A Heterogeneous Approach to Gapping

David Potter
Northwestern University

1. Introduction

Gapping constructions, as in (1), have long been known to be ambiguous between *wide scope* (1-a) and *distributive scope* (1-b) interpretations (Siegel, 1987). Nevertheless, extant analyses of gapping which posit that Gapping occurs in just one syntactic configuration fail to account for this ambiguity.

(1)   James shouldn't order caviar and Mary chili.

    a.   Wide scope:
        (i) $\Box\neg$(Order(James, caviar) $\wedge$ Order(Mary, chili))
        (ii) "There is an obligation for it not to be the case that James order caviar and Mary order chili"

    b.   Distributive scope:
        (i) $\Box\neg$Order(James, caviar) $\wedge$ $\Box\neg$Order(Mary, chili)
        (ii) "There is an obligation for it not to be the case that James order caviar and there is an obligation for it not to be the case that Mary order chili"

We argue that Gapping is a structurally heterogeneous phenomenon, supported only in *v*P and CP coordinate structures. This analysis thereby captures the Gapping scope ambiguity: the wide scope construal is the result of *v*P coordination, as in (2-a), and the distributive scope construal, the result of CP coordination, as in (2-b). It also makes several novel predictions, including that *split scope* in Gapping is impossible.

(2)   a.   *v*P coordination: James shouldn't [$_{vP}$ order caviar] and [$_{vP}$ Mary ~~order~~ chili]
    b.   CP coordination: [$_{CP}$ James shouldn't order caviar] and [$_{CP}$ Mary ~~shouldn't order~~ chili]

2. The Gapping Scope Ambiguity

In example (1) we saw the ambiguity of root modal and sentential negation together. However, the Gapping scope ambiguity is fully general: all scopal elements above the *v*P domain participate, including epistemic and root modals, sentential adverbs, and sentential negation, illustrated in (3)-(6).

(3)   Epistemic Modality: Spencer must have drunk scotch and Alexi beer.

    a. $\Box$(Drink(S, scotch) $\wedge$ Drink(A, beer))
        . . . because they're debating the virtues of all wheel drive, which they only do when Spencer has drunk scotch and Alexi has drunk beer.

    b. $\Box$Drink(S, scotch) $\wedge$ $\Box$Drink(A, beer)
        . . . because each is hung over, and Spencer only gets hung over when he drinks scotch, and Alexi only gets hung over when he drinks beer.

(4) Root Modality : James should order mussels and Mary shrimp

    a.   □(Order(J, mussels) ∧ Order(M, shrimp))
       . . . because they plan to share, they should get complementary dishes.

    b.   □Order(J, mussels) ∧ □Order(M, shrimp)
       . . . because mussels is all James wants and shrimp is Mary's favorite seafood.

(5) Negation[1]: James doesn't watch comedies and Mary dramas

    a.   ¬(Watch(J, comedies) ∧ Watch(M, dramas))
       . . . they watch westerns together

    b.   ¬Watch(J, comedies) ∧ ¬Watch(M, dramas)
       . . . because he has no sense of humor and she finds dramas trite.

(6) Sentential Adverbs: Tim luckily works at SFU and Alexi at UBC. (evaluative *luckily*)

    a.   Luckily(Works-at(T, SFU) ∧ Works-at(A, UBC))
       . . . because now they can collaborate together more easily.

    b.   Luckily(Works-at(T, SFU)) ∧ Luckily(Works-at(A, UBC))
       . . . because Tim owns a condo near SFU, and Alexi's condo is near UBC.

Only under the distributive reading is each conjunct independently entailed. The distributive construal of (5) entails that James doesn't watch comedies. The wide scope construal entails that what doesn't happen is the conjoined event of James watching comedies and Mary watching dramas. Thus, James watching comedies while Mary watches documentaries is a state of affairs compatible with the wide scope but not the distributive scope construal.

It is important to note that both wide and distributive scope construals should both be treated as instances of Gapping. Both behave uniformly with respect to certain characteristic properties of Gapping, including the *no-subordination* and the *no-embedding* constraints, which set gapping apart from similar constructions. See (Johnson, 2009) for summary of these and other properties.

The no-embedding constraint captures the generalization that neither the gap nor the antecedent may be embedded within their conjunct, as illustrated in (7-a). Notice that (7-a) is not acceptable under either wide or distributive construal. Other elliptical configurations, like verb phrase ellipsis (7-b) and pseudogapping (7-c), in contrast with Gapping, freely violate the no-embedding constraint.

(7)   a.   *[Charlie thinks that John shouldn't order caviar] and [James thinks that Mary chili].
     b.   James loves beans and I think Mary does too.
     c.   John shouldn't order caviar but James thinks that Mary should chili.

