of containing vP:
V < N, D < AdverbP < CP

Importantly, extraposition creates an ordering contradiction here: when the head-final DP was spelled-out, it was established that the relative CP precedes D, but after extraposition and spell-out of vP, this CP was determined to follow D.

[9]The symbol "<" encodes relative linear precedence, not strict adjacency or concatenation. Thus an ordering $[\alpha < \beta]$ is consistent with α later moving away from β, with the result that other material ultimately intervenes between them, as in $[\alpha\ \gamma\ \beta]$. This is because α still precedes β after such movement, despite no longer being adjacent to it.

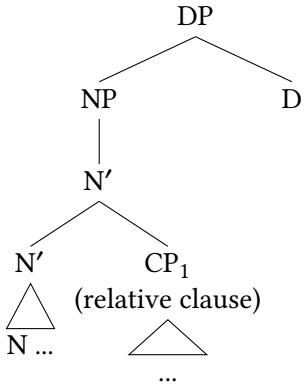

Figure 3: Construction and linearization (see (18)) of head-final DP

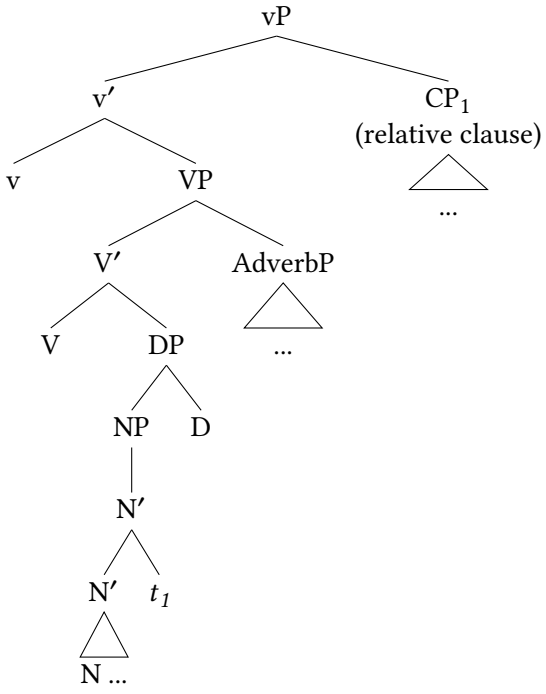

Figure 4: Construction and linearization (see (19)) of vP after extraposition from head-final DP

By hypothesis, due to this contradiction the derivation crashes at PF. As we have seen, Wolof examples fitting this schema are indeed unacceptable. Additionally, notice that when D is pre-nominal, D will simply precede the relative CP for the entire derivation—a fact that is not changed by extraposition, as we saw in Figure 1. We thus do not expect extraposition to cause an ordering contradiction when D is head-initial. We have seen that Wolof examples of this sort are acceptable. When analyzed in this way, the REEC is simply an order preservation effect.

Jenks (2011, 2013a,b) sketches an account of precisely this sort. However, Jenks does not address the fact that there is another hypothetical derivation to consider. Recall that for CL, ordering contradictions can be avoided by performing successive-cyclic movement through phase edges. Given this prediction, we expect Wolof extraposition to be legal even in the presence of a head-final determiner provided that the extraposed phrase successive-cyclically passes through (a right-leaning) spec-DP, as Figure 5 shows.

Since such examples are in fact unacceptable, it is necessary to rule out such a derivation.

I argue that anti-locality is applicable here. While there are several varieties of anti-locality proposed in the literature, works such as Bošković 2005, 2016 and Erlewine 2015, 2017 develop a definition of anti-locality which bans movement from the edge (specifier or adjunct) of a given phrase XP to the edge of the phrase that immediately dominates XP. Since DP immediately dominates NP and since relative clauses are adjuncts of NP, extraction of a relative clause from NP to spec-DP is banned by this form of anti-locality. This account accurately rules out derivations like Figure 5, thus maintaining the REEC.

3.2 Against a base generation theory of extraposition

Several works have argued that extraposition does not in fact involve extraction, but rather base-generation of the extraposed constituent outside of DP (Culicover & Rochemont 1990, 1997, Koster 2000, Sheehan 2010, Reeve & Hicks 2017). The result of such a derivation would look like the one in (16a) above, for instance, but omit the trace in the NP.

