Parasitic gaps and Locality Theory: a conclusion[*]

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1 Introduction

In Manzini (1992b) I showed that for head dependencies, the BC notion of barrier, in the sense of Chomsky (1986), is a theorem of Minimality, again in the sense of Chomsky (1986), and of c-command, as defined in Reinhart (1976). In what follows, I will show that the BC notion of barrier need not be stated for phrasal dependencies either, if the c-command requirement on dependencies is suitably modified.

Thus if I am correct, Minimality is the only necessary component of Chomsky's (1986) ECP and Subjacency. In other words, Minimality, the most restrictive locality requirement in Chomsky (1986), exhausts the definition of locality in grammar. All locality behaviors that do not fall under Minimality are proposed in this article to fall under an ordering constraint, that in some form must be imposed on dependencies in any theory. Thus there are no overwhelming reasons to think of dependencies as requiring satisfaction of complex barriers algorithms (Chomsky 1986; Lasnik and Saito 1992) or to think of empty categories as requiring, all of them, both (head) licencing and (antecedent) identification (Aoun et al. 1987; Rizzi 1990). Rather, it is possible to conceive of all extraction as a combination of exactly two atomic modules: ordering and government.

2 Ordering

Let me return to the canonical examples of parasitic gaps in (1)-(4), from Manzini (1992b):

(1) A patient that [operating immediately e] could save t

(2) A book that people buy t [without reading e]

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[*]During 1993, versions of this work were presented as part of a graduate course at the University of Florence and at seminars at the University of Geneva and at the University of Venice. I am especially grateful to M. Brody, whose work (1991; 1992; 1992/93) helped mine, to L. Rizzi, and to my students. A revision of Manzini (1992b) and of the present article that takes Chomsky (1992) into account is provided in Manzini (to appear).

(3) *A patient that you chose t [[because operating e immediately] was vital]

(4) *A book that people buy t [without understanding anything [after reading e]]

The successive cyclic derivations for the illformed (3)-(4) are as in (5)-(6):

(5) because [$_{IP}$ e"$_i$ [$_{IP}$ [$_{CP}$ e'$_i$ operating e$_j$] [$_{I'}$ could save you]]]

(6) without [$_{VP}$ e"$_i$ [$_{VP}$ [$_{V'}$ understanding linguistics] [$_{CP}$ e'$_i$ after reading e$_j$]]]

In (5)-(6) e" obviously c-commands e'. Furthermore, as detailed in Manzini (1992b), under the Minimality notion of barrier, e" governs e'. Indeed the only maximal projection that intervenes between them, CP, is not a barrier for e' under Minimality, because e' is a daughter of CP.

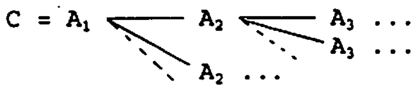
Thus, it appears that in order to derive the illformedness of (5)-(6), the notion of locality for phrasal dependencies must include the BC definition of barrier as well. Unfortunately, given that the notion of locality for head dependencies reduces to Minimality, accepting this conclusion means accepting that a partial disjunction must be reintroduced within Locality, in the form of partially different conditions on phrasal and head dependencies. This obviously is an unwelcome result.

It is worth emphasizing that this problem is far from being of purely theory-internal interest. Indeed it is true in all theories that Minimality and c-command derive the BC notion of barrier for head dependencies, and that they do not derive it for non-head dependencies. Hence in all theories the BC notion must be stated either for all dependencies, giving rise to a redundancy, or for non-head dependencies only, giving rise to a disjunction. Neither situation is optimal.

Crucially, if the discussion of head dependencies in Manzini (1992b) is correct, adjunct and subject islands do no in fact correspond to simple Locality violations, but also to violations of the c-command requirement on dependencies. If the c-command requirement can be circumvented, as in parasitic gaps, then Locality is also satisfied. By analogy, it can be supposed that the conclusion that (5)-(6) do not actually represent Locality violations, as under Minimality, is correct. Hence (5)-(6) can only represent violations of the ordering requirement on dependencies. But since e" c-commands e' in (5)-(6), this means that the ordering requirement on dependencies must be modified from c-command to some more restrictive notion.