The no-subordination constraint captures the generalization that the gap and antecedent clauses may not be joined by subordinators, as illustrated in (8-a). As with the no-embedding constraint, the example is acceptable under neither a wide nor a distributive scope construal. Again, verb phrase ellipsis, in (8-b), and pseudo gapping, in (8-c), occur freely in subordinate contexts.

(8)   a.   *John shouldn't order caviar although Mary chili.
     b.   James loves beans although Mary doesn't.
     c.   John shouldn't drink as much beer as James does whiskey.

Both wide and distributive scope construal of the kind of examples we have been considering are subject to the same diagnostic characteristic of Gapping, and so warrant uniform treatment as instances Gapping.

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[1] Wide-scope negation does not appear to always be metalinguistic as it licenses NPIs, as in (i), cf Repp (2009).

(i)   James shouldn't drink scotch and anyone else bourbon
       . . . because he gets so drunkenly obnoxiously elitist about his booze.

3. Prior approaches to Gapping

We next turn to the question of whether and how prior approaches to Gapping account for the Gapping scope ambiguity. Prior approaches generally fall into one of two categories, positing either large, roughly clause sized conjuncts or positing small, roughly VP sized conjuncts[2].

If we assume that Gapping is the result of clausal coordination, as do the classic analyses of Neijt (1980) and Ross (1967), we can capture only the distributive scope reading. If the conjuncts are each clausal, as illustrated in (9) all scopal material would be trapped within the conjuncts, taking distributive scope. What is not clear under this analysis is how the scopal material might take scope over the coordinate structure at all.

(9)   [$_{CP}$ James shouldn't order caviar] and [$_{CP}$ Mary ~~shouldn't order~~ chili]

If we assume that Gapping is the result of low, roughly VP level coordination, as do Lin (2002), Coppock (2001) and Johnson (2009), we can capture just the wide scope reading. The analysis of Johnson (2009) will serve as an example for this general approach. Johnson pairs a small conjunct analysis with ATB VP movement to SpecPredP, as roughly illustrated in (10). In such an analysis, the scopal material is positioned above the coordinate structure, thereby capturing the wide scope reading, and, in turn, leaving the distributive scope readings mysterious.

(10)   James$_i$ shouldn't [$_{VP_j}$ order t$_k$] [[$_{vP}$ t$_i$ [$_{VP}$ t$_j$ caviar$_k$]] and [$_{vP}$ Mary [$_{VP}$ t$_j$ chili$_k$]]]

What has made the ATB approach to Gapping so appealing is that it derives the no-embedding and no-subordination constraints from the very operation that derives the gap. Independently motivated limitations on ATB movement, and the contexts in which a VP may ATB raise largely serve to derive these constraints, as discussed in Johnson (1994, 2004, 2009). However, the distributive scope construal, which the ATB approach to Gapping cannot derive, still conforms to the no-embedding and no-subordination constraints, as discussed above. Thus, a complete explanation of these constraints on Gapping cannot be so elegant as the solution provided by ATB-based analyses. We leave their explanation an open question.

4. Analysis: Gapping is a structurally heterogeneous phenomena

We propose that that Gapping is supported in just two configurations: CP coordination and *v*P coordination. This core idea derives the Gapping scope ambiguity and predicts which elements do and do not participate in it. Beyond the gapping scope ambiguity, from this central claim a number of predictions follow, which we discuss in the following section.

Our central claim is compatible with a number of hypotheses about the mechanism that derives the gap, and the process by which the remnants are excluded from the gap. The current space constraints prohibit detailed comparison of these hypotheses, and so we will sketch just one way in which our central claim can be implemented, illustrated in (11) and (12) and discussed below.

(11)   a.   *v*P coordination: James shouldn't [$_{vP}$ order caviar] and [$_{vP}$ Mary ~~order~~ chili]

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[2] The analysis of Repp (2009) is an exception, proposing Gapping to consist of conjunctions of one of two distinct phrases within an extended CP domain. Space limitations preclude extended discussion, but such an analysis fails to predict the ambiguity of root modals and sentential negation or the availability of cross-conjunct binding.