There is indeed syntactic and semantic evidence (involving binding and reconstruction, for instance) for a non-movement derivation of extraposition, which works of the sort mentioned in the next section also take seriously. However, one disadvantage of base-generation theories is that they must assume a special mechanism that allows the extraposed constituent to be semantically united with the NP that it modifies, despite never having any structural relationship to it. I

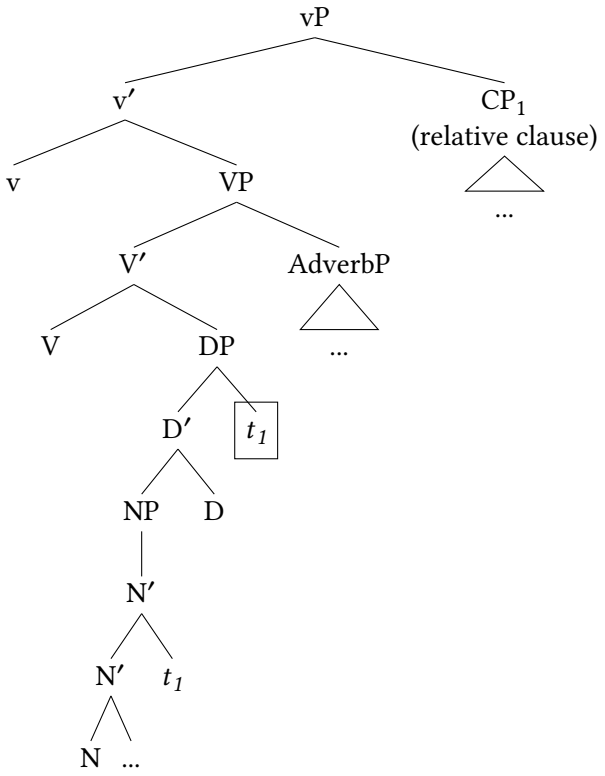

Figure 5: Hypothetical relative clause extraction via spec-DP

argue that another disadvantage of such theories is that they cannot straightforwardly account for the REEC. Since under a base generation theory there is in fact no syntactic dependency between the extraposed constituent and corresponding NP, it is unclear why there should be any word-order constraint mediating the relationship between the two, since under such a theory there is no syntactic relationship between them to speak of. Therefore, to the extent that the REEC is correct, it suggests that there really is a syntactic dependency between an extraposed phrase and the "source" NP.

3.3 Extraposition as covert movement plus late merge

While a simple base-generation analysis is not clearly compatible with the REEC, there is a hybrid base-generation analysis that fares better in this regard. This

analysis takes advantage of the proposal from Lebeaux 1988, 1991 that it is possible to move a constituent, and then externally merge an adjunct to it. Lebeaux originally used this hypothesis to discuss certain facts involving (non-)reconstruction with overt leftward movement, but a variety of works have argued that when a DP covertly moves, and then late merger of an adjunct applies to it, the result is extraposition (Fox & Nissenbaum 1999, Nissenbaum 2000, Fox 2002, Johnson 2012, Overfelt 2015). This is illustrated in Figure 6, where there are two co-indexed copies of the relevant DP, the higher of which is covert (as indicated by the crossing-out of the terminals it contains) and to which late merge of a relative CP applies.

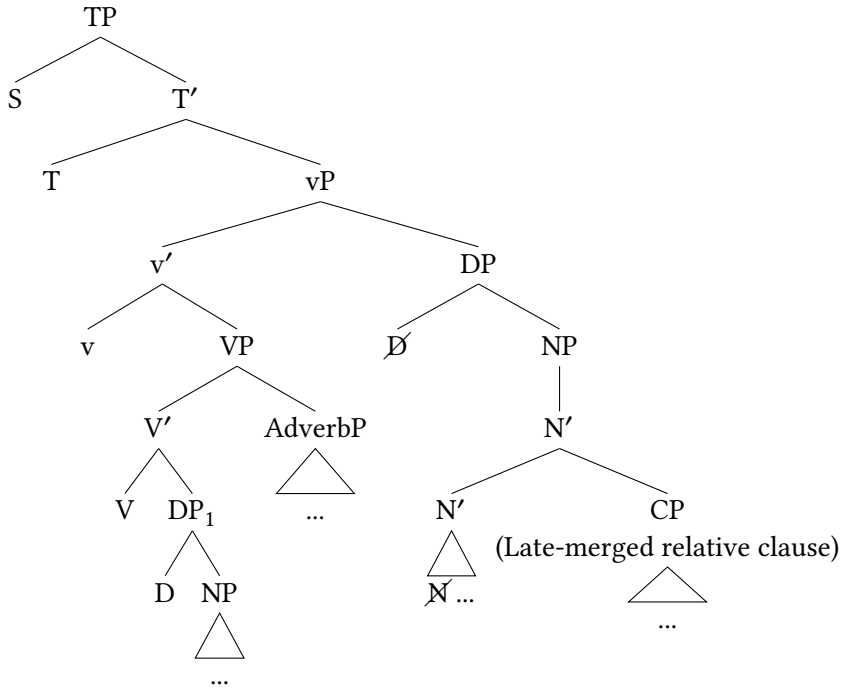

Figure 6: Extraposition as covert movement + late adjunction

See Fox & Nissenbaum 1999, Nissenbaum 2000, and Overfelt 2015 for syntactic and semantic arguments for this proposal from phenomena like scope and (non-) reconstruction.[10]

This hybrid analysis captures some empirical details about extraposition that a pure extraction analysis does not obviously explain. However, the CL analysis of the REEC that I offered above is not clearly compatible with this analysis of extraposition.

