

## Toward a Uniform Analysis of Short Answers and Gapping

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### Abstract

Starting from Rooth's (1992a) theory on question/answer congruence, this paper argues, first, that Rooth's semantic requirement on congruent sentential answers is already a sufficient condition to license ellipsis in sentential answers, and, second, that this approach to short answers can be straightforwardly generalized to gapping: whereas short answers directly relate to an explicitly mentioned *wh*-question, first conjuncts in gapping constructions trigger —via the information structure they carry— an implicit question under discussion, which gets, in a way, 'answered' by non-first conjuncts. It is argued that such an approach elegantly accounts for the central properties common to short answers and gapping, and that this analysis of gapping may shed some light on the question of how discourse is organized by questions under discussion.

### 1 Introduction

In the literature on gapping it is common practice to introduce a gapped sentence in the context of a multiple *wh*-question, the main reason usually being to facilitate parsing of the relevant example. The grammaticality of the gapped sentences in (1), for example, becomes immediately obvious if they are taken to answer the corresponding questions in (2), as has been pointed out by Steedman (1990), where the examples are taken from.

- (1) a. Harry went to London, and Barry Detroit.  
b. Harry will give a bone to a dog, and Barry a flower to a policeman.  
c. Harry claimed that hedgehogs eat mushrooms, and Barry frogs.
- (2) a. Which city did each man go to?  
b. Which man will give what to whom?  
c. What did each man claim that hedgehogs eat?
- (3) a. Harry London, and Barry Detroit.  
b. Harry a bone to a dog, and Barry a flower to a policeman.  
c. Harry mushrooms, and Barry frogs.

Steedman (1990: 248) puts it as follows “[...] even the most basic gapped sentence like *Fred ate bread, and Harry, bananas* is only really felicitous in contexts which support (or accommodate) the presupposition that the topic under discussion is *Who ate what?*” Starting from this intuition, Steedman develops —within the framework of categorial grammar— an analysis of gapping as constituent coordination: strings like *Barry Detroit* in (1a) are considered to be ‘atypical’ constituents that get coordinated with a corresponding constituent in the first (prima facie) conjunct —*Harry London* in (1a). To enable coordination of these atypical constituents, the information structural background *went to* of the first ‘conjunct’ —which corresponds, roughly

speaking, to the topic under discussion *Where did who go to?*— gets ‘separated’ from the rest of this sentence by a rule of decomposition, and combines —again simplifying to a great extent— with the resulting structure after *Harry London* has been coordinated with *Barry Detroit*.

Building on the basic intuitions of Steedman (1990), the main concern of this paper is to explicitly establish a tight connection between two kinds of ellipsis processes —short answers and gapping— and to argue for a uniform analysis of the two phenomena. Ultimately, this analysis boils down to the claim that (most probably) the only relevant difference between short answers and gapping lies in the fact that short answers directly relate to an explicitly mentioned and independently given *wh*-question, whereas first conjuncts in gapping constructions typically trigger —via their information structure— an implicit question under discussion (QUD) that gets in a way ‘answered’ by non-first conjuncts. I will furthermore show that a uniform approach to short answers and gapping —though not completely unproblematic— is in fact empirically well-founded in many common properties, and, what is perhaps the more interesting part of the story, that this approach is able to deduce, and thus to explain the mentioned commonalities.

It should be noted here explicitly that even the mere possibility of a uniform analysis of short answers and gapping is in no way a matter of course in the literature: for example, neither the constituent coordination analysis of gapping in Steedman (1990) nor the ATB-movement analysis proposed in Johnson (1996) can be generalized to also deal with short answers. This is already clear in Steedman’s (1990) case from what has been said above: a uniform analysis would require constituent coordination of the answer fragments and the corresponding *wh*-phrases. Johnson’s analysis of gapping reduces gapping to VP-coordination; an example like (1a) would be analyzed along the following lines (I am ignoring some complications related to pied piping): 1. coordinate the VPs *Harry went to London* and *Barry went to Detroit*; 2. scramble the (future) remnants *Barry (B)* and *Detroit (D)*, and their correlates *Harry (H)* and *London (L)*; 3. ATB-move the remnant-VP; 4. move the subject to [Spec,IP]. This results in a structure like (4) (for a similar analysis see also Winkler 2003):

$$(4) \quad [_{IP} H_1 [_{PredP} [_{VP} t_1 \text{ went to } t_2]_3 [_{VP} [_{VP} t_1' [_{VP} L_2 t_3 ]]] \text{ and } [_{VP} B_1 [_{VP} D_2 t_3 ]]] ] ]$$

Though this analysis of gapping cannot easily account for the gapping facts in German —if the so-called verbal complex is non-empty, as in, e.g., *Harry ist nach London gegangen und Barry nach Detroit* (*Harry is to London gone, and Barry to Detroit*), ATB-movement of the remnant-VP results in an incorrect word order (namely, *Harry ist gegangen nach London, ...*)— both Steedman’s and Johnson’s analyses make an important prediction: gapping is only possible in coordinated structures. It remains to be seen to what extent this result can be deduced in a uniform approach. The strength of these analyses, however, is at the same time their weakness: they miss the generalization that gapping and short answers behave similarly in many respects.

This paper is structured as follows: To substantiate the claim of a uniform analysis of short answers and gapping, I will first point out several well-known, but nevertheless suggestive commonalities between short answers and gapping. I will then sketch Rooth’s (1992a) theory on question/answer congruence, and show that the constraint Rooth imposes on congruent sentential answers turns out to already be an empirically adequate condition on ellipsis in short answers (a somewhat stronger requirement than Merchant’s 2001 notion of e-GIVENNESS). In a second step, I will generalize the short answer analysis to gapping along the lines suggested by Steedman’s quote and discuss an alternative formulation within Schwarzschild’s (1999) theory on F-marking

and accent placement. The paper closes with a discussion of some remaining differences whose explanation leads to interesting implications concerning the role of QUDs in discourse.