b.
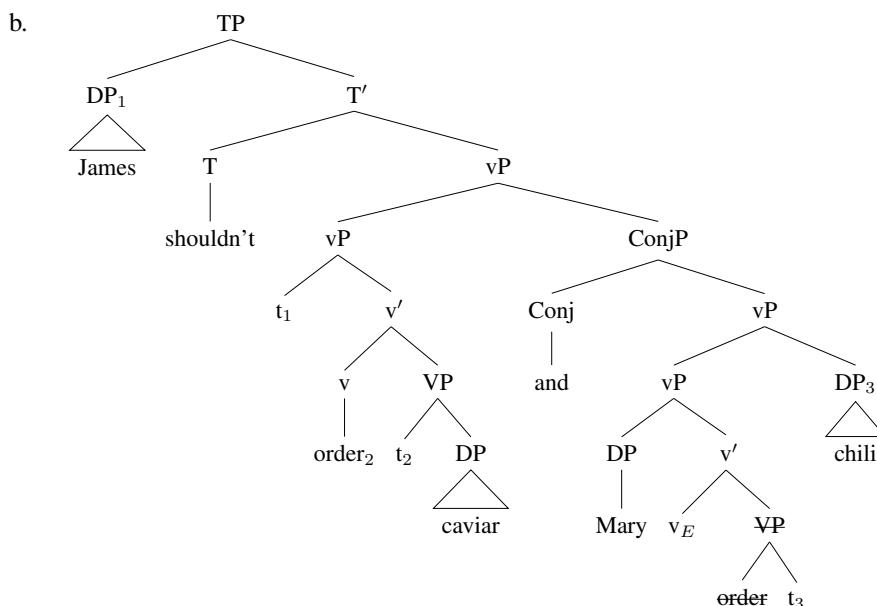
(12) a. CP coordination: [_CP James shouldn't order caviar] and [_CP Mary ~~shouldn't order~~ chili]

b.
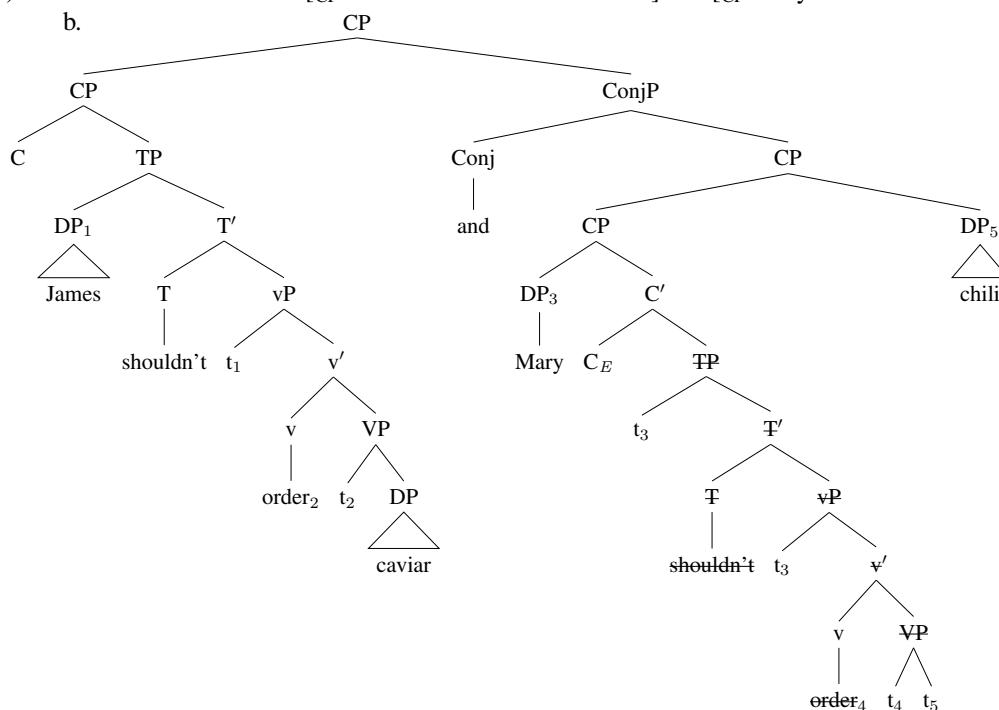
We assume that the gap is the result of an ellipsis process, in both the large and small conjunct Gapping configurations. We adopt the general approach to ellipsis outlined by Merchant (2001), in which ellipsis is the non-pronunciation of some syntactic material, licensed in the complement of a head featuring an E-feature under an E-GIVENness identity condition. In small conjunct Gapping configurations, the E-feature resides on the head of the vP, and so in these cases it is the VP that is the target of ellipsis. In the large conjunct Gapping, the E-feature is found on C^0, licensing the ellipsis of the TP.

We note that the Gapping scope ambiguity data does not directly speak to how the gaps are derived. An ATB movement analysis can derive the small, but not the large, conjunct structures. On the other hand, both large and small conjunct Gapping configurations can be derived by a process of ellipsis. We therefore assume that the gaps in both Gapping configurations are due to this one mechanism.