In particular, the idea that I want to pursue is that the notion of ordering relevant for dependency formation is defined by reference to heads, exactly like the notion of Minimality. Intuitively, what I want to say is that e" and e' are not ordered with respect to one another in (5)-(6) because they are not ordered with respect to any head. In other words, they are both c-commanded by, and c-command, exactly the same class of heads. This intuition is expressed in first approximation by the definition of ordered pair in (7). Under (7), B and A form an ordered pair only if there is some head that B c-commands and that A is c-commanded by. The definition of dependency can then be modified to include the notion of ordered pair as in (8):

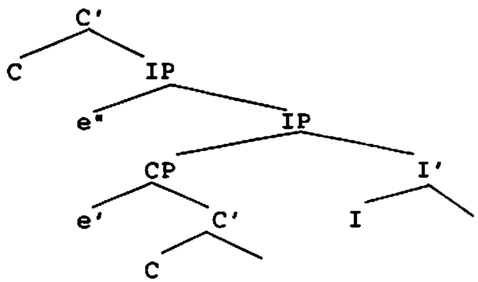
(7) (B, A) is an ordered pair iff
 (i) B c-commands A; and
 (ii) A is a head, or B is a head, or there is a head C that c-commands A and is c-commanded by B

(8)


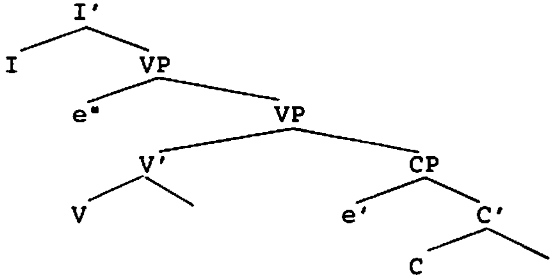
is a dependency iff for every A_i in C, i not=1, there is an A_{i-1} such that A_{i} is coindexed with A_i and (A_{i-1}, A_i) is an ordered pair

The same conclusion, that e" is local with respect to e' in (5)-(6), but that (e", e') is not a possible link of a dependency, is essentially reached in Frampton (1990). According to Frampton (1990), however, (e", e') is not a possible link of a dependency because the adjoined position e" cannot be created starting from e', under the Head Government Condition on Adjunction. The present theory differs from Frampton's (1990) in that it contains no head-government; correspondingly, the HGCA is replaced by an ordering constraint.

Consider the relevant portion of the trees in (5)-(6), as in (9)-(10):

(9)


(10)

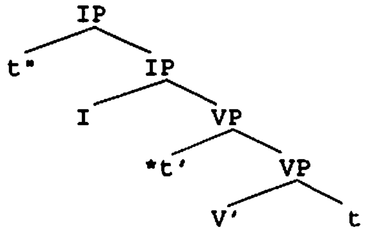


As anticipated, (7)-(8) have the desired effect in the configurations in (9)-(10). In both cases the pair (e", e') satisfies c-command, but does not count as an ordered pair, in that there is no head that c-commands e' and is c-commanded by e". Thus e" and e' cannot form a dependency. But any dependency that omits e" necessarily violates Locality, in that it crosses VP in (10) and IP in (9), both of them barriers for e'. Hence (9)-(10) are ruled out, as desired.

On the other hand, (7)-(8) do not affect head dependencies; since all of their links involve at least one head, c-command effectively defines ordering for them as before. Furthermore, successive-cyclic movement across L-marked constituents obeys (7)-(8) as desired. In particular, movement from the Spec of an L-marked constituent, XP, to the Spec of the immediately superordinate constituent, YP, crosses the L-marking head, Y, satisfying (7)-(8). Similarly, movement from a position adjoined to an L-marked constituent, XP, to the immediately superordinate YP-adjoined position again crosses the L-marking head Y and satisfies (7)-(8).

This leaves movement from an argument or adjunct position to the next Spec or adjoined landing site to be considered. To begin with, the theory in (7)-(8) yields the correct results for movement from the object position of a V head to the VP-adjoined position. Indeed such an extraction crosses the V head, as required; the same holds for the object of a X head in general. Similarly, (7)-(8) allow for movement from the subject position, in the Spec of IP, to the Spec of CP, since this crosses the C head. The same holds for subjects of XP in general. One type of movement that (7)-(8) do not allow is movement from an adjunct position daughter of XP to the XP-adjoined position, as indicated in (11) with XP = VP. However, it is in fact not necessary for this movement to take place. Rather, in (11) adjunction can take place directly from t to the IP-adjoined position t". This is because t is not dominated by V' and hence VP is not a Minimality barrier for t. Thus movement from t to t" satisfies Locality[1]:

(11)



Finally, the present notion of dependency covers not only A'-movement, but also A-movement. Thus it is necessary to briefly consider potential local pairs of A-positions for ordering. As expected, (subject, object) pairs are wellformed. For instance, a V head always intervenes between its object and its subject in the Spec of VP, yielding the required ordering. As for (object, object) pairs, the binary branching hypothesis of Kayne (1981b) insures that the two objects are always separated by at least one head. Thus the requirement in (7)-(8) is satisfied for all pairs of A-positions, given current X-bar theoretical assumptions.