## 2 Some (Very) Suggestive Commonalities

Now, what about the just mentioned commonalities? Apart from the fact that, like so many other ellipsis phenomena, both short answers and gapping allow for sloppy readings of elided pronominals (cf., e.g., *Who gave what to his mother? Bill a book, John flowers, ...* vs. *Bill gave a book to his mother, and John flowers*), these common properties concern such central questions as “Does the deletion process respect constituency?”, “What needs to be deleted, if deletion applies?”, “What can be deleted optionally?”, “What exactly do the remnants look like?”, and “Is the deletion process subject to any locality constraints? —If so, what do these look like?”

*Non-Constituent Deletion.* Let’s start with the question concerning constituencyhood. As is already obvious from examples (1) to (3) above, both short answers and gapping are prima facie cases of non-constituent deletion. Although this is well known, this common property is nevertheless quite remarkable: assuming that stripping (e.g., *Harry went to London, and Bill too*) is a subcase of gapping, right node raising (e.g., *Harry sent his younger and Bill sent his older sister a letter*) is probably the only other deletion process that does not respect constituency (see, e.g., Hartmann 2002 for relevant discussion).

*Finite First Condition.* While in the case of right node raising the finite verb is never affected by the deletion process, it is always affected in the case of short answers and gapping; see (5):

- (5) a. Which man gave a book to which woman?
- b. \*Harry gave a ~~book~~ to Sue, ...
- c. \*Harry gave a book to Sue, and Bill gave a ~~book~~ to Mary.

Thus it seems that already with respect to these two criteria short answers and gapping constitute some kind of natural subclass within the class of ellipsis phenomena.

*Locality Conditions I.* Moreover, short answers and gapping are subject to quite similar locality constraints. Consider German, for example. Neither in the case of short answers nor in the case of gapping is it possible to separate the ellipsis site from its antecedent by embedding the former under a predicate that only subcategorizes for verb-final sentences; see (6):

- (6) a. Wer hat wen eingeladen? \*Ich weiß, (dass) Harry Sue ~~eingeladen hat~~, ...  
      Who has whom invited? \*I know, (that) Harry Sue ~~invited has~~, ...  
      ‘Who invited whom? I know that Harry invited Sue.’
- b. \*Harry hat Sue eingeladen, und ich weiß, (dass) Bill Mary ~~eingeladen hat~~  
      \*Harry has Sue invited, and I know, (that) Bill Mary ~~invited has~~  
      ‘Harry invited Sue, and I know that Bill invited Mary.’

It is possible, however, if the relevant predicate also subcategorizes for V2-sentences:

- (7) a. Wer hat wen eingeladen? Ich glaube, Harry ~~hat~~ Sue ~~eingeladen~~, ...  
 Who has whom invited? I believe, Harry ~~has~~ Sue ~~invited~~, ...  
 ‘Who invited whom? I believe Harry Sue.’
- b. Harry hat Sue eingeladen, und ich glaube, Bill ~~hat~~ Mary ~~eingeladen~~  
 Harry has Sue invited, and I believe, Bill ~~has~~ Mary ~~invited~~  
 ‘Harry invited Sue, and I believe Bill Mary.’

*Major Constituent Constraint.* Furthermore, both short answers and gapping obey Hankamer’s (1979) so-called ‘Major Constituent Constraint,’ which, roughly speaking, states that a remnant is only well formed if it is (a non-verbal constituent) immediately dominated by the root-clause or by some node of its verbal projection:

- (8) a. Did John invite the semanticist from MIT or the semanticist from Amsterdam?  
 b. \*~~John invited the semanticist~~ from MIT.
- (9) \*John invited the semanticist from MIT,  
 and Bill ~~invited the semanticist~~ from Amsterdam.

*Island Sensitivity.* Finally —and apparently related to the previous property— short answers and gapping pattern alike with respect to island phenomena; this is illustrated in (10) and (11) for adjunct islands (see, e.g., Neijt 1979, Drubig 1994):

- (10) Who will be offended if we invite which colleague?  
 a. John will be offended if we invite Bill, ...  
 b. ?John if we invite Bill, ...  
 c. ?\*John Bill, ...
- (11) John will be offended if we invite Bill, and  
 a. Jane will be offended if we invite Martha.  
 b. ?Jane if we invite Martha.  
 c. ?\*Jane, Martha.

Of course, one mustn’t forget that there are also several differences in behavior; an exposition and discussion of these deviations in the light of the proposed analysis will be postponed to section 5.

### 3 A Topical Account within Alternative Semantics

Taken together, these facts constitute, I think, sufficient and convincing empirical evidence for the assumption that a uniform approach to short answers and gapping is in fact desirable and promising. In the remainder of the paper, I will present a proposal to this effect. This will be done in two steps. First, I will illustrate on the basis of short answers that a variant of Rooth’s (1992a) condition on congruent sentential answers is in fact already an adequate condition on

ellipsis in question/answer sequences (and gapping). In a second step, this condition (as well as an alternative formulation) will be generalized to gapping by linking gapping to QUDs.

### 3.1 Congruent Sentential Answers

What is a good answer to a given question? Consider (12) for illustration. Whereas (12b) is a perfect answer to the question in (12a), the not so perfect ‘answers’ in (12c) and (12d) show that there are important well-formedness constraints on answers concerning both form and meaning: (12c) is not a well-formed answer, because the grammatical role of the minimally focused constituent *Sue* in the answer (subject) does not match the grammatical role of the corresponding *wh*-phrase in the question (object); (12d) is out, because what we know about the linguist Noam Chomsky is in conflict with the sortal restriction *student* carried by the *wh*-phrase in (12a).