If, as we have assumed, TP and VP ellipsis produces the gaps in Gapping constructions, some process must result in the remnants escaping these constituents. We follow the proposal of Nakao (2008) and assume that the remnants, as focused elements, do not have a local antecedent and so, forced by a condition called Recoverability, given in (13), must escape ellipsis through overt focus A′ movement in order to be pronounced.

(13)   Recoverability: ((Pesetsky, 1997): 342)
        A syntactic unit with semantic content must be pronounced unless it has a sufficiently local antecedent.

This solution to the problem of ellipsis remnant movement avoids any look-ahead problem, as remnants raise to the specifier of the head featuring the E-feature. We further assume that the overt focus movement underlying the remnants' escape targets only those positions compatible with focused elements, and that these positions are just the CP and vP domains. If the specifier of these positions is already occupied, rightward movement and adjunction results. Why Gapping should surface in just CP and vP coordinate structures is thus explained. Ellipsis remnants, of the sort found in Gapping, are possible just when the position above the ellipsis site is a possible landing site for focus movement.

The first advantage of this analysis is that it accounts for the Gapping scope ambiguity in a principled manner: the scope ambiguity is the result of a CP/vP structural ambiguity. As discussed in section (2), scopal material above vP domain participates in the scopal ambiguity. In large conjunct Gapping configurations, a copy of all the scopal material is contained with each of the conjuncts. Thus, even material such as epistemic modal and sentential adverbs, which have been argued to be interpreted in the CP domain (Butler, 2003; Hacquard, 2011), can be contained with the conjuncts to thereby receive a distributive reading. In small conjunct Gapping configurations, the conjuncts are vPs, and so all of the scopal material that participates in this ambiguity will be interpreted above the coordinate structure, thereby taking wide scope in these configurations.

This analysis also accounts for why vP domain scopal elements, including manner adverbs and VP-negation vP (Potsdam, 1998; Jackendoff, 1969), are unambiguously interpreted within each conjunct. Examples (14-a) and (14-b) admit only a distributive scope reading for the manner adverb and the VP-negation, respectively. The smallest Gapping conjuncts, the vP conjuncts in small conjunct Gapping, will always contain these non-ambiguous elements.

(14)   a.   James can quickly drink PBR and Mary Champagne.
        b.   James shouldn't not cook dinner and Mary dessert.

5. Predictions

In addition to capturing the Gapping scope ambiguity, our heterogeneous analysis makes a number of novel predictions, which we detail in this section.

5.1. No Split Scope

Under the heterogeneous analysis proposed in section 4, Gapping occurs just in CP and vP coordinate structures. The material which participates in the Gapping scope ambiguity is interpreted within the CP and TP domains. This proposal then predicts that, in an example like (15), all ambiguous scopal material is predicted to either take wide scope or to take distributive scope. In a small conjunct Gapping structure, all of the scopal material is necessarily interpreted above the coordinated vPs. Conversely, in a large conjunct Gapping structure, the CP sized conjuncts necessarily contain all of the scopal material. Thus it is predicted that *split scope* is impossible in Gapping.

(15)   James should not eat caviar and Mary chili.

An alternative heterogeneous analysis of Gapping might permit intermediate levels of coordination. in a configuration like that in (16). Here, some XP has been coordinated, such that a copy of the sentential negation *not* is contained within each of the conjuncts, taking distributive scope, while the modal *should*

appears above the coordinate structure, taking wide scope. If such Gapping configurations were possible, split scope would be predicted to be possible.

(16)   James should [XP not eat caviar] and [XP Mary ~~not eat~~ gruel]

The prediction of the present analysis is sustained: split scope is impossible in Gapping. This is a novel observation, to the best of our knowledge. Examples like (15) do not support an interpretation in which the modal takes wide scope while the negation takes distributive scope, of the sort illustrated in (17). More complex examples yield the same conclusion. Examples like (18), which contain more than two scopal elements nevertheless do not yield a split scope interpretation.

(17)   #□(¬Eat(J, caviar) ∧ ¬Eat(M, chili))

(18)   Tim probably should not drink whiskey and Alexi beer
        # ◇(□¬Drink(T, whiskey) ∧ □¬Drink(A, Beer)

5.2. Structural consequences of Gapping

The structural heterogeneity we have argued to exist in Gapping constructions might lead one to expect other syntactic correlates between the large and small conjunct Gapping configurations to surface. This is exactly what we find.