Let me summarize so far. On the one hand, (7)-(8) appear to be no more complex than the BC definition of barrier. On the other hand, under a grammar that includes both a c-command requirement on dependencies and Minimality, the BC definition of barrier must either be redundant for head dependencies or be stated disjunctively for non-head dependencies. A theory that includes (7)-(8) and not the BC definition of barrier overcomes these problems. On purely theoretical grounds, then, such a grammar appears to be preferable. The question is whether any independent evidence supports it.

So far, I have reviewed contexts where the BC notion of barrier and the notion of ordering in (7)-(8) are empirically equivalent. To be more precise, I have reviewed one context, (11), in which the representations they allow are not identical; but this has no empirical consequences. Now, the position of adjuncts and the position of subjects mirror each other across X'. Thus, though movement is possible from the Spec of IP to the Spec of CP, as already indicated, by analogy

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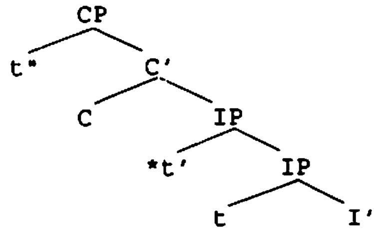
[1]An anonymous reviewer for *Linguistic Inquiry* pointed out to me that the definition of barrier given in (34) in Manzini (1992b) does not allow for extraction of adjuncts. In order to allow for it, we will have to substitute Spec of B with daughter of B in the definition, as in (i):

(i) B is a barrier for A if B is a maximal projection and B dominates A unless A is the head of B or its daughter with (11) I predict that movement is impossible from the Spec of IP to IP-adjoined position, as in (12):

(12)



Contrary to (11), this prediction is empirically verifiable. Consider (13):

(13) *[$_{IP}$ t are intelligent] all the students who solved the problem

According to Rizzi (1990), t in (13) is locally bound by its antecedent from the IP-adjoined position, but there is no head (of the proper type) that both c-commands and governs t. Thus (13) is excluded as a head-government violation, not as a locality one. In the present theory, there is no head-government requirement, and (13) cannot be excluded as a locality violation either. However, (13) can be excluded by (7)-(8), given a structure of the type in (12), with the antecedent of t right-adjoined, rather than left-adjoined, to IP.

Similarly, consider (14):

(14) I believe [$_{IP}$ t to be intelligent] all the students that can solve this problem

Rizzi (1990) correctly predicts the wellformedness of (14), given the presence of the governor *believe* for t. The present approach also yields the correct prediction, on the assumption that movement takes place directly from the embedded subject position to the matrix VP adjoined position, across the embedded IP, and the matrix V head[2].

Since that-t and wh-t effects can also be treated within the present theory without recourse to head-government, as discussed in Manzini (1992b), it appears that the head-government constraint of the conjunctive ECP can be dispensed with. Thus theoretical considerations seem once again to favor the present approach.

Finally, the successive cyclic derivation for the wellformed parasitic gap examples in (1) and (2) remains to be considered. Under this derivation, (1) and (2) are associated with partial structures of the type in (15) and (16):

(15) [O that [$_{IP}$ t' [$_{IP}$ [$_{CP}$ e' operating e] [$_{I'}$ could save t]]]]

(16) that [$_{IP}$ t'' [$_{IP}$ I [$_{VP}$ t'[$_{VP}$ [$_{V'}$ bought t] [$_{CP}$ e' without reading e]]]

Under (7), (t', e') in (15)-(16) is not an ordered pair, so that direct extraction from e' to t' is blocked, as detailed above; direct extraction from e' to O/ t'' is also blocked by Locality, since one Minimality barrier is crossed in each case, namely IP in (15) and VP in (16). However (t', t) is a wellformed ordered pair. Thus if dependencies can be composed, or are allowed to fork, t' can be part of the same dependency as e'; and since e' is governed by t', Locality can also be satisfied.