- (12) a. Which student did John invite *t* ?  
 b. John invited [SUE]<sub>F</sub>.  
 c. \*[SUE]<sub>F</sub> invited John.  
 d. #John invited [NOAM CHOMSKY]<sub>F</sub>.
- (13) a.  $[[[12a)]] = \{p; \exists x[x \text{ a student} \ \& \ p = \text{that John invited } x]\}$   
 b.  $[[[12b)]]_F = \{p; \exists x[x \in D_e \ \& \ p = \text{that John invited } x]\}$   
 c.  $[[[12c)]]_F = \{p; \exists x[x \in D_e \ \& \ p = \text{that } x \text{ invited John}]\}$

Given a Hamblin-style analysis for *wh*-interrogatives, both constraints can be dealt with within Rooth’s (1992a) theory on question/answer congruence. According to Hamblin a question like (12a) denotes the set of its possible answers, i.e., the set of propositions of the kind *that John invited x*, *x* being some arbitrary student; see (13a). According to Rooth the focus/background structure of a sentence is interpreted on a second layer of interpretation—the focus value  $[[\alpha]]_F$  of an expression  $\alpha$ —whereby foci are treated more or less like pronominal in situ *wh*-phrases in Hamblin’s approach (which are, however, not subject to any sortal restrictions, apart from type-identity). In the case of (12b) the focus value we derive is the set of propositions of the form *that John invited x*—see (13b); in the case of (12c) we end up with the set of propositions of the form *that x invited John*—see (13c) (for details the reader is referred to Rooth 1992a). Though all three sets of propositions share exactly one proposition—namely *that John invited John*—there is one important difference: whereas the denotation of the question in (12a) is a subset of the focus value of (12b), this is not true in the case of (12c). As a consequence, the formal aspect of the answerhood relation can be captured by a subset relation: the focus value of a congruent (i.e., well-formed with respect to formal properties) answer *A* needs to be a superset of the denotation of the question *Q* it is meant to answer; see the F-ANSWER constraint in (14b) below. The content-related restriction excluding (12d) as a well-formed answer to (12a) apparently reduces to the element relation; see the C-ANSWER constraint in (14a).

- (14) a. C-ANSWER:  $[[A]] \in [[Q]]$ .  
 b. F-ANSWER:  $[[Q]] \subseteq [[A]]_F$  (and  $||[[Q]] \cap [[A]]_F| \geq 2$ ).

On the level of Logical Form, the F-ANSWER condition is formally implemented by the so-called squiggle-Operator ‘ $\sim$ ’, which adjoins to the answer’s CP and introduces a context variable  $\Gamma$ , which in turn picks up the denotation of the preceding question via coindexing:

- (15) a. [Which professor did John invite  $t$  ?]<sub>1</sub>  
 b. [John invited [Noam Chomsky]<sub>F</sub>]  $\sim \Gamma_1$ .

The interpretation of the context variable  $\Gamma$  doesn’t have any effect on the truth-conditions of the sentence in a strict sense; it does, however, introduce the presupposition that  $\Gamma$ ’s complement is a congruent (sentential) answer to the coindexed question in the sense discussed above:

- (16) *(alternative) semantics of  $\sim \Gamma$*   
 a.  $[[\alpha \sim \Gamma]]^g = [[\alpha]]^g$ .  
 b.  $\alpha \sim \Gamma$  presupposes that  $[[\Gamma]]^g \subseteq [[\alpha]]_{F^g}^g$  (and  $[[\Gamma]]^g \cap [[\alpha]]_{F^g}^g \geq 2$ ).

That concludes our summary of Rooth’s (1992a) theory on the congruence of questions and sentential answers.

### 3.2 *Deriving Short Answers*

Though Rooth (1992a) doesn’t address the issue of ellipsis in the paper just mentioned (but see Rooth 1992b for an analysis of VP ellipsis), it can and will be shown (in the following subsection) that the semantic requirement on congruent answers implemented by  $\sim \Gamma$  is, at the same time, a sufficient condition on ellipsis in the case of short answers (and gapping).

So let’s suppose for the moment that this is in fact the case. How does ellipsis in short answers (and gapping) then come about? To see this, it is quite instructive to reconsider a well-formed question/answer sequence like the one in (15), repeated here as (15’a,b):

- (15’) a. [Which professor did John invite  $t$  ?]<sub>1</sub>  
 b. [John invited [Noam CHOMSKY]<sub>F</sub>]  $\sim \Gamma_1$ .  
 c. [Noam CHOMSKY]<sub>F</sub>.

As we saw above, a congruent sentential answer carries a specific focus/background structure (or, more general, a specific information structure) that is determined by or corresponds to the structure of the preceding *wh*-question: those constituents that correspond to a *wh*-phrase in the question are marked by a minimal focus (see the F-marker on the relevant constituent), which is phonologically realized as a pitch accent (indicated by capitals) in languages like English or German; those lexical items that have already been mentioned in the *wh*-question get deaccented. Thus, if we want to account for the fact that (15’c) is a well-formed short answer to the question (15’a), it seems straightforward to assume that the short answer (15’c) is derived on the basis of the sentential answer in (15’b) by phonologically deleting exactly those parts of the answer that are not contained in an F-marked (i.e., minimally focused) constituent. A phonological deletion rule like this can (and probably should) be stated as a two-part requirement: first, PF-deletion — working its way top down, starting from the sister node of  $\sim \Gamma$  — mustn’t affect F-marked constituents (and, thus, any constituents contained in an F-marked node) — see (17a); second, deletion is maximized as long as the first condition isn’t violated — see (17b).

(17) *PF-deletion*

- a. F-markers are upper bounds to PF-deletion.
- b. Maximize PF-deletion. (short answers, gapping)

Whereas (17a) probably represents the least common denominator of ellipsis phenomena in general, (17b) arguably is a condition that is specific to short answers and gapping.