As discussed in §2, Nissenbaum (2000) was aware that a constraint like the REEC holds due to facts from English and Hebrew. To account for this constraint, Nissenbaum (2000: 201) hypothesized the *Linear Edge Condition*, which allows

[10]Fox & Nissenbaum point out, citing Taraldsen 1981, that extraposition can circumvent violations of principle C in the way shown in (i) below. We also see here that failing to perform extraposition while holding everything else constant prevents principle C circumvention, as expected if this effect is indeed dependent on the application of extraposition here:

(i) a. I gave him$_1$ a picture yesterday [**from John's$_1$ collection**].
b. ??/* I gave him$_1$ a picture [**from John's$_1$ collection**] yesterday.
c. I gave him$_1$ an argument yesterday [**that supports John's$_1$ theory**].
d. ??/* I gave him$_1$ an argument [**that supports John's$_1$ theory**] yesterday.
e. I told you that he$_1$ will accept the argument, when you and I last spoke, [**that I presented to John$_1$**] yesterday.
f. ??/* I told you when you and I last spoke that he$_1$ will accept the argument [**that I presented to John$_1$**] yesterday.
(Fox & Nissenbaum 1999, ex. 11)

For Fox & Nissenbaum, in (i) covert movement of DP creates a position above the relevant pronoun where an adjunct can be late merged, allowing that adjunct to contain an R-expression which, due to never being c-commanded by that pronoun, can be co-indexed with it without violating principle C. Importantly, in Wolof principle C normally holds (iia-b), but extraposition circumvents it (iic), suggesting that English and Wolof derive extraposition by the same mechanisms:

(ii) a. Gis-na muusu Ada.
see-3SG cat Ada
'She$_{1/*2}$ saw Ada$_2$'s cat.'
b. Jang-na [téére [bu xaritu Roxaya sopp lool]] démb.
read-3SG book that friend Roxaya like very yesterday
'She$_{1/*2}$ read a book that Roxaya$_2$'s friend really likes yesterday.'
c. Jang-na [téére t_1] démb [bu xaritu Roxaya sopp lool]$_1$.
read-3SG book yesterday that friend Roxaya like very
'She$_{1/2}$ read a book yesterday that Roxaya$_2$'s friend really likes.'

late merger of material into a phrase only at its linear edge. Importantly, Nissenbaum assumes that covert material, despite being silent, possesses linear ordering. Since the late merged relative CP in Figure 6 above appears at the right edge of the covert higher copy of the moved DP, this instance of late merge is legal. In contrast, if late merge would have to apply to a non-edge position extraposition will fail. This would be the case for attempted extraposition of a usual pre-nominal adjective in English (11), or a relative clause in the context of a head-final D in Wolof (7). The tree in Figure 7 below shows the relevant ungrammatical Wolof scenario:

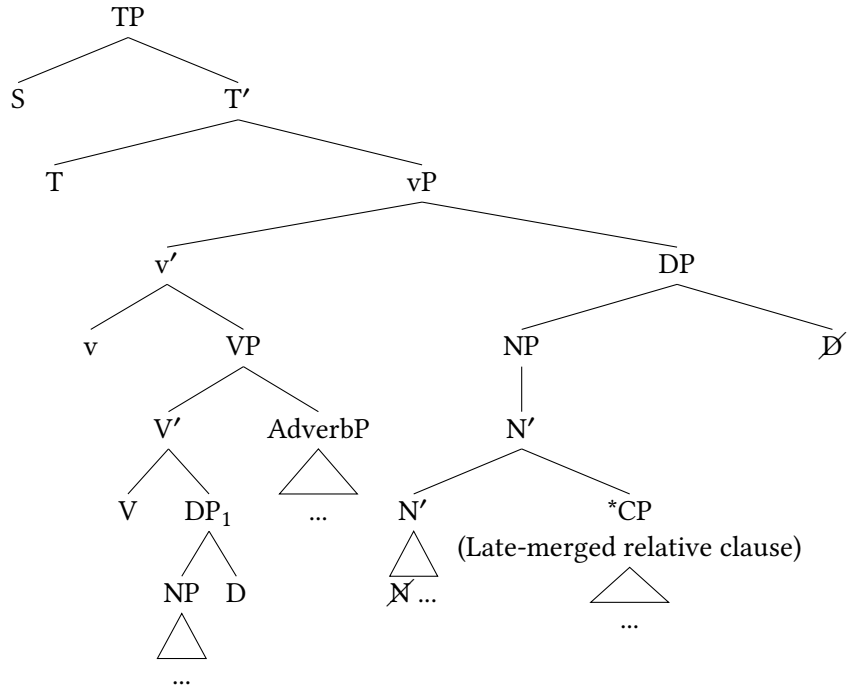

Figure 7: Wolof: Head-final D prevents late merger at the linear edge of DP

Nissenbaum's account thus does indeed capture the REEC. However, there are a few aspects of this account worth questioning. First, it is not obvious why the Linear Edge Condition should exist, since (as far as I know) it does not stem from any independent linguistic principles. Thus, the Linear Edge Condition is more like a descriptive generalization than an explanation. Second, as mentioned above, Nissenbaum's use of this condition requires the assumption that covert

material has linear order. This is an uncomfortable proposal, given that linear order describes the temporal order in which a set of elements is pronounced—a consideration that is irrelevant to silent material. An analogous point of discomfort is applicable to the covert movement plus late merge analysis of extraposition more generally, since this theory (at least as proposed by Fox & Nissenbaum 1999) requires assuming that covert movement is in fact linearly rightward, which causes material late merged to the site of covert movement to lean rightward in the way characteristic of extraposition. In closing, I will offer some discussion of how these potential issues might be understood.

The Linear Edge Condition resembles other proposals in the literature about the limitations of late merge. In particular, a number of works note that late merge that is in some sense "too deep" is not permitted (Tada 1993, Sauerland 1998, Stepanov 2001, Stanton 2016, Safir 2019). Consequently, late merge tends to occur in peripheral positions. While this intuition does not align exactly with that of the Linear Edge Condition, it is worth noting that the works cited above do not agree about how exactly to define the depth limitation of late merge. Therefore, this is a more general open question, the correct answer to which may subsume the Linear Edge Condition. It is also possible that the Linear Edge Condition may be reducible to some version of the CL theory, though this remains to be seen.

While Nissenbaum's proposal that covert material is ordered is potentially counter-intuitive (as he himself notes), this possibility is actually permitted by some morpho-syntactic theories. Specifically, a few works argue that linearization precedes the assignment of morpho-phonological form (Embick 2010, Arregi & Nevins 2012, Haugen & Siddiqi 2016). Importantly, notice that if linearization occurs first, the linearization process does not have access to information about whether the material it is ordering will ultimately be pronounced or not. Thus it is possible that linearization applies blindly to all syntactic nodes present, but that some of those nodes happen to not be assigned morpho-phonological form. This would result in material that has been linearized, but is covert. From this perspective, Nissenbaum's proposals about covert material and linear order are much more natural.[11]

[11]Fox & Pesetsky 2009 sketch a theory that addresses many of the considerations mentioned here, and attempts to reduce the Linear Edge Condition to CL while also making more general proposals about the nature of the covert versus overt movement distinction. They leave many of the details for future work, however, and it is beyond the scope of this paper to engage with this topic fully.

4 Conclusion

In this paper, I showed that Wolof provides new cross-linguistic evidence for a word order constraint on extraposition, which I termed the REEC. This constraint has precedent in previous literature, but has received little attention. If this constraint is indeed cross-linguistically robust, it is valuable because it reveals a distinction between extraposition and usual leftward movement which clarifies the criteria for an empirically adequate theory of extraposition. More cross-linguistic research on this topic is definitely necessary, however.

I went on to discuss how the REEC relates to the three main proposals about extraposition in the literature. I argued that a base generation analysis likely cannot account for the REEC, and summarized Nissenbaum's Linear Edge Condition account in the context of the late merge theory of extraposition. I suggested that Nissenbaum's account is by itself not satisfying, and discussed some ways of connecting it to other hypotheses that might strengthen it. Overall, in my evaluation an extraction analysis of extraposition allows the most appealing explanation for the REEC, since in this context it is entirely reducible to other well-supported concepts from current syntactic research (CL, DP phasehood, anti-locality). However, as mentioned, there are good reasons why a number of works on extraposition do not adopt an extraction analysis. Resolving the debate about the explanation for extraposition is beyond the scope of this paper, but I hope to have made the relevant issues clear.

Acknowledgments

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