Indeed (15)-(16) show that wellformed examples of parasitic gaps can be derived by Minimality and by (7)-(8) in theories that do not admit of address-based dependencies in the sense of Manzini (1992a), duplicating the result in Frampton (1990). However, I have already argued in Manzini (1992b) that the successive-cyclic derivation of wellformed parasitic gap examples, as in (15)-(16), must in fact

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[2] If topicalization is adjunction to IP in English, as in Lasnik and Saito (1992), the line of thought pursued here predicts that topicalization is impossible from an immediately adjacent subject position. The prediction is difficult to evaluate, since the movement is string vacuous, as in (i). Nevertheless, (i) is bad enough, with the relevant comma (non contrastive) intonation:

(i) *A guy like that, t can turn your head

On the other hand, topicalization is possible out of subjects in a parasitic gap dependency, as in (ii). This is correctly predicted by the present theory, as it is under head-government:

(ii) I am sure that a guy like that, [friends of e] really admire t

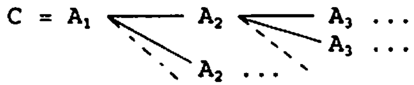
A related question concerns Left Dislocation. If Lasnik and Saito (1992) are correct, Left Dislocation, a root phenomenon, involves a higher position than topicalization. Thus Left Dislocation from subject position, as in (iii), does not create any problem for the theory either:

(iii) A guy like that, he can really turn your head

Left Dislocation finally raises the question of binding dependencies, which are in principle subsumed by the present notion of dependency. As I have argued that each two A-positions in the tree are separated by a head under binary branching, no A-dependency, including binding, is expected to create any problem for (7)-(8).

be excluded, so that illformed examples of parasitic gaps involving adjuncts can be excluded as well. In particular, I have argued that the impossibility of parasitic gaps with adjuncts cannot be explained by taking parasitic gaps to be *pro*'s along the lines of Chomsky (1982) and Cinque (1991).

The conclusion that address-based dependencies, but not ordinary movement dependencies licence parasitic gaps in turn has an evident intuitive basis. In essence, two addressed variables are identified by their different addresses, though they are bound by the same operator. On the other hand, an operator can identify at most one adjunct variable via ordinary coindexing. I will express this intuition by simply stipulating that in a forking dependency all members on parallel branches must be distinct from one another, as in (17), which I take to mean that their indices must differ, partially of course, since the overall coindexing requirement insures that they also partially overlap:

(17)


is a dependency iff for every A_i in C, i not= 1, A_i is distinct from any other A_j, and there is an A_{i-1} such that A_{i-1} is coindexed with A_i and (A_{i-1}, A_i) is an ordered pair

Though this is nothing more than a stipulation, under (17) no forking dependency can now be an ordinary movement dependency, as desired, since only address-based dependencies can insure the partial independent indexing of the separate branches.

3 Complex NP Islands

Before I turn to various important pieces of evidence concerning parasitic gaps that I have ignored so far, let me make the point of the situation. Parasitic gaps provide empirical evidence for a Minimality and ordering theory that does not include the BC definition of barrier. This is true whether parasitic gap dependencies are head-based, or address-based, as under the present theory, or they are ordinary chains, as under other current theories.

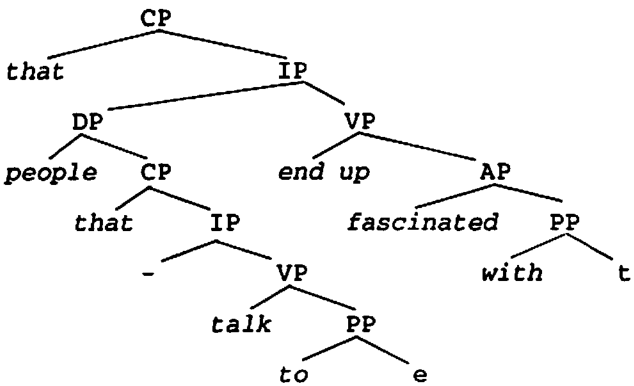
However, if Manzini (1992b) is correct, there are empirical reasons to believe that parasitic gap dependencies must in fact be address-based. Independently of this, the behavior of arguments and adjuncts with respect to weak islands can be explained on the basis of the same theory as their behavior with respect to strong islands only if address-based dependencies are introduced. Similarly, address-based dependencies eliminate the need for an independent head-government requirement from the grammar. Thus the basic argument for address-based dependencies remains so far a theoretical one.

In what follows, I will try to argue that the notion of address-based dependency explains, or at least throws fresh light upon a set of phenomena which are notoriously problematic for other current theories, including Complex NP islands and Tenseness and Definiteness effects. These, if I am correct, provide the crucial empirical evidence in favor of the notion.

Consider a sentence of the type in (18), which is associated in first approximation with the structure in (19):

(18) A person that [people that talk to e] usually end up fascinated with t

(19)



Under Kayne's (1983) Connectedness, the g-projection of the parasitic gap in (19) is blocked only at DP, where it can connect with the g-projection of the main gap, correctly predicting wellformedness. But if Connectedness must be revised to include a head-government requirement, as argued in Bennis and Hoekstra (1984), Longobardi (1984), Koster (1986), the g-projection of the parasitic gap is blocked at the embedded CP, where it no longer connects to the g-projection of the main gap. Illformedness is then predicted, incorrectly.