Altogether this approach to ellipsis in short answers relies on three basically independent components: first, some theory on F-marking and accent placement —like, e.g., the one in Schwarzschild (1999)— that accounts for the set of possible focus/background structures; second, (a well-formedness condition on congruent sentential answers that, in addition, constitutes) a licensing condition for ellipsis; and, third, the actual deletion process on the level of Phonological Form. Of course, this is only a rough sketch of such an analysis, which is complicated by several phenomena like contrastive topics, pied piping, and underfocusing (but see Reich 2002b, 2003 for discussion and a precise proposal); however, it should be clear from what has been said that if we find some reasonable way to also take advantage of the aforementioned licensing condition on ellipsis in gapping, then this analysis generalizes to gapping without further assumptions, and thus immediately accounts for the parallel behavior discussed in section 2 (tracing back most of the properties to properties of interrogative *wh*-phrases). In such a uniform analysis we expect gapping to exhibit a structure like the one in (18):

(18) JOHN likes MARY and [ [ [MARY]<sub>F</sub> likes [JOHN]<sub>F</sub> ] ~ Γ ].

This leaves us with two tasks. First, we need to show that the F-ANSWER condition in (14b/16b) is in fact an adequate condition on ellipsis in question/answer sequences (and gapping); second, we need to show how to generalize the proposed mechanism to gapping.

### 3.3 *The Subset Condition as a Semantic Condition on Ellipsis*

Let's begin with the first task. Here, I will follow a somewhat indirect strategy: Building on work done by Schwarzschild (1999), Merchant (2001) develops a semantic notion called e-GIVENNESS, which he argues in detail and on empirical grounds to constitute a sufficient condition to license ellipsis (in the case of sluicing and VP ellipsis, to be precise). What I want to show in this subsection is that Rooth's subset condition (or, similarly, Rooth's notion of symmetric contrast) is in fact the stronger notion of the two. Thus we have to conclude: if e-GIVENNESS is in fact a sufficient condition to license ellipsis, then Rooth's subset condition certainly is, too. To keep things as simple as possible (and types uniform), I will illustrate this result with gapping.

Now, what exactly is e-GIVENNESS? In a nutshell, e-GIVENNESS is a two-part condition based on Schwarzschild's (1999) notion of an expression being GIVEN:

(19) *e-GIVENNESS*

- An expression E counts as e-GIVEN iff E has a salient antecedent A and, modulo existential type shifting,
- a. A is GIVEN relative to E, and
  - b. E is GIVEN relative to A.

GIVEN in turn is an entailment relation modulo focus marking between two expressions A and E:

(20) *GIVEN*

An expression E counts as GIVEN iff E has a salient antecedent A and, modulo existential type shifting, A entails the F-closure of E. (Where the F-closure of E,  $FClo(E)$ , is the result of replacing F-marked expressions in E with variables and existentially closing the result.)

Consider (21) for illustration. If we want to know whether the structure  $[BILL]_F \text{ likes } [SUE]_F$  is GIVEN in the relevant context, we need to replace the F-marked constituents with variables, and close them off existentially; then we have to look for an antecedent that entails the result of this operation, i.e.,  $\exists x \exists y [x \text{ likes } y]$ . Since the first conjunct *John likes Mary* fulfills this requirement, we conclude that  $[BILL]_F \text{ likes } [SUE]_F$  is GIVEN, and that this F-structure is, therefore, licit.

(21) [  $[JOHN]_F \text{ likes } [MARY]_F$  ] and [  $[BILL]_F \text{ likes } [SUE]_F$  ].

Whilst GIVENNESS only tests for valid entailments in one direction, e-GIVENNESS does so in both directions, and thus encodes a semantic equivalence relation modulo focus marking. Consider again (21) for illustration. Since *John likes Mary* entails the F-closure of  $[BILL]_F \text{ likes } [SUE]_F$ , and *Bill likes Sue* entails the F-closure of  $[JOHN]_F \text{ likes } [MARY]_F$ , we can conclude that  $[BILL]_F \text{ likes } [SUE]_F$  is not just GIVEN, but actually e-GIVEN. According to Merchant (2001), this is the reason why the predicate *likes* in the second conjunct is not just deaccented (which presupposes GIVENNESS), but that it is even possible to elide it (which presupposes e-GIVENNESS). This may be more perspicuous in the following example, where the predicate *insult* is deaccented, but cannot be elided, the reason being that *call (someone) a Republican* entails *insult*, but not vice versa:

(22) John called Mary a Republican, and then MARY insulted JOHN.

Like e-GIVENNESS, Rooth's (1992a) notion of symmetric contrast encodes a semantic equivalence relation modulo focus marking. Symmetric contrast is implemented using a somewhat differently defined version of the squiggle-Operator ' $\sim$ ': the second conjunct in (23a) contrasts with the first conjunct if the first conjunct's denotation is an element of the focus value of the second conjunct, and vice versa; see (23b).

(23) a.  $[[[JOHN]_F \text{ likes } [MARY]_F] \sim \gamma_2]_1$  and  $[[[BILL]_F \text{ likes } [SUE]_F] \sim \gamma_1]_2$ ,  
 b. where  $\alpha \sim \gamma$  presupposes that  $[[\gamma]]^g \in [[\alpha]]_F^g$ .

As long as both conjuncts show parallel focus structure, Merchant's notion of e-GIVENNESS and Rooth's notion of symmetric contrast are in fact equivalent, and, consequently, Rooth's definition of symmetric contrast is a suitable prerequisite for ellipsis, if Merchant's definition of e-GIVENNESS is. It should be noted, though, that neither e-GIVENNESS nor symmetric contrast entail parallel focus structure. Symmetric contrast, for example, also licenses the following situation as long as  $\beta$  is semantically equivalent to  $\alpha$ :  $\beta$  is not contained in an F-marked constituent in the second conjunct; the corresponding expression  $\alpha$  in the first conjunct, however, is F-marked or is contained in an F-marked constituent. (24) illustrates this situation with  $\alpha = \beta = \textit{likes}$ :



(24) [[[JOHN]<sub>F</sub> [likes MARY]<sub>F</sub>] ~  $\gamma_2$ ]<sub>1</sub> and [[[BILL]<sub>F</sub> likes [SUE]<sub>F</sub>] ~  $\gamma_1$ ]<sub>2</sub>.