Topicalization targets a position above the TP (Rizzi, 1997). It follows that topicalized elements are predicted to be compatible with only the large conjunct structure, as the conjuncts in small conjunct Gapping do not contain the position which hosts topicalized elements. Example (19) illustrates the accuracy of this prediction. When one of the remnants corresponds to a topicalized correlate, the scopal material *can't* must be construed distributively. Wide scope *can't* is incompatible with topicalization.

(19)   Caviar, James can't eat and chili, Mary.
        a.   *Caviar, James can't [*v*P eat] and chili [*v*P Mary ~~eat~~]
        b.   [CP Caviar James can't eat] and [CP chili Mary ~~can't eat~~]

Similar reasoning leads us to the prediction that non-remnant wh-word across-the-board (ATB) movement is possible only in small conjunct structures. Let us assume that ATB wh-movement targets a position above the coordinate structure from which the wh-word originates. By hypothesis, such a position exists above the coordinate *v*Ps of the small conjunct structures: the SpecCP. However, no such SpecCP is present above the coordinated CPs in the large conjunct structures. Thus, non-remnant wh-movement is predicted to be impossible in large conjunct Gapping configurations.

In example (20), we see that this is indeed the case. The wh-word *who*, having ATB moved, appears in the correlate clause, and so is not a remnant. This example is acceptable only under the wide scope reading of *must*; as predicted, the distributive scope reading of *must* is absent.

(20)   Who must James make a drawing of and Peter a painting of?
        a.   Who must James [*v*P make a drawing of] and [*v*P Peter ~~make~~ a painting of]
        b.   *Who$_1$ [CP t_1 must he make a drawing of t_1] and [CP t_1 Peter ~~must make~~ a painting of t_1]

The next three predictions follow from the relationship between the correlate subject and the coordinate structure. Only in small conjunct Gapping configurations does the correlate subject c-command the coordinate structure. Quantificational binding of pronouns is one phenomenon that is sensitive to this configurational difference between large and small conjunct Gapping. It is known that quantificational correlate subjects can bind into pronouns contained within remnant subjects (Johnson, 1994), but this is predicted to be possible only in small conjunct structures, where the correlate subject only C-commands the coordinate structure. This prediction is confirmed through the availability of cross-conjunct binding for examples like (21) just when the modal *can* takes wide scope.

(21)   No woman$_1$ can join the Army and her$_1$ girlfriend the Navy.
        a.   No woman$_1$ can [*v*P join the Army] and [*v*P her$_1$ girlfriend ~~join~~ the Navy]
        b.   *[CP No woman$_1$ can join the Army] and [CP her$_1$ girlfriend ~~can join~~ the Navy]

Each other behaves in a similar manner. It can be bound by correlate subjects, but is predicted to be able to do so only in small conjunct structures, just as with quantificational subjects. Although the judgments are a bit murky, likely due to the complexity of the examples, it seems that example (22) can only support the wide scope construal, as predicted.

(22)   [Mary and John]$_1$ must have tattled to their friends and [each other]$_1$'s friends to the teacher
        . . . because only Mary and John saw each other misbehaving and their friends are all tattletales.

      a.   [Mary and John]$_1$ must have [$_v$P tattled to their friends] and [$_v$P [each other]$_1$'s friends ~~tattled~~ to the teacher]

      b. *[CP [Mary and John]$_1$ must have tattled to their friends] and [CP [each other]$_1$'s friends ~~must have tattled~~ to the teacher]

Finally, condition C effects between correlate and remnant subjects surface, but, again, are only predicted to do so in small conjunct structures. In example (23), the correlate subject *he* is co-indexed with the remnant subject. When the scopal element *can't* takes wide scope, the example appears to be unacceptable, while distributive scope *can't* seems to support this co-indexation reasonably well.

(23)   He$_1$ can't eat caviar and John$_1$'s brother chili.

      a. *He$_1$ can't [$_v$P eat caviar] and [$_v$P John$_1$'s brother ~~eat~~ chili]

      b. [CP He$_1$ can't eat caviar] and [CP John$_1$'s brother ~~can't eat~~ chili]

6. Summary and Conclusions

The observation that Gapping demonstrates a scope ambiguity has been in the literature for nearly thirty years, but no existing approach to Gapping captures the breadth of this phenomenon. In this paper, we have argued that the Gapping scope ambiguity results from a structural ambiguity between CP and *v*P coordinate structures. In pursuing the predictions made by this heterogeneous approach to Gapping, we were lead to several novel generalizations. Split scope is impossible in Gapping. Topicalization is possible only in large conjunct Gapping. Non-remnant ATB wh-movement and cross-conjunct binding of pronouns and *each other* are only possible in small conjunct Gapping, where condition C effects between correlate and remnant subjects surface as well.

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