Similarly consider Frampton's (1990) barriers based theory. In (19), under the HGCA, movement cannot take place from the Spec of the embedded CP to a DP-adjoined position, since head-government does not hold between the N head of DP, *people*, and the Spec of the embedded CP. On the other hand, movement from the Spec of the embedded CP across CP itself and DP is blocked on locality grounds; crucially, the presence of a trace adjoined to the matrix IP and belonging to the main gap dependency cannot rescue the violation either. The only way to predict the wellformedness of (19) is to postulate that the (restrictive) relative clause CP in (18) is adjoined to DP, so that DP is no longer a barrier for extraction from inside CP.

A straightforward argument can be constructed against Frampton's (1990) solution. On the assumption that non-restrictive relatives are adjoined to DP, and in general must be attached at least as high as restrictive relatives, the theory predicts that substituting a non-restrictive relative for the restrictive relative in (18) will produce a wellformed result. The prediction however appears to be wrong, as in (20):

(20) *A person that many people, who talked to e, ended up fascinated with t

Consider the theory I have developed here. I assume that the relative clause CP in (19) is attached under NP. I also assume that an address-based dependency can successfully relate the parasitic gap to the embedded C, *that*. The embedded CP is of course not a barrier for its head, *that*, which is therefore governed by the N head of DP, *people*. The crucial question is whether *people* also c-commands *that*, and can form a dependency with it, or not. Remember indeed that for address-based dependencies the ordering requirement reduces to c-command. Suppose that as in Reinhart (1976), c-command is defined for branching nodes. If so, in (19) *that* is c-commanded by the non-branching N *people*, since it is dominated by its first branching projection, NP; thus it can form a dependency with it. In turn the matrix I, which belongs to the main gap dependency, governs *people*, since DP is not a barrier for its N head; hence it appears that the wellformedness of (18) is correctly derived.

This account makes the immediate prediction that wellformed parasitic gap dependencies are not found in relative clauses sisters to branching N's. This appears to be correct, as seen in the contrast between (18) and (21):

(21) *A man that [lovers of conversation] that talk to e end up fascinated with t

What is more, the impossibility of parasitic gaps in non-restrictive relatives, as in (20), can be accounted for in the same way, under precise enough assumptions about where restrictive and non-restrictive relatives are attached. Since I assume that a restrictive relative is attached under NP, its head, C, is c-commanded by the head of NP, N, if N' is non-branching, as in (18), and the two can form a link of a dependency. But suppose non-restrictive relatives are attached under DP. D' is always branching because D obligatorily selects NP. Hence the C head of a non-restrictive relative is never in a position to be c-commanded by D, and hence to form a local dependency with it.

An obvious problem arises at this point. In the absence of parasitic gaps, extractions out of relative clauses must still be predicted to be illformed, even when the N' they modify is non-branching, as in (22). If no adjunct island violation is involved, then apparently my theory predicts (22) to be wellformed:

(22) *The only woman that I found presents [to give to t]

The solution that I intend to propose makes use of the fact that, descriptively speaking, (22) still involves a Complex NP violation. In particular, (22) is comparable to Complex NP violations with sentences in the object position of N, as in (23):

(23) *Who did you see [attempts [to portray t]]

Now, current theories of extractions in general derive Complex NP islands to the extent that they stipulate a difference in head-government properties between N and V, as in Kayne (1981a) or Cinque (1991). Under Locality theory, on the other hand, VP's are never addressed, since they are never visible, while DP's are generally visible and hence addressed. If so, the basic difference between N's and V's with respect to Locality is that it is possible for V's, but not for N's, to be included in address-based dependencies, in that N's, and not V's, in general have an address of their own.

Suppose the wh-phrase in (23) moves successive-cyclically. I make the standard assumption that DP is not associated with any A' escape hatch, whether Spec or adjoined position. If so, successive-cyclic movement must bypass DP, creating a government violation.