If  $\beta$  is not semantically equivalent to  $\alpha$ , then Rooth's definition of symmetric contrast is violated. (25) illustrates this with  $\alpha = \textit{to call (someone) a Republican}$  and  $\beta = \textit{to insult (someone)}$ . (The definition of symmetric contrast is violated since the proposition *that Mary insulted John* is an element of the focus value of the first conjunct, but the proposition *that John called Mary a Republican* is definitely not an element of the focus value of the second conjunct.)

(25) [[[JOHN]<sub>F</sub> [called Mary a RePUBliCian]<sub>F</sub>] ~  $\gamma_2$ ]<sub>1</sub>, and then  
[[[MARY]<sub>F</sub> insulted [JOHN]<sub>F</sub>] ~  $\gamma_1$ ]<sub>2</sub>.

The crucial point here is the following: whereas (25) is not licensed by symmetric contrast, it is licensed by e-GIVENNESS, contrary to the fact that ellipsis of *insult* is impossible: the second conjunct is given relative to the first conjunct, since the proposition *that John called Mary a Republican* entails —mediated by pragmatic reasoning (a crucial ingredient in Schwarzschild's notion of GIVENNESS)— *that someone insulted someone*; and the first conjunct is given relative to the second conjunct, since the proposition *that Mary insulted John* entails the F-closure of the first conjunct, which is simply the trivial proposition  $p \vee \neg p$ . This shows two things:

1. symmetric contrast is in fact the stronger notion of the two, and
2. e-GIVENNESS is in general too weak to be an adequate condition on ellipsis.

If we furthermore take into consideration that asymmetrical F-structures like the ones cited in (24) and (25) above are the rule rather than the exception —expressions in the first conjunct deaccenting expressions in the second conjunct, and not necessarily vice versa— it becomes clear that we can switch again from the Roothian definition of symmetric contrast to a Roothian subset condition on focus values without losing too much information: given that expressions in the first conjunct deaccent expressions in the second conjunct, the second conjunct contains less (or equal) material that is F-marked (or contained in an F-marked node), and thus we expect the focus value of the second conjunct to be a subset of the focus value of the first conjunct. This condition is made precise in (26b) and illustrated with (26a); the reader is kindly invited to check that this condition does in fact adequately handle all the examples discussed above.

(26) a. [[JOHN]<sub>F</sub> [likes MARY]<sub>F</sub>]<sub>1</sub> and [[[BILL]<sub>F</sub> ~~likes~~ [SUE]<sub>F</sub>] ~  $\Gamma_1$ ]  
b.  $\alpha \sim \Gamma$  presupposes:  $[[\alpha]]_{F^g} \subseteq [[\Gamma]]^g$  (and  $||[\alpha]]_{F^g} \cap [[\Gamma]]^g| \geq 2$ ),  
where  $[[\Gamma]]^g$  is the focus value of its coindexed antecedent.

This is already very close to a uniform analysis. However, if the second conjunct in gapping is taken to play a role parallel to congruent answers in question/answer sequences, and the first conjunct to play a role parallel to the preceding *wh*-question, we see that the condition stated in (26b) is not quite the subset-condition proposed by Rooth for question/answer sequences, but in fact its inverse. Thus, a first step toward a uniform theory of short answers and gapping is (27):

(27) *Uniform Condition on Short Answers and Gapping (first try)*  
In sentential answers and in non-initial conjuncts adjoin  $\sim \Gamma$  to CP.  
a.  $\alpha \sim \Gamma$  presupposes that  $[[\alpha]]_{F^g} \subseteq [[\Gamma]]^g$  (and  $||[\alpha]]_{F^g} \cap [[\Gamma]]^g| \geq 2$ ), where

- b.  $\Gamma$  picks up the denotation of its coindexed antecedent if it is of type  $\langle\langle s, t \rangle, t \rangle$  (a question); otherwise it picks up the focus value of its coindexed antecedent.

If (27) is fulfilled, ellipsis in congruent answers and in non-initial conjuncts is licensed at the level of Phonological Form. This completes the first task.

### 3.4 Short Answers, Gapping and ‘Questions under Discussion’

Though based on the same kind of formal constraint, the condition in (27) still appears to be to some extent arbitrary—the antecedents are of quite a different nature: a common semantic value in the case of questions, and a focus value in the case of gapping—and it doesn’t capture the intuition expressed in Steedman’s quote, which we took as a starting point.

But how to do justice to this intuition? The basic idea is actually quite simple: Suppose that—at least in principle—every utterance in discourse relates to an implicit or explicit *wh*-question (as proposed, e.g., in Roberts 1996, Büring 2003). Given this assumption, it is quite clear that, if an utterance like (28b) is not explicitly linked to a *wh*-question, an implicit *wh*-question—a ‘question under discussion,’ short: QUD—needs to be reconstructed pragmatically, based on the focus/background structure carried by the first conjunct. If the first conjunct is minimally focused, this is a trivial exercise, for there is exactly one *wh*-question the utterance can be linked to—e.g., the question *Who ate what?* in the case of (28b).

- (28) a. [Who ate what?]<sub>i</sub> [[[JOHN]<sub>F</sub> ate [BREAD]<sub>F</sub>] ~  $\Gamma_i$ ], and ...  
 b. [JOHN]<sub>F</sub> ate [BREAD]<sub>F</sub>, and [[[HARRY]<sub>F</sub> ate [BANANAS]<sub>F</sub>] ~  $\Gamma$ ].

Having reconstructed the most salient QUD on the basis of the first conjunct, the second conjunct can then be taken to ‘answer’ this very question. Seen from the perspective of discourse structure, gapping thus can be reduced to the question/answer relation: gapping is nothing else than ‘answering an implicit *wh*-question,’ i.e., the most salient QUD.

But what about cases of wide focus in first conjuncts like, e.g., the ones presented in (29)? In these cases, so it seems, a complete set of possible QUDs—including, e.g., *What happened?*, *Who gave Sue what?*, *Who gave what to whom?* etc.—is reconstructed, from which the speaker chooses exactly one as the most salient QUD, and relative to which he utters the second and following non-initial conjuncts. This assumption immediately accounts for the possibility of different continuations in the case of gapping; see (29a) vs. (29b).