Suppose on the other hand that the argument in (23), say of address (j, i), moves by forming an address-based dependency. Suppose this dependency includes the embedded V, I and C heads in (24); crucially, it cannot include the N head, *attempts*, on the assumption that this already has an address of its own, say (l, k), that it shares with its DP projection. Indeed, percolation is blocked by DP, so that VP cannot bear address (j, i) either; the next element that can enter the dependency is then a trace in VP-adjoined position, t' in (24). But this means that government is violated, since DP is once more crossed. Thus the impossibility of extracting an argument from Complex NP islands follows, as desired, under the address-based derivation:

(24) Who did you [$_{VP}$ t'$_{(j,i)}$ [$_{VP}$ see [$_{DP}$ attempts$_{(l,k)}$ [$_{CP}$ C$_{(j,i)}$ [to portray t]]]]]

In short, one of the best empirical arguments in favor of Locality theory and in particular of its notion of address-based dependency is its ability to predict Complex NP violations without need for stipulation. Like (23), (22) is excluded under the successive-cyclic derivation, which is additionally blocked as a wh-island, and under the address-based derivation. Under the address-based derivation, extraction across DP is blocked by the fact that DP has an address of its own and so does its head, *presents*, as in (25). Thus *presents* cannot enter an address-based dependency with the embedded C, and Locality is violated, as desired:

(25) ... $[_{VP}$ $t'_{(j, i)}$ $[_{VP}$ found $[_{DP}$ $presents_{(l, k)}$ $[_{CP}$ $C_{(j, i)}$ ...

But consider (19) again. The assumption that the relative clause CP effectively functions as a sister of N, *people*, so that no adjunct island violation is involved is no longer sufficient to ensure that (18) is wellformed. Descriptively, indeed, (19) also embeds a Complex NP island, and *people* and *that* cannot form a dependency together, because they have incompatible addresses.

Now, so far I have assumed that heads and maximal projections share all of their indices. Suppose now that in (19) the address of DP, say (l, k), does not percolate down to its head, *people*. Rather, the address of e, say (j, i), percolates up to *people*, as in (26), so that *people* is in the parasitic gap dependency. Since the matrix I, which is in the main gap dependency, governs *people*, the potential subject island violation can be rescued. Hence the contrast between (18) and simple extraction from a subject island is explained:

(26) ... $[_{DP(l, k)}$ $people_{(j, i)}$ $[_{CP}$ $that_{(j, i)}$ ...

Suppose on the other hand that the presence of mismatching addresses on head and maximal projection in (26) still represents a violation. This allows us to predict the marginality of (22)-(23). Since (19) itself involves a violation, we also predict that (18) is degraded with respect to examples of parasitic gaps such as (1) or (2), though it is not obvious that this prediction is correct.

In summary, all theories of parasitic gaps face a problem in explaining why both an adjunct island (the relative clause) and a subject island can apparently be crossed in (18), as opposed to (3) or (4). In the present theory, however, only a subject island is crossed, since relative clauses can effectively be construed as objects of N; the residual illformedness of extracting from them can be imputed to the fact that they are Complex NP's. In particular, I construe Complex NP islands as involving an indexing violation, as in (26), thus differentiating them from adjunct islands, which involve a Locality violation. The essential difference between the present theory and others is then that the present theory derives

Complex NP islands on principled grounds, given the existence of address-based dependencies.

4 T and D islands

Let me now turn to another set of data. Wellformed examples of parasitic gap dependencies typically involve embedded untensed clauses. The introduction of T(ense) renders parasitic gaps unacceptable even in the most canonical configuration, as in (27):

(27) *A book that I taught t [after my students read e]

Following Enç (1987), among others, T is an element with denotational properties, hence an argument in the sense of Chomsky (1981). If all arguments must saturate an argument position and visibility is a precondition for saturation, then T must also be visible. As for the argument position that T saturates, I assume a framework of the type in Higginbotham (1985), where an extra temporal role can be associated with the argument structure of V. As for visibility, following an insight in Baker (1988), I assume that incorporation, like Case-marking can make an argument visible. I will then assume that T is systematically made visible and hence addressed by V, which has incorporated into T. Since address-based dependencies are sensitive to intervening addressed heads, I predict them to be sensitive to an intervening T. Hence, since parasitic gap dependencies are always address-based, I expect them to be blocked altogether in the presence of T. This correctly predicts that (27) is illformed.

Notice on the other hand that the solution that I have just proposed for the ungrammaticality of (27) potentially undermines my account of grammatical examples of the type of (1) or (2). Indeed, in (1)-(2) I have assumed that both the parasitic and the main gap dependencies are address-based. But it is obvious that any address-based dependency will eventually reach the denotational T head in the matrix clause. If the T head is addressed, the dependency should not be able to proceed further, yielding ungrammaticality.

To circumvent this problem, it is sufficient that movement takes place to the higher IP-adjoined position, rather than directly to the higher Spec of CP. Thus in (28) the dependency includes *without* and *buy*, and then an IP-adjoined position; this allows the denotational T in I to be bypassed. In (28), heads coaddressed with e bear subscript *e*, heads coaddressed with t subscript *t*:

(28) O_i that $[_{IP}$ t'_i $[_{IP}$ I$[_{VP}$ $[_{V'}$ buy_t $t_i]$ $[_{CP}$ $without_e$ I_e $reading_e$ $e_i]]]]$

Similarly, in (29), the dependency still includes the embedded C and the matrix V, *save*. But what it includes next is the IP-adjoined position, which allows it to bypass I:

(29) O_i that $[_{IP}$ t'_i $[_{IP}$ $[_{CP}$ C_e I_e $operating_e$ $e_i]$ $[_{I'}$ could $[_{VP}$ $save_t$ $t_i]]]]$

In (28)-(29) government and ordering are satisfied as before. In particular, in (28) t' governs *buy*, which in turn governs *without*. For, the only maximal projection that intervenes between t' and *buy*, VP, is not a Minimality barrier for its own head. Similarly, in (29) t' governs both *save* and the embedded C. Indeed the matrix VP is not a barrier for its head, *save*, nor is the embedded CP a barrier for C. As for ordering, since heads are involved, it effectively reduces to c-command, which is satisfied thoughout in (28)-(29).

Quite independently of parasitic gaps, notice that the presence of a T head leads to stronger violations in Complex NP contexts, both with and without relative clauses, as in (22) and (23) vs. (30) and (31):

(30) *Who do you disapprove [rumours [that Mary loves t]]

(31) *The only woman that I found [a present [that I wanted to give to t]]

Crucially, remember that the absence of an A' escape hatch in DP's and the presence of a wh-island in relative clauses forces an address-based strategy in both contexts; whence the sensitivity to T islands. The contrast between (23) and (30) is well-known from Stowell (1981), but is attributed there to the fact that only the untensed sentence in (23) is a genuine complement of N, while the tensed sentence in (30) is an adjunct. On the other hand, the contrast between (22) and (31), though not equally familiar, can be attributed to hardly anything but the presence or absence of T.

With parasitic gaps, I similarly predict that violations of untensed Complex NP's are better than violations of tensed Complex NP's. The evidence seems to be compatible with this prediction, as in (32)-(33)[3]:

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[3]Another consequence of the approach to T islands adopted here is that extraction from tensed wh-islands is predicted to be illformed, since the Spec to Spec extraction path and the head-to-head address path are blocked, by the wh-phrase and by T respectively. That extraction from tensed wh-islands, as in (i), is illformed, while extraction from untensed wh-islands is wellformed, is a conventionally accepted judgement:

(i) *What do you wonder how John repaired

These facts and their analysis are discussed in detail in Manzini 1992a, section 3.3. For the interaction of T with inner islands see now Roussou and Tsimpli (1993).

(32) The outlaw that [any attempt [to capture e]] would only enrage t

(33) *The outlaw that [rumours [that we captured e]] would only enrage t

Let me turn to the next set of data. All of the wellformed examples of parasitic gaps inside (Complex) NP's considered so far involve zero D's. The presence of an overt D does not in fact change the grammaticality status of examples like (18), as shown in (34). However Definiteness effects, which affect extractions in general, affect parasitic gaps as well. Thus substituting a definite D for the indefinite D in (34) yields an illformed result, as in (35); the same holds, perhaps more sharply, for non-complex DP's as in (36)-(37):

(34) A man that [many women that talked to e] ended up fascinated with t

(35) *A man that [the women that talked to e] ended up fascinated with t

(36) A man that [(some) friends of e] admire t

(37) *A man that [the friends of e] admire t

Since successive-cyclic movement out of DP's is blocked by the absence of an A'-escape hatch in all cases, Definiteness effects can be relevant only for address-based dependencies. In the present theory, in turn, address-based dependencies require the availability of maximal projections and/or heads that are themselves unaddressed, so that the address of the dependency can percolate without obstacles. The presence of any DP on the path of the dependency creates then a potential problem. As we have seen in the analysis of (18), this problem can be partially avoided. Thus suppose (34) is associated with a structure of the type in (38); in (38) the address of the parasitic gap, say (j, i), percolates as high as the D position *many*, so that the potential subject island violation can be rescued by the main gap dependency. The mismatching of the address of DP and D remains the only residual violation:

(38) ... $[_{DP(l,\ k)}$ many$_{(j,\ i)}$ $[_{NP}$ women$_{(j,\ i)}$ $[_{CP}$ that$_{(j,\ i)}$ ...