- (29) a. [John gave a book to SUE]<sub>F</sub>, and ~~John gave~~ [a BASEBALL]<sub>F</sub> [to BILL]<sub>F</sub>.  
 b. [John gave a book to SUE]<sub>F</sub>, and [PETER]<sub>F</sub> ~~gave a book~~ [to ANN]<sub>F</sub>.

If this is correct, then we can state the following condition on short answers and gapping:

- (30) *Uniform Condition on Short Answers and Gapping (within alternative semantics)*  
 In short answers and in non-initial conjuncts  $\text{adjoin } \sim \Gamma$  to CP.  
 a.  $\alpha \sim \Gamma$  presupposes that  $[[\alpha]]_F^g = [[\Gamma]]^g$ ,  
 b. where  $\Gamma$  anaphorically relates to the most salient QUD.

Note that in (30) —departing somewhat from the definition in (27)— semantic identity between  $\Gamma$  and the focus value of  $\alpha$  is required, for otherwise choosing the most salient QUD is not uniquely determined in the case of wide focus in first conjuncts. This slight redefinition, however, does not affect the results discussed with respect to definition (27).

## 4 Excursion: An Alternative Formulation

### 4.1 A Potential Problem: The Case of Underfocusation

Despite its elegance and generality, there is a non-trivial problem in this analysis that leads to an interesting reformulation of this approach within Schwarzschild's (1999) theory of F-marking. Consider the German question/answer sequence in (31). The discourse preceding the question in (31) contextually restricts its denotation, which is the set of propositions given in (32):

- (31) [We know that both of you stole something.  
One stole a handbag, the other one stole a DVD player. Now,]  
*Was davon hast DU getan?* ('Which (of these two) did YOU do?')
- a. ~~I~~~~h~~~~abe~~ [Die HANDtasche]<sub>F</sub> geklaut.  
I—have [the handbag]<sub>F</sub> stolen  
'I stole the handbag.'
- b. \*~~I~~~~h~~~~abe~~ [Die HANDtasche]<sub>F</sub> geklaut.  
\*I—have [the handbag]<sub>F</sub> stolen  
'I stole the handbag.'

- (32) [[(31)]]<sup>c</sup> = {*that you stole a handbag, that you stole a DVD player*}  
= [[*Which did you steal?*]]<sup>c</sup>

This set of propositions is, however, identical to the denotation of the question *Which did you steal?* uttered in the same context. Thus, it is wrongly predicted that the question in (31) can be answered with (31b). Note that the same argument applies to Merchant's (2004) overt movement account, since (i) the semantic condition made use of in (30) is stronger than e-GIVENNESS (see above), and (ii) there is only one potential candidate for movement, namely the direct object.

### 4.2 Toward a Solution with Unstructured Propositions

In Reich (2002b, 2003) —basically following arguments put forward in Drubig (1994) and Krifka (2001)— data like this have been taken to show that we need to assume that *wh*-questions denote structured propositions rather than unstructured ones. If we furthermore assume that the way we interpret minimal foci results in a set of structured propositions too, then the anaphoric relation proposed in (30) will coerce the F-marking on the VP as required —given that (30) is ranked higher than Schwarzschild's constraint AVOIDF ("Avoid unnecessary F-marking").

It seems, however, that there is in fact an unstructured alternative to this approach within Schwarzschild's (1999) theory of F-marking and accent placement. Let's assume that in *wh*-questions all *wh*-phrases undergo LF-movement to SpecCP; then we can formulate a different anaphoric relation —see (33)— that makes the correct predictions, if  $\gamma$  is coindexed with the

question’s IP (or the phase vP), and if—as has already been assumed—we allow this anaphoric relation to overrule AVOIDF: the existential closure of the question’s IP on LF (i.e., the question modulo (complex) *wh*-phrases) needs to entail the answer’s F-closure.

(33)  $\alpha \sim \gamma$  presupposes that  $\text{ExClo}([\gamma])^{\text{S}}$  entails  $\text{FClo}([\alpha])^{\text{S}}$ .

- (34) a. Was<sub>1</sub> ? [du hast t<sub>1</sub> getan]<sub>i</sub>  
 b. ~~[[Ich habe~~ [[Die HANDtasche]<sub>F</sub> geklaut]<sub>F</sub> ~  $\gamma_i$ .  
 c. \*~~[[Ich habe~~ [Die HANDtasche]<sub>F</sub> geklaut] ~  $\gamma_i$ .

Consider again (31), repeated here as (34), for illustration. Having moved (all) the (complex) *wh*-phrase(s) to SpecCP at LF, we need to check whether the existential closure of the question’s IP—i.e.,  $\exists X[\text{you did } X]$ —entails the F-closure of the answer. In the case of (34b) this is to ask whether  $\exists X[\text{you did } X]$  entails  $\exists X[\text{you did } X]$ , which is obviously true; in the case of (34c), however, it is to ask whether  $\exists X[\text{you did } X]$  entails  $\exists x[\text{you stole } x]$ , which is definitely false. Therefore the condition in (33) coerces F-marking on the constituent corresponding to the moved *wh*-phrase(s), and thus excludes the possibility of underfocusing.

The basic idea underlying (33) is to somehow locally restrict salient antecedents for GIVENNESS to the most salient QUD, but—and this is crucial for the distribution of accents—without at the same time completely excluding relevant previous context. But let’s again pose the crucial question: “Is (33) also an adequate condition on ellipsis in question/answer sequences?” Of course it is not an adequate condition all by itself (since it implements semantic entailment, rather than semantic equivalence). But if we take into account that we need to impose an  $\in$ -condition on well-formed sentential answers anyway—to account for sortal restrictions—the interplay of both conditions does in fact result in an adequate semantic constraint on ellipsis:

- (35) C-ANSWER:  $[[A]] \in [[Q]]$ . Accounts for  
 a. sortal restrictions imposed on well-formed answers by *wh*-phrase restrictions,  
 b. semantic identity modulo (complex) *wh*-phrases.