Consider however (35). What I want to suggest is that there is a good reason why the mismatching of indices in this case creates a worse violation than in the case of (38). I tentatively assume a theory of DP's under which the representation of indefinite and definite DP's differ at an appropriately abstract level. Roughly speaking, an indefinite DP as a whole can correspond to a logical variable; however the logical variable in a definite DP corresponds to the D position. Remember in turn that addressing simply encodes visibility; so that no unaddressed position is visible. We can assume that the fact that *many* is not visible in (38) is immaterial, in that the whole DP can correspond to a logical variable. But the fact that *the* must correspond to the logical variable in (35) forces the addressing structure in (39), where *the* has an address of its own:

(39) ... $[_{DP}$ the$_{(l, k)}$ $[_{NP}$ women$_{(j, i)}$ $[_{CP}$ that$_{(j, i)}$ ...

On the assumption that (39) is the structure relevant for (35), the main gap dependency and the parasitic gap dependency are separated by DP, a barrier, and a Locality violation is predicted to arise.

The factual correlation that emerges from the discussion so far is worth emphasizing. The basic empirical argument in favor of Locality theory, or in particular in favor of the notion of address-based dependency, is that it predicts that denotational heads create islands for argument extraction. Now, on the one hand parasitic gaps can involve A'-movement of arguments, but not A'-movement of adjuncts, A-movement or head-movement; on the other hand, parasitic gaps are sensitive to Complex NP, T and D islands, i.e. in general denotational head islands. My theory predicts this correlation, or at the very least provides a straightforward framework for stating it, whereas to other theories it simply remains a mistery.

Finally, before concluding, the examples of parasitic gaps of the type in (36)-(37) involving arguments of N, disregarded so far, must be briefly considered. Within the present theory the question arises why a simple DP can be extracted from, since a potentially blocking N/ D head is encountered on the address-based extraction path. The answer I propose is a form of reanalysis. The idea is that if an element A is addressed by a head B which is itself addressed, the address of A can correspond to the address, rather than the categorial index, of B followed by the categorial index of A itself. In practice, this can be the case only if the addressing head is N, and the addressed element is an argument of N. Thus complex NP's are excluded from this form of reanalysis. Under the appropriate definition of compatibility of indices in a dependency, an N head, say of address (k, j) can then be assumed to be able to form a dependency with a variable of address, say, ((k, j), i).

Concretely, consider parasitic gap extractions of the type in (36) again. Under my proposal, a wellformed derivation exists for (36), as in (40); in (40) I have again indicated members of the t dependency with a *t* subscript:

(40) ... O_i that$_t$ [friends$_{j, (k, j)}$ of $e_{i, ((k, j), i)}$] I_t admire$_t$ t_i

In (40) both e_i and the N head of DP, *friends*, have an address of their own; but because e_i is an argument of *friends*, the address of *friends* is part of the address of e_i. Assuming that inclusion is sufficient for index compatibility, we can allow sequence formation between e_i and *friends*. Since *friends* in turn is governed by I_t, the e dependency can be rescued by the t dependency in (40), as desired.

In my schema of explanation I have abstracted away from T, which actually forces the derivation to include an IP-adjoined trace in (40), rather than the matrix I. More significantly, notice that the explanation of Definiteness effects on Complex NP's does not automatically work for non-complex ones. Indeed, in order to predict the contrast between (36) and (37), it is not sufficient to say that D must have the same index as DP; it is in fact necessary to say that it must have the same index as DP to the exclusion of N, which cannot then 'reanalyze' with its argument. Conceivably, the abstract variable status of D is again sufficient to impose such a uniqueness requirement[4].

In conclusion, in this article I have shown how parasitic gaps are accounted for, given the notion of address-based dependency, the Locality principle and the Minimality notion of barrier. I have tried to present empirical evidence in favor of my account. In particular, I have argued that this analysis accounts for a number of residual island effects involving Complex NP's, T, and D. To compensate for the elimination of the BC notion of barrier, and for the lack of any independent head-government requirement, I have tightened the ordering requirement on dependencies from simple c-command to the notion of ordered pair.

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[4]For more on (non-parasitic) extraction from DP's along these lines the reader is referred to Manzini 1992a, section 3.4. Examples of the type in (37) are also reported to have an interpretation whereby the real and the parasitic gap are disjoint in reference, as indicated in (i):

(i) Who$_i$ do [friends of e_j] admire t_i

This disjoint interpretation is impossible in (1) and (2). One generalization that immediately comes to mind is that the disjoint reference reading can be obtained only if the main gap and the parasitic gap are arguments of the same predicate complex so that one of them could be an anaphor depending on the other, as indeed in (36). If the main and the parasitic gaps belong to different argument complexes, so that neither of them could be an anaphor depending on the other, as in (1) and (2), then they must be interpreted as coreferential. In other words, there is a descriptive parallelism between parasitic gap dependencies and anaphoric binding. Whether there is a theoretical interpretation of this parallelism or not will be left as an open question here, since binding dependencies are outside the scope of this article.

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