To sum up, we can state the following (additional) condition on short answers and gapping:

- (36) *Uniform Condition on Short Answers and Gapping (within Schwarzschild 1999)*  
 In short answers and in non-initial conjuncts adjoin  $\sim \gamma$  to CP.  
 a.  $\alpha \sim \gamma$  presupposes that  $\text{ExClo}([\gamma])$  entails  $\text{FClo}([\alpha])$ ,  
 b. where  $\gamma$  anaphorically relates (at LF) to IP (vP) of the most salient QUD.

The proposal in (36) does indeed avoid recourse to structured propositions. There are at least two drawbacks though: first, this proposal presupposes covert movement of (complex) *wh*-phrases on the level of Logical Form (to a place above the question operator ‘?’), and, thus, an unstructured solution to the pied piping problem (see, e.g., Reich 2002a for discussion); second, it requires that in gapping the context variable  $\gamma$  pick up part of an implicit [!] QUD; though this may very well be possible, it is somewhat counterintuitive. At this point, it has to be left open for future research whether such LF-constituents are in fact accessible in D-trees.

## 5 Some Implications of a Uniform Approach

In the previous sections, I exclusively focused on those properties that short answers and gapping have in common, and proposed a uniform analysis that predicts exactly this parallel behavior by reducing both phenomena to one and the same mechanism. In this analysis, common properties like island sensitivity, the ‘Major Constituent Constraint’, and so on can be explained as epiphenomena of properties of (complex) *wh*-phrases and *wh*-questions (given our assumptions about F-marking in congruent sentential answers). Of course, this is not to say that the properties of short answers and gapping are completely parallel. In this final section, I want to call attention to these differences, some of which can be explained within the present proposal, and some of which still remain puzzling. In any case, it seems that the new perspective on these properties may shed some light on the question of how discourse is organized by implicit QUDs.

*Gapping in Embedded Contexts.* Let me start with gapping in embedded contexts. As example (37) below shows, gapping—in contrast to short answers—also occurs in dependent clauses; that this is not true of short answers in question/answer sequences is probably simply due to the fact that both questions and answers necessarily carry illocutionary force.

- (37) Ich glaube / weiß, dass Hans Anna eingeladen hat und Peter Maria.  
I believe / know, that Hans Anna invited has and Peter Maria  
‘I believe/know that Hans invited Anna and Peter Maria’

What is by far more interesting, though, is that (37) in addition shows that—given the uniform approach to short answers and gapping is correct—we need to assume that first conjuncts in coordinated structures may evoke a (set of) QUD(s) even if they occur in embedded contexts: the first conjunct triggers the QUD *Who invited who?*, which is then ‘answered’ by the following conjunct. This seems to be a reasonable assumption in the light of the following example, where an embedded question carrying no illocutionary force is nevertheless answered, if possible:

- (38) Do you know who won the lottery? Yes, Joe.

*Gapping within Short Answers.* Essentially the same assumption will then account for the possibility of gapping within short answers; see, e.g., (39):

- (39) a. Was hast du gesagt? [What did you say?]  
b. dass Anna ein Buch bekommt und Peter ein Fahrrad bekommt.  
that Anna a book gets and Peter a bicycle gets  
‘I said that Anna gets a book, and Peter a bicycle.’

(39a) explicitly introduces a most salient QUD relative to which the answer in (39b) gets evaluated. However, having uttered the first conjunct of the answer in (39b), a new QUD (which needs to be consistent with the focus/background structure of this very conjunct) is introduced, overriding the previous one as the most salient one; the second conjunct of the answer then gets evaluated relative to this second QUD as usual.

*The Tensed S-Condition.* In Neijt (1979) an example is discussed in which the predicted parallelism between *wh*-questions and gapping seems to break down: although there are cases of so-called ‘long *wh*-movement’ out of tensed clauses —see, e.g., (40a)— corresponding cases of ‘long gapping’ —see (40b)— are out.

- (40) a. What did you tell her *t* that you sent *t* to Mary?  
b. \*Peter told her that he sent something to Mary, and  
John ~~told her that he sent something~~ to Sue.

However, again assuming that the uniform approach developed above is correct, the relevant QUD presupposed in (40b) is of course not (40a), but (41). At least in German, the corresponding *wh*-question is definitely out (if *wem* is interpreted with interrogative force).

- (41) Who told her that he sent something to whom?  
  
(42) a. \*Wer erzählte ihr, dass er etwas wem geschickt hat?  
b. \*Peter erzählte ihr, dass er etwas Hans geschickt hat und  
Hans ~~erzählte ihr, dass er etwas Peter geschickt hat~~

*Locality II.* Short answers and gapped clauses also differ with respect to the possibility of separating them from their antecedent by another intervening potential antecedent: in gapping the result is definitely ungrammatical —see (43a); in the case of short answers we only observe that the hearer is uncertain to some extent whether the term is intended to answer the first question or whether it is intended to answer the second —see (43b).

- (43) a. Sue gave a book to Harry, Bill gave a ring to Sue, and  
\*Harry ~~gave a book~~ to Bill.  
b. Who gave a book to whom? (And) Who gave a ring to whom?  
?Harry ~~gave a book~~ to Bill.

Somewhat surprisingly, ungrammaticality in (43a) can be accounted for quite straightforwardly: the second conjunct in (43a) introduces a new and different (set of potentially) most salient QUDs, and thus excludes linking to the first conjunct. This should predict, however, that the short answer in (43b) can only be linked to the second question. To avoid this conclusion, we apparently need to assume that in the case of explicit questions an immediately following second question does not necessarily replace the previous QUD as the most salient one.

*Locality III.* As I already mentioned in the introduction, gapping seems to be restricted to coordinated structures, whereas short answers are never conjoined with the *wh*-question they are meant to answer. Is it possible to account for this important distributional difference within a uniform analysis of the two phenomena in question? I think the answer is: to some extent. What does certainly follow from the analysis proposed in this paper is the fact that each ‘sentential unit’ (to avoid the term conjunct) in a gapping structure needs to carry its own and independent information structure —simply because the information structure of answers is, per se, independent of the information structure of the *wh*-question. This excludes gapping from occurring across matrix and subordinate clauses. What it doesn’t immediately account for is (i)

the adjacency condition imposed on the sentential units in gapping, and (ii) the fact that it isn't possible to drop the conjunction. As far as (i) is concerned, we already saw in section 2 that it is not only gapping that is subject to such an adjacency restriction, but that short answers and gapping do indeed behave quite parallel in this respect. So it seems that whatever is responsible for gluing questions and answers together may also be responsible for the adjacency requirement in gapping constructions. (ii), on the other hand, is still a puzzling fact from the perspective of a uniform analysis, and it remains to be seen whether it can be derived on independent grounds.

*P-Stranding.* A final tough nut to crack concerns English data related to P-stranding. In English we observe that short answers show a strong tendency toward 'P-stranding' —see (44) and (45)— whereas gapping behaves more or less parallel to the German short answer pattern — see (46) and (47).

- (44) Mit wem hast du gesprochen? / Who did you talk to?
  - a. Mit meinem Nachbarn. / ?To my neighbor.
  - b. ?Meinem Nachbarn. / My neighbor.
  
- (45) Über was habt ihr gesprochen? / What did you talk about?
  - a. Über Ethik in den Wissenschaften. / ??About ethics in science.
  - b. ?Ethik in den Wissenschaften. / Ethics in science.
  
- (46) The men talked about the Red Sox, and
  - a. the women about ethics in science.
  - b. ?the women ethics in science.
  
- (47) Bill talked to John's mother, and
  - a. Mary to Janet's mother.
  - b. ?Mary Janet's mother.

This seems completely unexpected under the present approach. To account for this observation, we could stipulate that prepositions in English behave differently on different levels of analysis: if their complement is subject to some overt or covert movement operation, they are left behind; however, on a more pragmatic level —i.e., when an implicit *wh*-question needs to be reconstructed within discourse grammar— they behave quite similarly to their German counterparts. At present, however, I know of no convincing independent justification for such an assumption.

## 6 Summary

In this paper, I have argued for and developed a uniform analysis of short answers and gapping, the basic idea being that both short answers and gapped sentences should be taken as 'answering' the most salient 'question under discussion' (QUD). This QUD is either explicitly given —in the case of short answers— or it needs to be reconstructed on the basis of the focus/background structure of the first conjunct. Two variants of this analysis have been presented, one within Rooth's alternative semantics, and one within Schwarzschild's theory on F-marking and accent

placement. The last part of the paper presented some challenges to a uniform approach and outlined some interesting implications concerning the role of implicit QUDs in discourse.

## References

- Büring, D. 2003. "On D-Trees, Beans, and B-Accents". *Linguistics and Philosophy*: 26, 511-545.
- Drubig, H. B. 1994. *Island Constraints and the Syntactic Nature of Focus and Association with Focus*. Arbeitspapiere des SFB 340, Nr. 51. Stuttgart/Tübingen.
- Hankamer, J. 1979. *Deletion in Coordinate Structures*. New York: Garland Publishing.
- Hartmann, K. 2002. *Right Node Raising and Gapping: Interface Conditions on Prosodic Deletion*. Philadelphia/Amsterdam: John Benjamins.
- Johnson, K. 1996. *In Search of the Middle Field*. Ms., University of Massachusetts, Amherst.
- Krifka, M. 2001. "For a Structured Account of Questions and Answers". In *Audiatu Vox Sapientiae: A Festschrift for Arnim von Stechow*, C. Féry and W. Sternefeld (eds.), 287-319. Berlin: Akademie Verlag.
- Merchant, J. 2001. *Shuicing, Islands, and the Theory of Ellipsis*. Oxford: Oxford University Press.
- Merchant, J. 2004. "Fragments and Ellipsis". *Linguistics and Philosophy*: 27, 661-738.
- Neijt, A. 1979. *Gapping*. Dordrecht: Foris.
- Reich, I. 2002a. "Pied Piping and the Syntax and Semantics of Complex *wh*-Phrases". In *Georgetown University Working Papers in Theoretical Linguistics, Volume 2 (2002)*, S. Mauck and J. Mittelstaedt (eds.), 263-286. Georgetown University.
- Reich, I. 2002b. "Question/Answer Congruence and the Semantics of *wh*-Phrases". *Theoretical Linguistics*: 28, 73-94.
- Reich, I. 2003. *Frage, Antwort und Fokus*. Berlin: Akademie Verlag.
- Roberts, C. 1996. "Information Structure in Discourse: Towards an Integrated Formal Theory of Pragmatics". In *Ohio State University Working Papers in Linguistics, Volume 49*, J. Hak Yoon and A. Kathol (eds.), Ohio State University.
- Rooth, M. 1992a. "A Theory of Focus Interpretation". *Natural Language Semantics*: 1, 75-116.
- Rooth, M. 1992b. "Ellipsis Redundancy and Reduction Redundancy". In *Ellipsis Redundancy and Reduction Redundancy*, S. Berman and A. Hestvik (eds.), volume 29 of *Arbeitspapiere des Sonderforschungsbereichs 340*, Tübingen/Stuttgart.
- Schwarzschild, R. 1999. "GIVENness, AVOIDF and Other Constraints on the Placement of Accent". *Natural Language Semantics*: 7, 141-177.
- Steedman, M. 1990. "Gapping as Constituent Coordination". *Linguistics and Philosophy*: 13, 207-263.
- Winkler, S. 2003. *Ellipsis at the Interfaces: An Information Structural Investigation of Sentence-Bound and Discourse-Bound Ellipsis in English*. Habilitationsschrift, Universität Tübingen.

## Endnotes

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